Specifications

Issued for Tender

Volume 1 – Division 1, Structural and Architectural

Government of Canada Building

Bay d'Espoir, NL

PROJECT NO. 1005744

DISCIPLINE	DATE	STAMP
Architectural Specifications:	26 Sept 2018	
Mechanical Specifications:	26 Sept 2018	
Electrical Specifications:	26 Sept 2018	

END OF SECTION

General Requirements Subgroup
Volume 01 of 02

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 - GENERAL REQUIREMENTS

Facility Construction Subgroup
Volume 01 of 02

DIVISION 02 - EXISTING CONDITIONS

DIVISION 03 - CONCRETE

DIVISION 04 - MASONRY

DIVISION 05 - METALS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

DIVISION 08 - OPENINGS

DIVISION 09 - FINISHES

DIVISION 27 - COMMUNICATIONS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

DIVISION 31 - EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

Volume 02 of 02

APPENDICES

END OF SECTION

ARCHITECTURAL

A001 CODE PLAN AND MATRIX
A100 ARCHITECTURAL PROJECT NOTES AND LEGENDS
A101 ARCHITECTURAL PROJECT NOTES AND LEGENDS
A102 ARCHITECTURAL PROJECT NOTES AND LEGENDS
A200 ARCHITECTURAL SITE PLAN
A201 EXISTING/DEMOLITION PLAN
A202a GENERAL FLOOR PLAN
A202b MILLWORK EQUIPMENT PLAN
A202c REFLECTED CEILING PLAN
A203 OUTBUILDING PLANS, ELEVATION AND DETAILS
A401 EXTERIOR ELEVATIONS
A501 BUILDING SECTIONS
A701 WALL SECTIONS
A702 EXTERIOR WINDOW DETAILS
A703 INTERIOR DETAILS
A801 INTERIOR ELEVATIONS AND SECTIONS
A802 INTERIOR ELEVATIONS AND SECTIONS

MECHANICAL

M001 LEGEND AND DRAWING LIST
M101 DRAINAGE AND FIRE PROTECTION PLAN
M102 WET SERVICES PLAN
M103 HVAC PLAN
M501 DETAILS
M502 DETAILS
M701 SCHEDULES
M801 CONTROLS

ELECTRICAL

E100 ELECTRICAL LEGEND
E101 ELECTRICAL SITE PLAN
E301 LIGHTING, POWER AND MISC SYSTEMS DEMOLITION FLOOR PLAN AND RISER
E302 LIGHTING AND FIRE ALARMS SYSTEMS FLOOR PLAN
E303 POWER AND MISC. SYSTEMS FLOOR PLAN
E304 SECURITY SYSTEMS FLOOR PLAN
E305 FLOOR PLANS OUT BUILDING
E401 PARTIAL FLOOR PLANS
E501 ELECTRICAL RISER DIAGRAM
E502 ELECTRICAL DETAILS
E503 ELECTRICAL DETAILS
E601 MISC. RISER DIAGRAM
E602 MISC. RISER DIAGRAM
E603 DETAIL AND SCHEMATIC
E604 DOOR HARDWARE RISER DIAGRAMS
E605 ELECTRICAL SCHEMATICS
E701 LIGHTING AND HEATING FIXTURE SCHEDULE
E702 MECHANICAL EQUIPMENT SCHEDULE
E703 PANEL SCHEDULES

END OF SECTION

1.1 DESCRIPTION OF WORK

.1 The Work of the Project is defined by the Contract Documents and generally involves the reconstruction of the interior of the administrative section after damage by fire. Building envelope improvements, window and door replacement, new insulation and some cladding. It also includes some more minor changes to the building including electrical and mechanical upgrades, a new remote storage building, replacement of some concrete walkways and asphalt and landscape reinstatement from the construction works.

.2 Type of Contract

.1 Project will be constructed under a single lump sum contract.

1.2 PROJECT INFORMATION

.1 Project Identification: Government of Canada Building

.1 Project Location: Bay d'Espoir, NL.

1.3 FAMILIARIZATION WITH SITE

.1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

.2 Obtain prior permission from the Departmental Representative before carrying out such.

.3 A non-mandatory site visit will be held during the tender period and will be identified on the tender notice.

1.4 CODES AND STANDARDS

.1 Perform work in accordance with the National Building Code of Canada 2015 (NBC), National Fire Code of Canada 2015 (NFC), National Plumbing Code of Canada 2015 (NPC), Canadian Electrical Code 2015 (CEC), and any other code of federal, provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.

.2 Perform work in accordance with the latest editions of all codes and standards.

.3 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.5 INTERPRETATION OF DOCUMENTS

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.6 SETTING OUT WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.2 Provide devices needed to lay out and construct work.

.3 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.

.4 Supply stakes and other survey markers required for laying out work.

1.7 COST BREAKDOWN

.1 Before submitting first progress claim submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating contract amount. Required forms will be provided for application of progress payment.

.2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.

.3 Upon approval, cost breakdown will be used as basis for progress payment.

.4 Provide cash flow projection with cost breakdown. Update and submit cash flow projection on monthly basis with progress invoice and updated schedule.

1.8 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each of the following:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda and amendments.
.4 Reviewed Shop Drawings.
.5 List of outstanding shop drawings.
.6 Change Orders.
.7 Other modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and other safety related documents.
.11 Other documents as stipulated elsewhere in the Contract Documents.

1.9 PERMITS

.1 In accordance with the General Conditions, obtain and pay for building permit, certificates, licenses and other permits as required by municipal, provincial and federal authorities.

.2 Provide appropriate notifications of project to municipal and provincial inspection authorities.

.3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.

.4 Promptly submit to Departmental Representative, copy of application forms and approval documents received from above referenced authorities. Submit in orderly sequence and in accordance with Section 01 33 00 – Submittal Procedures, to not cause delay in work. Do not proceed with work affected by submittals until review is complete.

.1 Immediately after award of Contract, submit Workers' Compensation Board status.
.2 Submit transcription of insurance immediately after award of Contract.

1.10 LIMITED OCCUPANCY

.1 Government of Canada reserves the right to place furniture and equipment in completed portions of the Work provided such occupancy does not interfere with completion of the

Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1.11 ACCESS TO SITE

.1 General: Contractor shall have full use of Project site for construction operations during construction period. Government of Canada reserves the right to perform work or to retain other contractors on portions of Project.

.2 Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.12 ROUGHING-IN

.1 Be responsible for obtaining reviewed shop drawings, manufacturer's literature and for correct roughing-in and hook-up of equipment, fixtures and appliances.

1.13 CUTTING, FITTING AND PATCHING

.1 Ensure that cutting and patching required by all trades is included in total bid amount submitted for the work.

.2 Execute cutting including excavation, fitting and patching required to make work fit properly.

.3 Do not cut, bore, or sleeve load-bearing members, except where specifically approved by Departmental Representative.

.4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

.5 Fit work airtight to pipes, sleeves ducts and conduits.

1.14 CONCEALMENT

.1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.15 LOCATION OF FIXTURES

.1 Location of equipment, fixtures and outlets, shown or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.16 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.3 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.4 Record locations of maintained, re-routed and abandoned service lines.

.5 Construct barriers in accordance with Section 01 51 00 - Temporary Facilities and Controls

1.17 BILINGUAL NOTATIONS

.1 Any items supplied and installed under this contract which have operating instructions on them such as door hardware, washroom accessories, push button activation controls powered hand dryers, mechanical equipment such as water coolers, etc., and which can be expected to be used by the public and building tenants, must have such operating instructions in bilingual format - English and French.

.2 Factory embossed or recessed symbols illustrating equipment operation is an acceptable alternate to lettering.

.3 Items supplied with factory - embossed or recessed lettering in one official language with an applied sticker or decal representing the second official language is not acceptable unless the Departmental Representative gives prior approval before any such items are ordered.

.4 Internationally recognized colour coding such as red and blue center pieces for plumbing brass is acceptable.

.5 No extra costs will be paid for re-stocking or re-ordering of materials and equipment due to Contractor's failure to fully meet bilingual signage requirements specified herein.

.6 Ensure that all trades are made aware of above requirements.

1.18 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

END OF SECTION

PART 1 GENERAL

1.1 SUBMITTALS

.1 Upon award of contract and prior to commencement of work, submit to Departmental Representative the following work management documents:

- .1 Work Schedule as specified herein.
- .2 Shop Drawing Submittal Schedule
- .3 Waste Management Plan.
- .4 Health and Safety Plan.
- .5 Project and Site Hazard Assessment
- .6 Hot Work Procedures.
- .7 Lockout Procedures.
- .8 Dust Control Plan.
- .9 List of workers requiring security clearance and those to be placed on Site Security Control list.
- .10 Designated Security Coordinator Contact Information.

1.2 WORK SCHEDULE

.1 Upon acceptance of bid submit:

- .1 Detailed work schedule submitted within 7 calendar days.

.2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.

.3 Provide sufficient details in detailed schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

.4 Detailed work schedule content to include as a minimum the following:

- .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
- .2 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
- .3 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.

.5 Schedule work in cooperation with the Departmental Representative. Incorporate within Detailed Work Schedule, items identified by Departmental Representative during review of preliminary schedule.

.6 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.

.7 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.

.8 Schedule Updates:

.1 Submit on a monthly basis with monthly progress claim.

.2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.

.3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.

.9 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.

.10 In every instance, change or deviation from the Work Schedule, no matter how minimal, will be subject to prior review and approval by the Departmental Representative.

1.3 WORK COORDINATION

.1 Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.

.1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.

.2 Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.

.1 Provide each trade with the plans and specs of the interfacing trade, as required, to assist them in planning and carrying out their respective work.

.3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.

.4 Work Cooperation:

.1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.

.2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.

.5 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the Work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the Contractor to be resolved at own cost.

1.4 INTERFERENCE DRAWINGS (ALSO REFERRED TO AS COORDINATION DRAWINGS)

.1 Prepare interference drawings for all areas; consisting of plans, sections, and details.

.1 Plans and sections shall be minimum 1:50 scale and shall indicate all components in one view. Separate drawings for each trade is not acceptable.

.2 Details to be of scale necessary.

.2 Coordinate drawings with all trades. Have mechanical, electrical, and applicable trade contractors review and approve drawings.

.3 Make required changes in layouts, at no increase in Contract Price, to ensure ceiling heights, as noted on drawings, are maintained.

.4 Do not start installation until interference drawings have been reviewed and approved by applicable trade contractors.

.5 Update drawings as required with information generated by Interference Meetings and to accommodate shop drawings.

.6 Interference drawings shall, as a minimum:

.1 Show mechanical and electrical services:

.1 Ductwork.

.2 Major pipe runs including heating and cooling, plumbing, and sprinkler.

.3 Electrical conduit, cable trays, and recessed light fixtures.

.4 Ductwork, large piping, cabletrays, and similar services to be drawn to scale.

.5 Equipment to be shown to scale using products being provided.

.6 Identify locations of access panels and doors on equipment.

.2 Show ceiling mounted equipment and accessories.

.3 Provide sectional details through ceilings.

.1 Allow for solid and open structural steel members, hangers and support systems for all above ceiling services, bracing required for walls, thicknesses of ceiling components, and clearances required for installation and maintenance of ceilings and services above ceiling.

.2 Arrangement of services within ceiling spaces shall provide an efficient and orderly construction sequence and shall maintain required ceiling heights.

.4 Ensure areas requiring installation of firestopping or acoustic sealant are accessible for installation of firestopping or acoustic sealant. Note areas, such as top of walls and around structural members, where firestopping or acoustic sealant is required to be applied before installation of mechanical and electrical services.

.5 Ensure access space is provided around equipment for maintenance, servicing, and daily use of components.

END OF SECTION

1.1 GENERAL

.1 The Departmental Representative will supply certain material and equipment in the Contract for installation and incorporation into the Work by the Contractor.

1.2 MATERIAL SUPPLIED

.1 Departmental Representative will supply the following materials to the Contract:

.1 Kitchen Appliances.

.2 Exercise Equipment.

1.3 DELIVERY REQUIREMENTS

.1 Materials supplied by the Departmental Representative will be turned over to the Contractor.

.2 Within 3 calendar days of receipt of material supplied by Departmental Representative, the Contractor must:

.1 Conduct a complete audit to verify that all materials have been received, including loose parts and accessories associated with a particular item;

.2 Acknowledge receipt, identify any missing or damaged items, in writing;

.3 Provide copy of delivery slips submitted by manufacturer and shipping company.

.3 Unless shortages of material or damaged items are identified in writing to the Departmental Representative within the above specified period, the Contractor will become responsible to supply all missing materials and repair or replace damaged items and missing parts discovered thereafter at own expense.

.4 Failure to make a complete check of supplied materials or to acknowledge receipt of same shall not relieve Contractor's responsibility to replace or repair any item subsequently found to be missing or damaged.

.5 Departmental Representative will make final determination as to whether an item can be repaired or must be replaced.

.6 In the event of failure on the part of the Contractor to submit written proof within the specified verification period, Departmental Representative reserves the right to:

.1 Proceed with the supply or repair of missing items through independent sources and;

.2 Charge costs of such items, including related shipping charges, to the General Contractor through financial holdback assessments against the Contract.

1.4 CONTRACTOR'S DUTIES

.1 Pick-up the supplied material, at location indicated.

.2 Promptly inspect delivered material. Report missing, damaged or defective items in writing to Departmental Representative in accordance with delivery requirements specified above.

.3 Obtain and pay costs to load and transport to site.

.4 Unload and handle at site, including lifting, uncrating etc.

.5 Store material on site at a location approved by Departmental Representative. Protect against inclement weather and site damage by use of appropriate covers.

.6 Make all arrangements and pay associated costs to provide temporary storage from date of receipt and until ready for incorporation into the work.

.1 Type and location of storage to meet with Departmental Representative's approval.

.7 Be responsible for the protection of such material against damage, loss, theft and fire from date of receipt, during [transportation], loading, unloading, temporary storage and until final installation of work is accepted by the Departmental Representative.

.8 Any damage or loss of such material shall result in the Contractor being responsible for replacement or repair of equipment at no additional cost to the Contract.

.9 The decision as to whether damaged items may be repaired or must be replaced with new equipment shall be the Departmental Representative's decision.

.10 Install such material and equipment and incorporate into the work. Perform assembly and make all connections as required to make item functional.

.11 Dispose of containers, crating and protective covering off site.

END OF SECTION

PART 1 GENERAL

1.1 PRECONSTRUCTION MEETING

.1 Within 7 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 14 10 - Scheduling and Management of Work

.3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 51 00 - Temporary Facilities and Controls.

.5 Delivery schedule of specified equipment.

.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.7 Departmental Representative provided products.

.8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.10 Take-over procedures, acceptance, warranties in accordance with Section 01 77 00 – Closeout Procedures and 01 78 00 - Closeout Submittals.

.11 Monthly progress claims, administrative procedures, photographs, hold backs.

.12 Appointment of inspection and testing agencies or firms.

.13 Insurances, transcript of policies.

1.2 PROGRESS MEETINGS

.1 Contractor will schedule project meetings, on a minimum bi-weekly basis, for entire duration of work and more often when directed by Departmental Representative as deemed necessary due to progress of work or particular situation.

.2 Contractor and Departmental Representative are to be in attendance. Major Subcontractors involved in Work will be requested to attend on an as needed basis.

.3 Provide physical space and make arrangements for meetings.

.4 Preside at meetings.

.5 Record the meeting minutes and circulate to attending parties and affected parties not in attendance within 5 days after meeting. Include significant proceedings and decisions. Identify actions by parties.

.1 Make revisions as directed by Departmental Representative.

.6 Notify parties minimum 5 days prior to meetings.

.7 Department Representative will provide format of progress meeting agendas at Preconstruction Meeting that will include, but is not limited to the following:

.1 Health and Safety
.2 Review, approval of minutes of previous meeting.
.3 Review of Work progress since previous meeting.
.4 Field observations, problems, conflicts.
.5 Problems which impede construction schedule.
.6 Review of off-site fabrication delivery schedules.
.7 Corrective measures and procedures to regain projected schedule.
.8 Revision to construction schedule.
.9 Progress schedule, during succeeding work period.
.10 Review submittal schedules: expedite as required.
.11 Maintenance of quality standards.
.12 Review proposed changes for effect on construction schedule and on completion date.
.13 Review logs for RFI's, Shop Drawings, CCO's, CO's and SI's.
.14 Other business.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

.2 Types of items you will not find described in this Section:

.1 Requirements for submitting applications for payment and the schedule of values.

.2 Requirements for submitting schedules and reports, including contractor's construction schedule.

.3 Requirements for submitting operation and maintenance manuals.

.4 Requirements for submitting record drawings, record specifications, and record product data.

1.2 DEFINITIONS

.1 Action Submittals: Written and graphic information and physical samples that require Departmental Representative's responsive action. Action submittals are those submittals indicated in individual Specification Sections as *action submittals.*

.2 Informational Submittals: Written and graphic information and physical samples that do not require Departmental Representative's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as *informational submittals.*

.3 Portable Document Format (PDF): a digital file format licensed by Adobe and other software developers and used to display and print information in a consistent format regardless of computer operating system, monitor, or printer.

.4 Days: Days of the week, excluding Saturday, Sunday, and any statutory holidays.

1.3 ACTION SUBMITTALS

.1 Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Departmental Representative and additional time for handling and reviewing submittals required by those corrections.

.1 All shop drawings to be submitted within 90 days of contract award.

.2 Coordinate submittal schedule with list of subcontracts, and Contractor's construction schedule.

.3 Submit Submittal Schedule concurrently with the first complete submittal of Contractor's construction schedule.

.4 Format: Arrange the following information in a tabular format:

.1 Scheduled date for first submittal.

.2 Specification Section number and title.

.3 Submittal category: Action; informational.

.4 Name of subcontractor.

.5 Description of the Work covered.

.6 Scheduled date for Departmental Representative's final release.

.7 Scheduled date of fabrication.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

.1 Digital Data Files: Electronic CAD files of the Contract Drawings are available upon request from the Departmental Representative for the Contractor's use in preparing submittals.

.1 Available files:

.1 Floor plans.

.2 Reflected ceiling plans.

.2 Departmental Representative makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

.3 Digital Format: Files will be provided in the format generated by the drawing software used to produce the drawing.

.2 Coordination: Coordinate preparation and processing of submittals with the performance of the construction activities.

.1 Coordinate each submittal to accommodate time required for fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

.2 Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

.3 Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

.4 Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

.5 Departmental Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

.3 Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Departmental Representative's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

.1 Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Departmental Representative will advise Contractor when a submittal being processed must be delayed for coordination.

.2 Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

.3 Resubmittal Review: Allow 15 days for review of each resubmittal.

.4 Electronic Submittals: Place a permanent label or title block on each submittal item for identification.

.1 Indicate name of firm or entity that prepared each submittal on label or title block.

.2 Include the following information for processing and recording action taken:

.1 Project name.

.2 Date.

.3 Name of Contractor.

.4 Name of subcontractor.

.5 Name of supplier.

.6 Submittal number or other unique identifier, including revision identifier.

.1 Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

.7 Number and title of appropriate Specification Section.

.8 Drawing number and detail references, as appropriate.

.9 Location(s) where product is to be installed, as appropriate.

.10 Other necessary identification.

.5 Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Departmental Representative may discard submittals received from sources other than Contractor.

.1 Transmittal Form for Submittals: Provide locations on form for the following information:

.1 Project name.

.2 Date.

.3 Name of Contractor.

.4 Names of subcontractor, manufacturer, and supplier.

.5 Category and type of submittal: action or informational as indicated in the applicable Specification Section.

.6 Specification Section number and title.

.7 Specification paragraph number or drawing designation and generic name for each of multiple items.

.8 Drawing number and detail references, as appropriate.

.9 Indication of full or partial submittal.

.10 Transmittal number, if applicable

.11 Submittal and transmittal distribution record.

.12 Remarks.

.13 Signature of transmitter.

.6 Options: Identify options requiring selection by Departmental Representative.

.7 Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Departmental Representative on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

.8 Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

.1 Note date and content of previous submittal.

.2 Note date and content of revision in label or title block and clearly indicate extent of revision.

.3 Resubmit submittals until they are marked with approval notation from Departmental Representative's action stamp.

.9 Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.

.10 Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Departmental Representative's action stamp.

PART 2 PRODUCTS

2.1 SUBMITTAL PROCEDURES

.1 General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

.1 Action Submittals: Submit electronic copy of each submittal unless otherwise indicated.

.2 Informational Submittals: Submit electronic copy of each submittal unless otherwise indicated. Departmental Representative will not return copies.

.1 Return of Action Submittals: Departmental Representative will return a PDF of a reviewed Submittal via online Construction Contract Administration service. No paper copies will be returned.

.2 Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

.1 If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

.2 Mark each copy of each submittal to show which products and options are applicable.

.3 Include the following information, as applicable:

.1 Manufacturer's catalogue cuts.

.2 Manufacturer's product specifications.

.3 Standard colour charts.

.4 Statement of compliance with specified referenced standards.

.5 Testing by recognized testing agency.

.6 Application of testing agency labels and seals.

.7 Notation of coordination requirements.

.8 Availability and delivery time information.

.4 For equipment, include the following in addition to the above, as applicable:

.1 Wiring diagrams showing factory-installed wiring.

.2 Printed performance curves.

.3 Operational range diagrams.

.4 Clearances required to other construction, if not indicated on accompanying Shop Drawings.

.5 Submit Product Data before or concurrent with Samples.

.3 Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

.1 Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

.1 Identification of products.

.2 Schedules.

.3 Compliance with specified standards.

.4 Notation of coordination requirements.

.5 Notation of dimensions established by field measurement.

.6 Relationship and attachment to adjoining construction clearly indicated.

.7 Seal and signature of professional engineer if specified.

.2 Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets no larger than 11 x 17 in size.

.4 Samples: Submit Samples for review of kind, colour, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

.1 Transmit Samples that contain multiple, related components such as accessories together in one submittal package.

.2 Identification: Attach label on unexposed side of Samples that includes the following:

.1 Generic description of Sample.

.2 Product name and name of manufacturer.

.3 Sample source.

.4 Number and title of applicable Specification Section.

.5 Specification paragraph number and generic name of each item.

.3 Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

.1 Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

.2 Samples not incorporated into the Work, or otherwise designated as Canada's property, are the property of Contractor.

.4 Samples for Initial Selection: Submit manufacturer's colour charts consisting of units or sections of units showing the full range of colours, textures, and patterns available.

.1 Number of Samples: Submit one full set(s) of available choices where colour, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Departmental Representative will return submittal with options selected.

.5 Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of colour and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing colour, texture, and pattern; colour range sets; and components used for independent testing and inspection.

.1 Number of Samples: Submit two sets of Samples. Departmental Representative will retain one Sample set; remainder will be returned.

.2 Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

.3 If variation in colour, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least two sets of paired units that show approximate limits of variations.

.5 Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

.1 Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.

.2 Manufacturer and product name, and model number if applicable.

.3 Number and name of room or space.

.4 Location within room or space.

.6 Coordination Drawing Submittals: Comply with requirements specified in Section 01 14 10 - Scheduling and Management of Work.

.7 Contractor's Construction Schedule: Comply with requirements specified in Section 01 14 10 - Scheduling and Management of Work.

.8 Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section *Quality Requirements.*

.9 Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section *Closeout Procedures.*

.10 Maintenance Data: Comply with requirements specified in Section 01 78 00 – Closeout Submittals.

.11 Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of

Welding Procedure Specification and Procedure Qualification Record. Include names of firms and personnel certified.

.12 Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

.13 Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

.14 Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

.15 Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

.16 Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

.1 Name of evaluation organization.

.2 Date of evaluation.

.3 Time period when report is in effect.

.4 Product and manufacturers' names.

.5 Description of product.

.6 Test procedures and results.

.7 Limitations of use.

.17 Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

.18 Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

.19 Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

.20 Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

.21 Refrigeration license and environmental awareness certificate in accordance with Federal Halocarbon Regulations (FHR) 2003.

2.2 DELEGATED-DESIGN SERVICES

.1 Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

.1 Submittals shall bear the seal and signature of the Contractor's design professional licensed in the jurisdiction of the project.

.2 If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Departmental Representative.

PART 3 EXECUTION

3.1 CONTRACTOR'S REVIEW

.1 Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Departmental Representative.

.2 Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section *Closeout Procedures.*

.3 Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DEPARTMENTAL REPRESENTATIVE'S ACTION

.1 Action Submittals: Departmental Representative will review each submittal, make marks to indicate corrections or revisions required, and return it. Departmental Representative will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

.2 Informational Submittals: Departmental Representative will review each submittal and will not return it, or will return it if it does not comply with requirements.

.3 Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Departmental Representative.

.4 Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

.5 Submittals not required by the Contract Documents may be returned by the Departmental Representative without action.

3.3 CONTRACTOR'S ACTION

.1 Contractor to PDF all reviewed shop drawings and forward to commissioning agent.

END OF SECTION

1.1 SECTION INCLUDES

.1 Fire Safety Requirements.

.2 Hot Work Permit.

1.2 RELATED SECTIONS

.1 Section 01 35 29 - Health and Safety Requirements.

1.3 DEFINITIONS

.1 Hot Work defined as:

.1 Any work involving open flames or producing heat or sparks, including without being limited to cutting, welding, roof torching, soldering, brazing, grinding, adhesive bonding, thermal spraying, and thawing pipes.

1.4 SUBMITTALS

.1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.

.2 Submit in accordance with section 01 33 00.

1.5 FIRE SAFETY REQUIREMENTS

.1 Implement and follow fire safety measures during Work. Comply with following:

.1 National Fire Code (2015).

.2 Federal and Provincial Occupational Health and Safety Acts and Regulations.

.2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.6 HOT WORK AUTHORIZATION

.1 Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site.

.2 To obtain authorization submit to Departmental Representative:

.1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.

.2 Description of the type and frequency of Hot Work required.

.3 Sample Hot Work Permit to be used.

.3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:

.1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;

.2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.

.4 Requirement for individual authorization will be based on:

.1 Nature or phasing of work;

.2 Quantity of various trades needing to perform hot work on project or;

.3 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.

.5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

1.7 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Hot Work Procedures to include:

.1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 28.

.2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.

.3 Permit required for each Hot Work event.

.4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.

.5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.

.6 Site specific rules and procedures in force at the site as provided by the Departmental Representative.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.

.4 Procedures shall clearly establish responsibilities of:

.1 Worker performing hot work,

.2 Person issuing the Hot Work Permit,

.3 Fire Safety Watcher,

.4 Subcontractor(s) and Contractor.

.5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

1.8 HOT WORK PERMIT

.1 Hot Work Permit to include the following:

.1 Project name and project number;

.2 Building name and specific room or area where hot work will be performed;

.3 Date of issue;

.4 Description of hot work type needed;

.5 Special precautions to be followed, including type of fire extinguisher needed;

.6 Name and signature of permit issuer.

.7 Name of worker to which the permit is issued.

.8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.

.9 Worker's signature with time/date of hot work completion.

.10 Stipulated time period of safety watch.

.11 Fire Safety Watcher's signature with time/date.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.9 DOCUMENTS ON SITE

.1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.

.2 Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

END OF SECTION

1.1 SECTION INCLUDES

.1 Procedures to isolate and lockout electrical facility and other equipment from all energy sources.

1.2 RELATED SECTIONS

.1 Section 01 35 29 - Health and Safety Requirements

1.3 REFERENCES

.1 Comply with the following:

.1 CSA C22.1-12, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations.

.2 CAN/CSA-C22.3 No.1-06, Overhead Systems.

.3 CSA C22.3 No.7-06, Underground Systems.

.4 CAN/CSA-Z460-13, Control of Hazardous Energy

.5 CAN/CSA-Z462-15, Workplace Electrical Safety

.6 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

1.4 DEFINITIONS

.1 Electrical Facility: means any system, equipment, device, apparatus, wiring, conductor, assembly or part thereof that is used for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy, and that has an amperage and voltage that is dangerous to persons.

.2 Guarantee of Isolation: means a guarantee by a competent person in control or in charge that a particular facility or equipment has been isolated.

.3 De-energize: in the electrical sense, that a piece of equipment is isolated and grounded, e.g. if the equipment is not grounded, it cannot be considered de-energized (DEAD).

.4 Guarded: means that an equipment or facility is covered, shielded, fenced, enclosed, inaccessible by location, or otherwise protected in a manner that, to the extent that is reasonably practicable, will prevent or reduce danger to any person who might touch or go near such item.

.5 Isolate: means that an electrical facility, mechanical equipment or machinery is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making it dangerous.

.6 Live/alive: means that an electrical facility produces, contains, stores or is electrically connected to a source of alternating or direct current of an amperage and voltage that is dangerous or contains any hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous to persons.

1.5 COMPLIANCE REQUIREMENTS

.1 Comply with the following in regards to isolation and lockout of electrical facilities and equipment:

.1 Canadian Electrical Code.

.2 Federal and Provincial Occupational Health and Safety Acts and Regulations.

.3 Regulations and code of practise as applicable to mechanical equipment or other machinery being de-energized.

.4 Procedures specified herein.

.2 In event of conflict between any provisions of above authorities the most stringent provision will apply.

.1 Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on course of action to be followed.

1.6 SUBMITTALS

.1 Submit copy of lockout procedures, sample of lockout permit and lockout tags proposed for use in accordance with Section 01 33 00.

.2 Submit within 21 calendar days of acceptance of bid. Do not proceed with work until submittal reviewed by Departmental Representative.

.3 Resubmit Lockout Procedures with noted revisions as may result from Departmental Representative's review.

1.7 ISOLATION OF EXISTING SERVICES

.1 Obtain Departmental Representative's written authorization prior to working on existing live or active electrical facilities and equipment and before proceeding with isolation of such item.

.2 To obtain authorization, submit to Departmental Representative the following documentation:

.1 Written request to isolate the particular service or facility and;

.2 Copy of Contractor's Lockout Procedures.

.3 Make a Request for Isolation for each event, unless directed otherwise by Departmental Representative, as follows:

.1 Fill-out standard form in current use at the Facility as provided by Departmental Representative or;

.2 Where no form exist, make written request indicating:

.1 The equipment, system or service to be isolated and it's location;

.2 Duration of isolation period (ie: start time & date and completion time & date).

.3 Voltage of service feed to system or equipment being isolated.

.4 Name of person making the request.

.4 Do not proceed with isolation until receipt of written notification from Departmental Representative granting the Isolation Request and authorizating to proceed with the work.

.1 Note that Departmental Representative may designate another person at the Facility being authorized to grant the Isolation Request.

.5 Conduct safe, orderly shut down of equipment or facility. De-energize, isolate and lockout power and other sources of energy feeding the equipment or facility.

.6 Determine in advance, as much as possible, in cooperation with the Departmental Representative, the type and frequency of situations which will require isolation of existing services.

.7 Plan and schedule shut down of existing services in consultation with the Departmental Representative. Minimize impact and downtime of Facility operations. Follow Departmental Representative's directives in this regard.

.8 Conduct hazard assessment as part of the process in accordance with health and safety requirements specified Section 01 35 28.

1.8 LOCKOUTS

.1 De-energize, isolate and lockout electrical facility, mechanical equipment and machinery from all potential sources of energy prior to working on such items.

.2 Develop and implement clear and specific lockout procedures to be followed as part of the Work.

.3 Prepare typed written Lockout Procedures describing safe work practices, procedures, worker responsibilities and sequence of activities to be followed on site by workforce to safely isolate an active piece of equipment or electrical facility and effectively lockout and tagout it's sources of energy.

.4 Include as part of the Lockout Procedures a system of lockout permits managed by Contractor's Superintendent or other qualified person designated by him/her as being "in-charge" at the site.

.1 A lockout permit shall be issued to specific worker providing a Guarantee of Isolation before each event when work must be performed on a live equipment or electrical facility.

.2 Duties of person managing the permit system to include:

.1 Issuance of permits and lockout tags to workers.

.2 Determining permit duration.

.3 Maintaining record of permits and tags issued.

.4 Making a Request for Isolation to Departmental Representative when required as specified above.

.5 Designating a Safety Watcher, when one is required based on type of work.

.6 Ensuring equipment or facility has been properly isolated.

.7 Collecting and safekeeping lockout tags returned by workers as a record of the event.

.5 Clearly establish, describe and allocate responsibilities of:

.1 Workers.

.2 Person managing the lockout permit system.

.3 Safety Watcher.

.4 Subcontractor(s) and General Contractor.

.6 Generic procedures, if used, must be edited and supplemented with pertinent information to reflect specific project requirements.

.1 Incorporate site specific rules and procedures in force at site as provided by the Departmental Representative.

.2 Clearly label the document as being the Lockout procedures applicable to work of this contract.

.7 Use energy isolation lockout devices specifically designed and appropriate for type of facility or equipment being locked out.

.8 Use industry standard lockout tags.

.9 Provide appropriate safety grounding and guards as required.

1.9 CONFORMANCE

.1 Brief all workers and subcontractors on requirements of this section. Stringently enforce use and compliance.

1.10 DOCUMENTS ON SITE

.1 Post Lockout Procedures on site in common location for viewing by workers.

.2 Keep copies of Request for Isolation forms and lockout permits and tags issued to workers on site for full duration of Work.

.3 Upon request, make available to Departmental Representative or to authorized safety representative for inspection.

END OF SECTION

1.1 RELATED SECTIONS

.1 Section 01 35 24: Special Procedures on Fire Safety Requirements.

.2 Section 01 35 25: Special Procedures on Lockout Requirements.

1.2 REFERENCE STANDARDS

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of Newfoundland and Labrador

.1 Occupational Health and Safety Act, R.S.N. - Updated 2012.

1.3 DEFINITIONS

.1 COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

.2 Competent Person: means a person who is:

.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;

.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;

.3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

.4 PPE: personal protective equipment.

.5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit site-specific Health and Safety Plan prior to commencement of Work.

.1 Submit within 10 work days of notification of Bid Acceptance. Provide 3 copies.

.2 Departmental Representative will review Health and Safety Plan and provide comments.

.3 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.

.4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.

.5 Submit revisions and updates made to the Plan during the course of Work.

.3 Submit site specific health and safety hazard assessment.

.4 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.

.5 Submit building permit, compliance certificates and other permits obtained.

.6 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.

.1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

.7 Submit copies of reports or directions issued by Federal, Provincial, and Territorial health and safety inspectors within 24 hours of receipt.

.8 Submit copies of incident reports within 24 hours.

.9 Submit WHMIS MSDS - Material Safety Data Sheets.

.10 Personnel training records including but not limited to the following:

.1 Training & Qualifications of personnel and alternates responsible for site safety and health.

.2 Training requirements for hazards present on site.

.3 Training for use of personal protective equipment.

1.5 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act for Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations as well as any other regulations made pursuant to the Act.

.1 The Canada Labour Code can be viewed at: http://laws.justice.gc.ca/eng/acts/L-2/FullText.html

.2 Canadian Occupational Health and Safety Regulations can be viewed at: http://laws-lois.justice.gc.ca/eng/regulations/sor-86-304/

.3 Observe construction safety measures of:

.1 NBC latest edition, Division B, Part 8.

.2 Municipal by-laws and ordinances.

.4 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.

.5 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing with each progress claim.

.6 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.6 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.7 SITE CONTROL AND ACCESS

.1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.

.1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means.

.1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 50 00 for minimum acceptable requirements.

.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

.3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm.

1.8 PROTECTION

.1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.

.2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.9 FILING OF NOTICE

.1 Obtain and file Notice of Project with pertinent provincial health and safety authorities prior to beginning of Work.

.1 Departmental Representative will assist in locating address if needed.

1.10 PERMITS

.1 Post permits, licenses and compliance certificates, specified in section 01 10 10, at Work Site.

.2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.11 HAZARD ASSESSMENTS

.1 Perform site specific health and safety hazard assessment of the Work and its site.

.2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, [including when new trades and subcontractors arrive on site].

.3 Record results and address in Health and Safety Plan.

.4 Keep documentation on site for entire duration of the Work.

1.12 PROJECT/SITE CONDITIONS

.1 Following are potential health, environmental and safety hazards at the site for which Work may involve contact with:

.1 Existing hazardous and controlled products stored on site:

.1 No known products.

.2 Existing hazardous substances or contaminated building materials:

.1 No known substances or contaminates.

.3 Known latent site and environmental conditions:

.1 No known site and environmental conditions.

.4 Post fire demolition and remediation has already taken place. See Appendix A – Post-Fire Building Condition Assessment.

.2 Above items shall not be construed as being complete and inclusive of potential health and safety hazards encountered during Work.

.3 Include above items in the hazard assessment of the Work.

.4 MSDS Data sheets of pertinent hazardous and controlled products stored on site can be obtained from Departmental Representative.

1.13 MEETINGS

.1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:

.1 Superintendent of Work.

.2 Designated Health & Safety Site Representative.

.3 Subcontractors.

.2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.

.3 Keep documents on site.

1.14 HEALTH AND SAFETY PLAN

.1 .1 Prior to commencement of Work, develop written Health and Safety Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.

.2 Health and Safety Plan shall include the following components:

.1 List of health risks and safety hazards identified by hazard assessment.

.2 Control measures used to mitigate risks and hazards identified.

.3 On-site Contingency and Emergency Response Plan as specified below.

.4 On-site Communication Plan as specified below.

.5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.

.6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.

.3 On-site Contingency and Emergency Response Plan shall include:

.1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.

.2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire fighting equipment and other related data.

.3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.

.4 Emergency Contacts: name and telephone number of officials from:

.1 General Contractor and subcontractors.

.2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.

.3 Local emergency resource organizations.

.5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of PWGSC and Facility Management contacts.

.4 On-site Communication Plan:

.1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.

.2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

.5 Address all activities of the Work including those of subcontractors.

.6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.

.7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.

.8 Post copy of the Plan, and updates, prominently on Work Site.

1.15 SAFETY SUPERVISION AND INSPECTION

.1 Designate one person to be present on site at all times, responsible for supervising and safety of the Work.

.1 Person to be competent in Occupation Health and Construction Safety as defined in the Provincial Occupational Health and Safety Act.

.2 Assign responsibility, obligation, and authority to such designated person to stop work as deemed necessary for reasons of health and safety.

.3 Conduct regularly scheduled informal safety inspections of work site on a minimum weekly basis.

.1 Note deficiencies and remedial action taken in a log book or diary.

.4 Conduct formal inspections on a minimum bi-weekly basis

.1 Use standardized safety checklist forms.

.2 Prepare written report of each inspection. Document deficiencies, remedial action needed and assign responsibility for rectification to appropriate subcontractor or worker.

.3 Distribute reports to subcontractors for their pursuance.

.4 Follow-up and ensure appropriate action and corrective measures are taken.

.5 Keep inspection reports on site.

1.16 TRAINING

.1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.

.2 Carry out Work using qualified licensed workers or apprentices in accordance with Provincial Act respecting manpower vocational training and qualification.

.3 Permit employees registered in Provincial apprenticeship program to perform specific tasks only if under direct supervision of qualified licensed workers.

.4 Determine permitted activities and tasks by apprentices, based on level of training attended and demonstration of ability to perform specific duties.

.5 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

.6 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.17 MINIMUM SITE SAFETY RULES

.1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:

.1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.

.2 Immediately report unsafe condition at site, near-miss accident, injury and damage.

.3 Maintain site and storage areas in a tidy condition free of hazards causing injury.

.4 Obey warning signs and safety tags.

.2 Brief persons of disciplinary protocols to be taken for non compliance. Post rules on site.

1.18 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.19 INCIDENT REPORTING

.1 Investigate and report the following incidents to Departmental Representative:

.1 The Constructor shall immediately advise the Departmental Representative of any incident, accident, injury, near-miss, fire, explosion or chemical spill occurring at the work site, and submit copies of incident and accident reports within 24 hours after the event to the Departmental Representative.

.2 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.

.3 Medical aid injuries.

.4 Property damage in excess of $10,000.00.

.2 Submit report in writing.

1.20 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS-2015).

.2 Keep MSDS data sheets for all products delivered to site.

.1 Post on site.

.2 Submit copy to Departmental Representative.

.3 For interior work in an occupied Facility, post additional copy in one or more publically accessible locations.

1.21 POWDER ACTUATED DEVICES

.1 Use powder actuated fastening devices only after receipt of written permission from Departmental Representative.

1.22 CONFINED SPACES

.1 Abide by occupational health and safety regulations regarding work in confined spaces.

1.23 SITE RECORDS

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.24 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

.2 Post other documents as specified herein, including:

.1 Site specific Health and Safety Plan.

.2 WHMIS data sheets.

END OF SECTION

1.1 RELATED SECTIONS

.1 Waste Management and Disposal: Section 01 74 21.

1.2 REFERENCES

.1 Government of Newfoundland and Labrador – Department of Transportation and Works:

.1 Government of Newfoundland and Labrador – Department of Transportation and Works Highway Design Division – Highways Specification Book (Latest Edition) – Division 8 – General Environmental Requirements.

.2 Canadian Environmental Protection Act, 1999

.1 Federal Storage Tank Regulations, 2008.

.2 Federal Halocarbon Regulations, 2003.

1.3 DEFINITIONS

.1 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

.2 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.3 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.4 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 – Submittal Procedures.

.2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues that shall be addressed during construction.

.3 Address topics at level of detail commensurate with environmental issue and required construction tasks.

1.5 ENVIRONMENTAL PROTECTION PLAN

.1 Include in Environmental Protection Plan:

.1 Name of person responsible for ensuring adherence to Environmental Protection Plan.

.2 Name and qualifications of person responsible for training site personnel.

.3 Descriptions of environmental protection personnel training program.

.4 Submit a Sedimentation and Erosion Control Plan designed and approved by a professional engineer licensed in the province of Newfoundland and Labrador for approval by Departmental Representative before starting work at site. Plan shall identify type and location of erosion and sediment controls to be proved, including monitoring and reporting requirements to assure control measures are in compliance with Sedimentation and Erosion Control Plan, Federal, Provincial, and Municipal laws and regulations.

.5 Traffic control plans: include measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.

.6 Spill Control Plan: include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.7 Non-Hazardous solid waste disposal plan: identify methods and locations for solid waste disposal including clearing debris.

.8 Air pollution control plan: detail provisions to assure that dust, debris, materials, and trash, are contained on project site.

.9 Contaminant Prevention Plan: identify potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.10 Excavation and Dewatering Plan: designed and approved by a professional engineer licensed in the province of Newfoundland and Labrador.

.1 Waste Water Management Plan: identify methods and procedures for management and discharge of waste waters that are directly derived from construction activities.

.2 Excavation Plan: show proposed activity in each portion of work area and identify areas of limited use or non-use. Plan shall include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.

.11 Historical, archaeological, cultural resources, biological resources, and wetlands plan: define procedures for identifying and protecting historical, archaeological, cultural resources, biological resources, and wetlands.

.12 Identify plan for noise control and requirements of local authorities having jurisdiction.

1.6 ENVIRONMENTAL COORDINATION

.1 Employ and assign to Work, a competent and authorized Environmental Coordinator.

.2 Environmental Coordinator shall:

.1 Have successfully completed the Erosion and Sedimentation Control Course provided by Newfoundland and Labrador Environmental Industry Association (NEIA) or alternate. Submit a copy of Environmental Coordinator's Certificate to Departmental Representative before starting work on site.

.2 Be responsible for coordinating, implementing, enforcing, and monitoring compliance with the Environmental Protection Plan.

1.7 COMPLIANCE

.1 Perform work in accordance with mitigation measures identified within the most current version of the attached CEAA 2012 Environmental Effects Determination found in Appendix B.

1.8 HAZARDOUS MATERIAL HANDLING

.1 Store and handle hazardous materials in accordance with applicable federal and provincial laws, regulations, codes and guidelines. Store in location that will prevent spillage into the environment

.2 Label containers to WHMIS requirements and keep SDS data sheets on site for all hazardous materials.

.3 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when storage began.

.4 Store and handle flammable and combustible materials in accordance with National Fire Code.

.5 Transport hazardous materials in accordance with federal Transportation of Dangerous Goods Regulations and applicable Provincial regulations.

1.9 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site. Dispose in accordance with project waste management requirements specified in section 01 74 21.

.2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.

.3 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

1.10 PRECAUTIONARY MEASURES

.1 Prevent discharge of material into environment. Provide necessary procedures, materials, equipment, and labour for prevention of discharges.

.2 Report to Departmental Representative, spills on site of substances introduced to site by Contractor (eg. fuel, lubricants). Adhere to spill reporting and remedial requirements as outline in provincial and federal legislation.

.3 Take necessary measures to remedy effects of spills, whether of hazardous or non-hazardous substances, and to assume full financial liability for remedial measures required.

.4 Fires and burning of rubbish on site not permitted.

1.11 SEDIMENTATON AND EROSION CONTROL

.1 Provide Sedimentation and Erosion Control Plan that identifies type and location of sediment and erosion controls to be provided. Include monitoring and reporting requirements to assure that control measures are in compliance with Sedimentation and Erosion Control Plan, Federal, Provincial, and Municipal laws and regulations.

.1 Install and maintain erosion control measures as specified in the approved Sedimentation and Erosion Control Plan. Include:

.1 Site trailer location.
.2 Dust control.
.3 Silt fencing.
.4 Gravel or stone filter dam.
.5 Storm drain inlet protection (curb inlet and catch basin).
.6 Sediment trap.
.7 Coarse gravel or washed rock site access.
.8 Mulching.
.9 Geotextiles.
.10 Seeding and planting.
.11 Stabilization of construction entrance.

.2 Take additional measures to prevent erosion as required by site conditions, or as directed by the Newfoundland and Labrador Department of Environment, or authority having jurisdiction.

.3 Repair damage that occurs as a result of erosion.

.4 Prevent loss of soil during construction by storm water runoff and wind erosion, including protecting topsoil by stockpiling for reuse.

.5 Prevent sedimentation of storm sewer and receiving streams.

.2 Provide temporary drainage and pumping required to keep excavations and site free from water.

.3 Do not pump water contain suspended materials into waterways, sewer and drainage systems.

.4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements. Collect water samples in receiving water course to approval of Departmental Representative, and provide lab results of suspended material content.

.5 Halt construction activity on exposed soils during high intensity rainfall events.

.6 Minimize vegetation cover removal.

.7 Cover stockpiled soils with tarps.

.8 Take steps to prevent loss of topsoil due to disturbance and movement during site preparation and landscaping

.1 Store and cover topsoil separately and cover with tarp.
.2 Strip topsoil when dry enough to prevent contamination with subgrade material
.3 Do not handle topsoil in wet or frozen condition
.4 Replace excavated soils in the same order after completion of work
.5 Replant disturbed areas as soon as possible

.9 Replant disturbed areas as soon as possible.

.10 Protect exposed soils with coarse granular materials, mulches, or straw.

.11 Use interceptor ditches or berms up gradient of construction to divert overland flow around exposed soils.

.12 Line steep ditches with filter fabric, rock, or polyethylene lining to prevent channel erosion.

.13 Maintain erosion control measures and monitor daily until Substantial Performance of Completion.

.14 Leave site so that no environmental damage to watercourses and surrounding properties may occur after completion of contract.

1.12 SITE AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated, and in accordance with Departmental Representative requirements.

.2 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.3 Minimize stripping of topsoil and vegetation.

.4 Restrict tree removal to areas indicated or designated by Departmental Representative.

.5 Cut trees so that they fall inside cleared perimeters

.6 Operate machinery in such a way that it does not damage vegetation

.7 Do not cover retained vegetation with excavated materials

.8 Imported topsoil will be clean and weed free

.9 Replant disturbed areas as soon as possible

.10 Accumulated snow contaminated with salt should only be deposited at designated areas away from retained vegetation and drainage pathways

.11 Restrict salt use to traveled surfaces and minimize through pre-wetting of salt, calibration of spreaders, combined use with sand and qravel, early snow removal

1.13 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 At borrow sites, design and construct temporary crossings to minimize erosion to waterways in strict conformance with provincial and federal environmental regulations.

.5 Do not skid logs or construction materials across waterways.

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.7 Do not blast under water or 100 m of spawning beds.

.8 Do not refuel any type of equipment within 100 meters of a water body. Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

1.14 SPILL RESPONSE PLAN

.1 Prepare a site specific spill response/environmental emergency response plan, which includes but is not limited to the following:

.1 Ensure spill contingency equipment, rapid clean up kit and other measures in place before work begins

.2 Identify any vulnerable site features and implement associated protective measures required to eliminate or minimize risk of spills (i.e. limiting fueling activities to identified areas, etc.)

.3 Ensure all equipment is well maintained and free of leaks

.4 Immediately report/manage any leaks and spills in accordance with developed plans and applicable regulations.

.5 Do not conduct fueling activities where run-off could carry contaminants into drainage pathways or nearby waterways.

.6 Ensure adequate training of all on site personnel is site specific spill response measures and provide personal protective equipment required for clean-up.

.7 All storage tank work must be completed in accordance with the Federal Storage Tank Regulations, 2008 (Canadian Environmental Protection Act, 1999).

.8 All halocarbons and halocarbon-containing equipment on site must be managed in accordance with the Federal Halocarbon Regulations, 2003 (Canadian Environmental Protection Act, 1999).

1.15 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and around entire construction site.

.5 Cover dry materials with tarp.

.6 Report, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment to Federal and Provincial Department of the Environment.

.1 Notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

.7 Provide a buffer zone in combination with appropriate sedimentation and erosion control when working adjacent to watercourse. Consult with regulatory agencies as required.

.8 Provide and maintain clean gravel covered access/egress roads as required. Do not convey soils onto paved surfaces of existing streets. Immediately sweep clean soils displaced and deposited on existing asphalt streets.

.9 Minimize idling of engines at all times.

.10 Noise pollution:

.1 Confine work, where practical, to normal working hours

.2 Follow requirements of local governing authorities

1.16 PERMITS AND APPROVALS

.1 Obtain copies of permits and approvals issued by approval agencies. Review and comply with conditions contained in permits and approvals.

.2 Be responsible for obtaining permits and approvals that are required, but not obtained at time of bidding.

.3 Be responsible to obtain and pay for required permits.

.4 Ensure staff and subcontractors are aware of terms and conditions of permit and approval issues and ensure compliance.

.5 Traffic control is considered part of contractor's work.

1.17 EQUIPMENT MAINTENANCE

.1 Contain, handle and dispose of maintenance fluids in accordance with Newfoundland and Labrador Department of Environment regulations. Spillage on ground is prohibited. Report spills federal, provincial and municipal authorities.

.2 Ensure all equipment is properly tuned, in good operating condition and fitted with standard air emission control devices.

.3 Equip vehicles and equipment with suitable dry chemical fire extinguisher.

.4 If vehicles and equipment are fuelled at work site, undertake in location approved by the Province, and in accordance with regulatory requirements.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Project security requirements.

1.2 OVERVIEW

.1 Due to the nature of the work and client operations on the site, increased security regulations pertaining to the site operations will apply to all work carried out **AFTER Substantial Performance** of the contract is achieved and the building is occupied by Departmental Representative. These regulations include:

.1 Control and limit of movement of construction workers at the site.

.2 Escort and continuous supervision of workers by security personnel.

.3 Workers will require a RCMP security clearance process.

.4 Specific rules and regulations as specified in this section and as directed by the Departmental Representative to be stringently followed.

.2 It is the Contractor's responsibility to:

.1 Submit necessary documentation required and obtain security clearances for all workers;

.1 Contractor must submit security applications for all required individuals within two (2) months following contract award.

.2 Become familiar with and abide by security rules and regulations;

.3 Brief all workers and subcontractors in respect of the security regulations and ensure that they abide by all rules and directives.

.3 The Departmental Representative will coordinate a pre-construction meeting between Contractor and Security Personnel who will provide details and directives on control and movement on site.

.4 Any infraction of site security regulations on the part of the Contractor, members of work force or any Subcontractor in his employ, could result in:

.1 Financial penalties in the form of progress payment reduction or holdback assessments being levied against the Contractor and;

.2 Demand immediate removal of offending party from the site.

1.3 SECURITY PERSONEL

.1 Contractor will obtain and pay for the services of security personnel, employed by the Canadian Corps of Commissionaires to provide escort and security supervision of all workers during the work of this contract **AFTER Substantial Performance.**

.2 Commissionaires employed on this project must have a current Enhanced Security Clearance status issued by the RCMP.

.3 A minimum of one (1) Commissionaire to be on site at all times when work is carried out, having the following responsibilities:

.1 Limit movement of workers to within the boundaries established by the Departmental Representative;

.2 Maintain security control list of workers authorized to be on site as determined by Contractor and the Departmental Representative;

.3 Manage the distribution and control of workers;

.4 Escort workers who need to circulate on site beyond the established boundaries of work, including entry into and work inside existing building.

.5 Escort and supervise short term visitors who need access to the work site such as for material deliveries or to conduct inspections.

.4 Provide additional commissionaires when required to perform supervision or escort function as may be needed due to Contractor's work operations such that no worker is left unsupervised if work is required to take place inside restricted building(s) on site.

.5 Ensure Commissionaire(s) are present on site for entire work shift including work breaks and time period after work shifts until all workers have left site.

.6 Commissionaire must stay within the actual construction area and provide surveillance of all workers ensuring that security rules and requirements are obeyed and to limit movement beyond approved work areas of site.

.7 Commissionaire must also escort workers from approved entry locations and work area(s).

.8 Escort and supervision of workers by Commissionaire, when required by the Work, will be provided at all times when work of the Contract is being performed regardless of whether this is during regular business hours or beyond.

.9 Commissionaire shall report directly to the Departmental Representative and ensure that all workers obey site security directives.

.1 Empower Commissionaire with authority to remove any worker deemed non-compliant with security directives.

.10 Ensure Commissionaire(s) is/are fitted and wears approved safety hard hat, safety footwear and other personnel protective equipment appropriate to work in accordance with applicable Occupational Health and Safety requirements specified.

1.4 SECURITY CLEARANCE REQUIREMENTS

.1 All persons employed by Contractor or by subcontractors who will be working on site will be required to undergo the following check **AFTER Substantial Performance**:

.1 Personnel security clearance screening and obtain a clearance ranging from a Facility Access up to Reliability Status. This will vary depending on the Contractor involvement and access requirements during and after construction.

.2 Persons who do not have security clearance, as specified above, will not be permitted access to restricted area.

.1 Restricted area defined as: areas of site beyond designated Construction area and work yard, and where required areas within other existing building(s) on site.

.3 Departmental Representative will advise when worker security clearance has been received and whether escort and supervision is still needed for any worker.

.4 Escort and supervision functions specified herein is still required on the project after workers having obtained security clearance.

1.5 SECURITY CLEARANCE APPLICATION

.1 Within two months following notification of acceptance of bid, submit application form for all workers who require security clearance.

.1 Assign a Security Coordinator to monitor and handle application process.

.2 Make application for all workers as one submission to facilitate processing and minimize delays.

.2 To obtain RCMP Reliability clearance, the following information is required for each applicant:

.1 "Personnel Screening, Consent and Authorization Form" (Form No.TBS/SCT #330-23E (Rev. 2006/02) completed by each worker.

.2 Contractor Declaration to Public Services and Procurement Canada completed by Contractor attesting to having conducted an assessment of reliability for each worker applicant verifying employment and other reference data.

.3 Proof of applicant's identity consisting of a picture ID such as a Canadian Motor Vehicle Driver's License or other similar official ID card. Provide copy of front and back of Drivers License or Governmental ID.

.4 Proof of applicant's Canadian citizenship consisting of a provincial issued birth certificate, baptismal certificate, citizenship certificate or passport.

.5 Include both forms along with a clear legible photocopy of the citizenship and identity documents submitted as one complete package for each applicant.

.3 A sample of the above mentioned forms are available upon request.

.1 Information on filling out form TBS/SCT # 330-23E are as follows:

.1 Part A: by Departmental Representative Project Manager;

.2 Part B: by applicant. Provide full name, including middle name (not simply and initial). Ensure addresses listed represent last five

.3 (5) years of residence and each address is fully completed including postal code. Print data in clear, legible manner.

.4 Part C: only boxes 1, 2, 3 and 5 need to be completed, requiring applicant's initials.

.5 Fingerprinting may be required depending on level of security requirements and if previous criminal convictions exist.

.6 Departmental Representative will provide details as to what procedures, location and time where workers must go should fingerprinting be required.

.4 Processing Time:

.1 The Departmental processing time to obtain all security clearances is estimated to be 4 weeks from date of receipt of required documentation.

.2 To avoid delays, prepare worker documentation as soon as possible, however submit documentation for each applicant as one package and send information for entire workforce as one submission. Ensure forms are fully completed, signed and that all information and photo identification is clear and legible. Incomplete application will result in immediate rejection by Departmental Representative.

.3 Be aware that processing time for applicants requiring higher level security clearances and/or those with criminal convictions may take longer and could extend to 6 months' duration.

.1 An interview with such applicant may also be required as part of the security clearance process.

.5 The contractor and/or contractor security representative is to facilitate worker's security clearance process as follows:

.1 Prepare comprehensive list of workers who will require security clearance throughout project, including those of subcontractors.

.2 Provide copy of list to Departmental Representative.

.3 Coordinate and expedite submission of various subcontractors.

.4 Brief and assist applicants in preparing and submitting documentation.

.5 Review documentation of each applicant for completeness before submission.

.6 Have each worker keep a copy of their completed application form in case the initial submission gets lost.

.7 Submit documentation in an organized manner with transmittal letter clearly identifying project for which worker clearance is required and with which company the employee is affiliated.

.6 Send submission(s) directly to Departmental Representative or to the approved mailing address as directed by Departmental Representative.

.7 Persons who have not been successful in obtaining security clearance, upon documentation review by Departmental Representative, will not be allowed further access on site and cannot work on project any longer.

1.6 SECURITY PASSES

.1 All personnel, visitors or workers requiring access on site and/or inside the existing building(s) on site beyond the public lobby require a HRMIS number issued by Departmental Representative. It is the responsibility of the Contractor and all personnel, visitors and workers to know their HRMIS number.

1.7 SECURITY CONTROL LIST

.1 Provide a list of employee names from workforce and from subcontractors who will be present at site during the course of work.

.2 List to include each person's name, address, and telephone number.

.3 Submit copy of list to Departmental Representative and to Security Commissionaire for control of workers.

.4 Update list as work progresses.

.5 Ensure that each worker can provide proof of identity upon demand, when requested by Security Personnel or Departmental Representative.

1.8 BUILDING ACCESS

.1 Keys necessary for access to restricted areas may be issued at the discretion of the Departmental Representative. Follow all instructions regarding use, care and disposition of all keys so issued.

.2 Keys given to the Commissionaire for his/her sole possession, as determined by Departmental Representative, shall not under any circumstances be given or loaned to any worker or subcontractor.

.3 Do not, under any circumstances, make or allow workers to make duplicates of keys issued.

.4 At end of project, return to Departmental Representative all keys issued.

.5 Departmental Representative will deduct from final contract payment, $250.00 for each item not returned, regardless of the reason.

.6 Immediately report to Departmental Representative any lost, stolen or destroyed keys.

1.9 SITE SECURITY

.1 When work must be carried out during hours beyond the work hours previously agreed upon at start of work, provide notice within 48 hours beforehand to minimize impact on security and other operations on site.

END OF SECTION

PART 1 GENERAL

1.1 ABBREVIATIONS AND ACRONYMS

.1 The abbreviations and acronyms are commonly found in the Project Manual and represent the associated organizations or terms.

1.2 MATERIALS, EQUIPMENT AND METHODS

.1 A:

.1 AC: acoustic.
.2 AC PAN: acoustic panel.
.3 ACU: acoustic unit ceiling.
.4 AFF: above finished floor.
.5 AC PLAS: acoustic plaster.
.6 ACT: acoustic tile.
.7 ACR CU LVR: acrylic cube louvre.
.8 ADH: adhesive.
.9 ADJ: adjustable.
.10 A/C: air conditioner.
.11 AL: aluminum.
.12 AB: anchor bolt.
.13 ANOD: anodized.
.14 ARCH: architecture.
.15 ARCH BLK: architectural block.
.16 AVB: air vapour barrier.

.2 B:

.1 B: base.
.2 BEAST: benthic assessment of sediment.
.3 BH: bore hole.
.4 BL: bottom layer.
.5 BLK: block.
.6 BLKD: bulkhead.
.7 BM: beam.
.8 BOT: bottom.
.9 BMP: best management practice.
.10 B PL: base plate.
.11 BRG: bearing.
.12 BRK: brick.
.13 BSMT: basement.
.14 BTEX: benzene, toluene, ethylbenzene and xylenes.

.15 BUR: built-up roof.

.3 C:

.1 CAL: caliper.
.2 CANTIL: cantilever.
.3 CB: catch basin.
.4 CC: centre to centre.
.5 CCN: contemplated change notice.
.6 CDF: controlled density fill.
.7 CEC: Canadian Electrical Code (2015 edition).
.8 CF: chair fabric.
.9 CHAN: channel.
.10 CHS: Canadian hydrographic service.
.11 CJ: construction joint.
.12 CL: centreline.
.13 CK: cork.
.14 CLG: ceiling.
.15 CLR: clear.
.16 COL: column.
.17 CONC: concrete.
.18 CONC BLK: concrete block.
.19 CONC BRK: concrete brick.
.20 CONT: continuous.
.21 CONT J: control joint.
.22 COMPL: complete.
.23 CM: centimetre. (Nursery stock).
.24 CPL: cement plaster.
.25 CPM: critical path method.
.26 CPT: carpet.
.27 CPTT: carpet tile.
.28 CT: ceramic tile.
.29 CVT: conductive vinyl tile.
.30 C/W: complete with.

.4 D:

.1 D: deep.
.2 DD: dutch door.
.3 DEG: degree.
.4 DF: drinking fountain.
.5 DIA: diameter.
.6 DIM: dimension.
.7 DL: dead load.

.8 DMNT: demountable.
.9 DP: dampproofing.
.10 DR: door.
.11 DRP: drapery.
.12 DWL: dowel.

.5 E:

.1 EA: each.
.2 EC: epoxy coating.
.3 ECF: engineered containment facility.
.4 EE: each end.
.5 EF: each face.
.6 EL: elevation.
.7 ELEC: electric.
.8 ELEV: elevator.
.9 EM: expanded metal.
.10 ENCL: enclosure.
.11 EQ: equal.
.12 EXH: exhaust.
.13 EXIST: existing.
.14 EXPJ: expansion joint.
.15 EXP STRUCT: exposed structure.
.16 EXT: exterior.
.17 EW: each way.

.6 F:

.1 FC: fuel contributed.
.2 FD: floor drain.
.3 FDN: foundation.
.4 FEAT W: feature wall.
.5 FEXT: fire extinguisher.
.6 FH: fire hose.
.7 FHC: fire hose cabinet.
.8 FHR: fire hose rack.
.9 FIN: finish.
.10 FIP: federal identity program.
.11 FL: floor.
.12 FLD: field.
.13 FLUOR: fluorescent.
.14 FR: frame.
.15 FRR: fire resistance rating.
.16 FTG: footing.

.7 G:

.1 GALV: galvanized steel.
.2 GB: grab bar.
.3 GBD: gypsum board.
.4 GC: General Conditions.
.5 GF: ground floor.
.6 GFCI: ground fault circuit interrupter.
.7 GL: glass or glazing.
.8 GL BLK: glass block.
.9 GPC: gypsum plaster ceiling.
.10 GPW: gypsum plaster wall.
.11 GT: glass tile.

.8 H:

.1 HB: hose bib.
.2 HC: hollow core.
.3 HCWD: hollow core wood door.
.4 HD: hand dryer.
.5 HDW: hardware.
.6 HDWD: hardwood.
.7 HM: hollow metal.
.8 HOR: horizontal.
.9 HOR EF: horizontal each face.
.10 HP: hydro pole.
.11 HR: hour.
.12 HRV: heat recovery ventilator.
.13 HT: height.
.14 HTR: heater.
.15 HWT: hot water tank.
.16 HYD: hydrant.

.9 I:

.1 ICF: insulated concrete formwork.
.2 ID: inside diameter.
.3 INS: insulation.
.4 INTLK: interlock.

.10 J:

.1 JT: joint.

.11 K:

.1 KPL: kick plate.

.12 L:

.1 LAV: lavatory.
.2 LDG: landing.
.3 LG: long.
.4 LINO: linoleum.
.5 LL: live load.
.6 LT: light.

.13 M:

.1 MAS: masonry.
.2 MAS FL: masonry flashing.
.3 MAX: maximum.
.4 MBG: metal bar grating.
.5 MCL: metal cube louvre.
.6 MECH: mechanical.
.7 MET: metal.
.8 MET DK: metal deck.
.9 MET FL: metal flashing.
.10 MET GRID CLG: metal grid ceiling.
.11 MET GRTG: metal grating.
.12 MET LIN CLG: metal linear ceiling.
.13 MET T PTN: metal toilet partition.
.14 MH: maintenance hole.
.15 MIN: minimum.
.16 MLP: metal lath and plaster.
.17 MO: masonry opening.
.18 MR: marble.
.19 MT: metal threshold.
.20 MWP: membrane waterproofing.

.14 N:

.1 NBC: national building code (2015 edition).
.2 NF: near face.
.3 NFC: national fire code (2015 edition).
.4 NIC: not in contract.
.5 NO: number.
.6 NRC: noise reduction coefficient.
.7 NRP: non removable pin.
.8 NTS: not to scale.

.15 O:

.1 OC: on centre.
.2 OD: outside diameter.
.3 OPNG: opening.

.4 OPR: operator.
.5 OVHD: overhead.
.6 OWSJ: open web steel joist.

.16 P:

.1 P: prefinished.
.2 PAH: polynuclear aromatic hydrocarbons.
.3 PARG: parging.
.4 PCC: precast concrete.
.5 PCT: porcelain ceramic tile.
.6 PED ACS FLG: pedestal access flooring.
.7 PF: panel fabric.
.8 PL: plate.
.9 PLAM: plastic laminate.
.10 PLAS: plaster.
.11 PLYWD: plywood.
.12 PR: pair.
.13 PREFAB: prefabricated.
.14 PREFIN: prefinished.
.15 PRFL: profile.
.16 PT: paint.
.17 PTD: paper towel dispenser.
.18 PTN: partition.
.19 PVC: polyvinyl chloride.

.17 Q:

.1 QTB: quarry tile base.
.2 QTF: quarry tile floor.
.3 QTR: quarry tile roof.

.18 R:

.1 R: radius.
.2 RA: return air.
.3 RB: resilient base.
.4 RC: reinforced concrete.
.5 RCPT: receptacle.
.6 RD: roof drain.
.7 REINF: reinforced/reinforcing.
.8 REQD: required.
.9 REQT: requirement.
.10 RFT: rubber floor tile.
.11 RM: room.
.12 RO: rough opening.

.13 RP: radiant panel.
.14 RRS: recycled rubber sheet.
.15 RRT: recycled rubber tile.
.16 RSD: rolling steel door.
.17 RSF: rubber sheet flooring.
.18 RTU: roof top unit.
.19 RWL: rain water leader.

.19 S:

.1 SAN SEW: sanitary sewer.
.2 SCHED: schedule.
.3 SC: solid core.
.4 SCRN: screen.
.5 SCWD: solid core wood door.
.6 SD: smoke developed.
.7 SDT: static dissipative tile.
.8 SECT: section.
.9 SH: sill height.
.10 SIM: similar.
.11 SL: sliding.
.12 SLR: sealer.
.13 SPEC: specification.
.14 SS: stainless steel.
.15 STD: standard.
.16 STL: steel.
.17 STL BM: steel beam.
.18 STC: sound transmission class.
.19 STL FL DK: steel floor deck.
.20 STL PL: steel plate.
.21 STN: stone.
.22 STR: structure or structural.
.23 ST SEW: storm sewer.
.24 S&U: stain and urethane.
.25 S&V: stain and varnish.
.26 SVT: solid vinyl tile.

.20 T:

.1 T: top.
.2 T&B: top and bottom.
.3 TCB: turbidity control plan.
.4 TEL: telephone.
.5 TER: terrazzo.

.6 TERT: terrazzo tile.
.7 THKNS: thickness.
.8 THR: threshold.
.9 TMPD: tempered.
.10 TOPG: topping.
.11 TRANSV: transverse.
.12 TYP: typical.

.21 U:

.1 U: urethane.
.2 UCUT: undercut.
.3 UGRD: underground.
.4 UNO: unless noted otherwise.
.5 UOS: unless otherwise specified.
.6 U/S: underside.
.7 UR: urinal.

.22 V:

.1 VCF: vinyl coated fabric.
.2 VCT: vinyl composite tile.
.3 VERT: vertical.
.4 VERT B: vertical blinds.
.5 VERT EF: vertical each face.
.6 VSF: vinyl sheet flooring.
.7 VT: vinyl tile.
.8 VWC: vinyl wall covering.

.23 W:

.1 WC: water closet.
.2 W-C: wall connectors.
.3 WD: wood.
.4 WDV: wood veneer.
.5 WH: wall hydrant.
.6 WHMIS: workplace hazardous materials information system.
.7 WP: waterproofing.
.8 WR: washroom.
.9 WSIB: workplace safety and insurance board.
.10 WT: weight.
.11 WTP: water treatment plant.

1.3 STANDARDS ORGANIZATIONS

.1 Standards writing organizations:

.1 AA - Aluminum Association.

.2 ACPA - American Concrete Pipe Association.

.3 ANSI - American National Standards Institute.

.4 ASHRAE - American Society of Heating and Refrigerating and Air-Conditioning Engineers.

.5 ASTM - American Society for Testing and Materials.

.6 AWI/AWMAC - Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada.

.7 AWPA - American Wood Preservers' Association.

.8 AWWA - American Water Works Association.

.9 BHMA - Builders Hardware Manufacturers Association.

.10 CCMPA - Canadian Concrete Masonry Producers Association.

.11 CGSB - Canadian General Standards Board.

.12 CNTA - Canadian Nursery Trades Association.

.13 CPCA - Canadian Painting Contractors Association.

.14 CRCA - Canadian Roofing Contractors Association.

.15 CSA - Canadian Standards Association.

.16 CSC - Construction Specifications Canada.

.17 CSDMA - Canadian Steel Door Manufacturers Association.

.18 CSI - Construction Specifications Institute.

.19 CSSBI - Canadian Sheet Steel Building Institute.

.20 CRCA - Canadian Roofing Contractors Association.

.21 DHI - Door and Hardware Insitute.

.22 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.

.23 ESA - Electrical Safety Authority.

.24 FCC - Fire Commissioner of Canada.

.25 FSC - Forest Stewardship Council.

.26 GANA - Glass Association of North America.

.27 HMMA - Hollow Metal Manufacturers Association.

.28 IEEE - Institute of Electrical and Electronics Engineers Inc.

.29 ISO - International Organization for Standardization.

.30 IWFA - International Window Film Association.

.31 MPI - Master Painters Institute.

.32 NAAMM - National Association of Architectural Metal Manufacturers.

.33 NCPI - National Clay Pipe Institute.

.34 NEMA - National Electrical Manufacturers Association.

.35 NFPA - National Fire Protection Association.

.36 PPI - Plastics Pipe Institute.

.37 SDI - Steel Door Intitute.

.38 SCAQMD - South Coast Air Quality Management District.

.39 TIA - Telecommunications Industry Association.

.40 TIAC - Thermal Insulation Association of Canada.

.41 TTMAC - Terrazzo Tile and Marble Association of Canada.

.42 UL - Underwriters Laboratories.

.43 ULC - Underwriters Laboratories of Canada.

.44 US EPA - United States Environmental Protection Agency.

.45 WH - Warnock Hersey.

1.4 FEDERAL GOVERNMENT DEPART-MENTS AND AGENGIES

.1 Departments, agencies and crown corporations.

.1 CEAA - Canadian Environmental Assessment Agency.

.2 CSC - Correctional Service Canada.

.3 CRA - Canada Revenue Agency.

.4 DFO - Department of Fisheries and Oceans

.5 DND - Department of National Defence.

.6 EC - Environment Canada.

.7 FHBRO - Federal Heritage Buildings Review Office.

.8 HC - Health Canada.

.9 HCD - Heritage Conservation Directorate.

.10 LC - Labour Canada.

.11 PC - Parks Canada.

.12 PSPC - Public Services and Procurement Canada

.13 RCMP - Royal Canadian Mounted Police.

.14 TBS - Treasury Board Secretariat.

.15 TC - Transport Canada.

1.5 UNITS OF MEASURE METRIC

.1 The following abbreviations of units of measure are commonly found in the Project Manual:

.1 C: Celsius.

.2 cm: centimetre.

.3 kg: kilogram.

.4 kg/mü: kilogram per cubic metre.

.5 kN: kilonewton.

.6 kPa: kilopascals.

.7 kw: kilowatts.

.8 l/s: litre per second.

.9 m: metre.

.10 mü: cubic metre.

.11 mg/kg: milligrams per kilogram.

.12 mg/L: milligrams per litre.

.13 mm: millimetres.

.14 MPa: megapascal.

.15 NTU: nephelometric turbidity unit.

.16 ppm: parts per million.

.17 ug/L: micrograms per litre.

.18 ug/mü: micrograms per cubic metre.

1.6 UNITS OF MEASURE IMPERIAL

.1 The following abbreviations of units of measure are commonly found in the Project Manual:

.1 F: Fahrenheit.

.2 ft: foot/feet.

.3 ga: guage.

.4 gpm: gallons per minute.

.5 in: inches.

.6 lbs: pounds.

.7 NTU: nephelometric turbidity unit.

.8 psi: pounds-force per square inch.

.9 ppm: parts per million.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

1.1 INSPECTION

.1 Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.

.2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

.3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.

.4 Pay costs to uncover and make good work disturbed by inspections and tests.

1.2 TESTING

.1 Tests on materials, equipment and building systems as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.

.1 Provide all necessary instruments, equipment and qualified personnel to perform tests.

.2 At completion of tests, turn over 2 sets of fully documented tests reports to the Departmental Representative. Submit in accordance with Section 01 33 00.

.1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00.

.3 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.

.4 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Departmental Representative may engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities:

.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

.2 Inspection and testing performed exclusively for Contractor's convenience.

.3 Testing, adjustment and balancing of mechanical and electrical equipment and other building systems.

.4 Performance verification tests before building commissioning procedures commences.

.5 Mill tests and certificates of compliance.

.6 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.

.7 Additional tests as deemed necessary by Department Representative.

.2 Provide sufficient advance notice to Departmental Representative of time when the Work will be ready for testing by designated Testing Agency in order for Departmental Representative to make attendance arrangements with such Agency. When directed by Departmental Representative notify the Agency directly.

.3 When specified or directed, submit Representative samples of materials, in required quantities, to Testing Agency for testing purposes. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.4 Provide labour and facilities to obtain, handle and deliver samples.

.5 Provide sufficient space on site for Testing Agency's exclusive use to store equipment and cure test samples.

.6 Employment of Independent Inspection and Testing Agencies by Departmental Representative does not relax responsibility to perform Work in accordance with Contract Documents.

1.4 ACCESS TO WORK

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Furnish labour and facility to provide access to the work being inspected and tested.

.3 Co-operate to facilitate such inspections and tests.

1.5 REJECTED WORK

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to new and existing construction and finishes resulting from removal or replacement of defective work.

1.6 MOCK-UPS

.1 Prepare mock-ups of certain work as specified in various sections of the Specifications. Include in each mock-up all related work components representative of final assembly.

.2 Construct in locations acceptable to Departmental Representative.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Departmental Representative will assist in preparing a schedule fixing dates for preparation.

.6 Dismantle and remove mock-up when directed by Departmental Representative, unless approval is given for mock-up to remain as part of the Work.

END OF SECTION

1.1 SITE ACCESS AND PARKING

.1 The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment and workers.

.2 Vehicular traffic and staging areas will be restricted to present-day roadways and disturbed areas.

1.2 CONTRACTOR'S SITE OFFICES

.1 Provide office heated to 22 ^{o}C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table, internet, fax machine, telephone, file cabinet and chair. Provide an accessible washroom within the contractor's site office.

.2 Site office meeting space to be of sufficient size to conduct all required site meetings.

.3 Provide a clearly marked and fully stocked first-aid case in a readily available location.

1.3 MATERIAL STORAGE

.1 Locate site storage trailers where directed by Departmental Representative. Place in location of least interference with construction operations.

1.4 SITE ENCLOSURES

.1 Provide temporary fence to enclose area of work site.

.2 Erect temporary site enclosure using new 1.2 m high snow fence wired to rolled steel "T" bar fence, posts spaced at 2.4 m on centre.

.1 Provide one truck gate and one pedestrian gate.

.2 Maintain fence in good repair.

.3 Make all gates lockable and provide keyed padlocks.

.3 Protect from damage by equipment and construction procedures

1.5 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.6 INTERIOR DUST CONTROL AND DUST BARRIERS

.1 Control creation and spread of dust and dirt to building interior and in particular to areas within premises that Government of Canada may place furniture or equipment.

.2 Develop and implement a dust control plan, addressing effective measures to carry out work with least amount of dust being created and propagated.

.1 Carefully evaluate the type of work to be undertaken and the physical layout of each work area on site.

.2 Provide specifically tailored strategy for each work area.

.3 Pre-determine location and placement of dust barriers to confine resulting dust to immediate work area.

.4 Inform Departmental Representative of the proposed dust control measures to be followed at each work area and for each major dust generating activities. Obtain Departmental Representative's approval before proceeding with work.

.3 Dust control plan to incorporate as a minimum the following dust protection and cleaning requirements:

.1 Erect dustproof partitions completely around work area to fully isolate construction from other parts of the building.

.2 Construct dust partitions as follows:

.1 Use 10 mm polyethylene installed and sealed tightly to abutting walls, ceilings and floor with continuous duct tape along all edges and seams. Support in position with 38 x 89 wood framing at 400 mm o.c. Locate seams only at framing members and overlap sheeting by minimum of 150 mm.

.3 Make all dust barriers airtight, effectively blocking and stopping all dust migration.

.4 Inspect dust barriers at various intervals during each work shift. Immediately fix tears, unsealed edges and maintain barriers effectively sealed for the entire work duration.

.5 Shut down existing ventilation system feeding construction space, or disconnect and seal-off supply and return air ducts to stop dust from contaminating other areas.

.6 Immediately clean areas in use by occupants contaminated by work.

.7 Vacuum carpets, wash floors and walls. Remove accumulated dust from all surfaces. Clean and remove smears, scuffs and marks.

.4 Meager attempts at controlling dust will not be tolerated. Failure to provide effective dust control during work and to perform satisfactory cleaning thereafter will result in Departmental Representative to proceed and obtain a separate cleaning service agency to perform cleaning to Departmental Representative's satisfaction with cost for such services being charged against this Contract in the form of financial holdbacks.

.5 Obtain Departmental Representative's approval before erecting any dust partitions simply to underside of finish ceiling.

.6 Construction of dust barriers, enclosures and placement of temporary protective devices to be performed prior to Government of Canada bringing furniture or equipment to building.

1.7 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Contractor's site office to have plumbed sanitary facilities to accommodate size of workforce. Holding tank is acceptable if municipal hook-up is not possible. No portable toilets are permitted on site.

.3 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 ENCLOSURE OF STRUCTURE

.1 Provide temporary weathertight enclosures and protection for exterior openings until permanently enclosed.

.2 Provide weathertight and heated enclosures to conduct exterior work during winter and other inclement weather conditions. Erect to allow accessibility for installation of materials and working inside of enclosure.

.3 Design enclosures to withstand wind pressure and snow loading.

1.9 POWER

.1 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.

.2 Supply and install all temporary facilities for power such as pole lines, meter socket, underground cables, etc. as required and to approval of local power supply authority.

.3 Provide and pay all costs to supply and install temporary cabling, panelboards, switching devices and other equipment as required to connect into power source, provide adequate ground fault protection and extend power supply from existing source to work areas. Perform work and make all connections in accordance with the CSA C22.1-12 Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations as specified in section 01 35 28 and to lockout requirements specified in section 01 35 25.

.4 Provide and maintain temporary lighting to conduct work. Ensure illumination level is not less than 162 lx in all locations.

1.10 WATER SUPPLY

.1 Arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

1.11 SCAFFOLDING

.1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CSA Z797-09, Code of Practice for Access Scaffold.

.2 Erect scaffolding independent of walls. Remove when no longer required.

1.12 HEATING AND VENTILATING

.1 Supply, install and pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.

.2 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of work.

.2 Protect work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.3 Maintain minimum temperature of 10 degrees C, or higher where specified, as soon as finishing work is commenced and maintain until acceptance of structure by Departmental Representative.

.1 Maintain ambient temperature and humidity levels as required for comfort of workers.

.4 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.5 Vent direct-fired combustion units to outside.

.6 Submit bid assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

1.13 CONSTRUCTION SIGN AND NOTICES

.1 Upon request by Departmental Representative, erect a self supporting project sign in location indicated.

.2 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.

.3 Contractor or subcontractor advertisement signboards are not permitted on site.

.4 Safety and Instruction Signs and Notices:

.1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN/CSA-Z321-96(R2006).

.5 Maintenance and Disposal of Site Signs:

.1 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.14 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Departmental Representative.

END OF SECTION

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within 7 days of written request by Departmental Representative, submit following information for any materials and products proposed for supply:

.1 Name and address of manufacturer.

.2 Trade name, model and catalogue number.

.3 Performance, descriptive and test data.

.4 Compliance to specified standards.

.5 Manufacturer's installation or application instructions.

.6 Evidence of arrangements to procure.

.7 Evidence of manufacturer delivery problems or unforseen delays.

.3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.

.4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.2 PRODUCT QUALITY

.1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.

.2 Final decision as to whether a product or system meets contract requirements rest solely with the Departmental Representative in accordance with the General Conditions of the Contract.

1.3 ACCEPTABLE MATERIALS AND ALTERNATIVES

.1 Approved Products: Some materials specified include trade names or trademarks or manufacturer's or supplier's name as part of the material description and are non-discretionary. No alternatives will be accepted for these products

.2 Substitutions: After contract award, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

1.4 MANUFACTURERS INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions, so that Departmental Representative will designate which document is to be followed.

1.5 AVAILABILITY

.1 Immediately notify Departmental Representative in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per clause 1.1.2 above.

1.6 WORKMANSHIP

.1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.

.2 Remove unsuitable or incompetent workers from site as stipulated in the General Conditions of the Contract.

.3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.

.4 Coordinate work between trades and subcontractors. See section 01 14 10 - Scheduling And Management Of Work in this regard.

.5 Coordinate placement of openings, sleeves and accessories.

1.7 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.

.2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable.

.3 Keep exposed fastenings to minimum, space evenly and lay out neatly.

.4 Fastenings which cause spalling or cracking of material to which anchorage is made, are not acceptable.

.5 Do not use explosive actuated fastening devices unless approved by Departmental Representative. See section on Health and Safety Requirements in this regard.

1.8 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and, use resilient washers with stainless steel.

1.9 STORAGE, HANDLING AND PROTECTION

.1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Immediately remove damaged or rejected materials from site.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

END OF SECTION

PART 1 GENERAL

1.1 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit written request in advance of cutting or alteration which affects:

.1 Structural integrity of elements of project.

.2 Integrity of weather-exposed or moisture-resistant elements.

.3 Efficiency, maintenance, or safety of operational elements.

.4 Visual qualities of sight-exposed elements.

.5 Work of Government of Canada or separate contractor.

.3 Include in request:

.1 Identification of project.

.2 Location and description of affected Work.

.3 Statement on necessity for cutting or alteration.

.4 Description of proposed Work, and products to be used.

.5 Alternatives to cutting and patching.

.6 Effect on Work of Government of Canada or separate contractor.

.7 Written permission of affected separate contractor.

.8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.3 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Remove samples of installed Work for testing.

.6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

.7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.10 Restore work with new products in accordance with requirements of Contract Documents.

.11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

.13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 This Section includes procedural requirements for cutting and patching.

.2 Related Sections include the following:

.1 Divisions 2 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

.2 Section 07 84 13 - Penetration Firestopping and Section 07 84 43 - Joint Firestopping and for patching fire-rated construction.

1.2 DEFINITIONS

.1 Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

.2 Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.3 QUALITY ASSURANCE

.1 Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

.2 Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operating elements include the following:

.1 Primary operational systems and equipment.

.2 Air or smoke barriers.

.3 Fire-suppression systems.

.4 Mechanical systems piping and ducts.

.5 Control systems.

.6 Communication systems.

.7 Conveying systems.

.8 Electrical wiring systems.

.3 Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:

.1 Water, moisture, or vapour barriers.

.2 Membranes and flashings.

.3 Exterior curtain-wall construction.

.4 Equipment supports.

.5 Piping, ductwork, vessels, and equipment.

.6 Noise- and vibration-control elements and systems.

.4 Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Departmental Representative's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

.5 Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.4 WARRANTY

.1 Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void warranties.

PART 2 PRODUCTS

2.1 MATERIALS

.1 General: Comply with requirements specified in other Sections.

.2 In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

.1 If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

.1 Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.

.2 Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Temporary Support: Provide temporary support of Work to be cut.

.2 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

.3 Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

.4 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.3 PERFORMANCE

.1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

.1 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

.2 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

.1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

.2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.

.3 Concrete and masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

.4 Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.

.5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.

.6 Proceed with patching after construction operations requiring cutting are complete.

.3 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

.1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

.2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

.1 Clean piping, conduit, and similar features before applying paint or other finishing materials.

.2 Restore damaged pipe covering to its original condition.

.3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Re-

move in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

.1 Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

.4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

.5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.

.4 Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION

1.1 GENERAL

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

.2 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

1.2 MATERIALS

.1 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 CLEANING DURING CONSTRUCTION

.1 Maintain work site in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.

.2 Keep building entrances, corridors, stairwells and tenant occupied areas of building in a clean dust free condition at all times. Conduct thorough cleaning of these areas when used by workers or affected by the Work.

.3 Provide on-site dump type and recycling containers for collection of waste materials and debris.

.4 Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.

.5 Remove waste materials, and debris from site on a minimum weekly basis.

.6 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

.7 Immediately clean all dust, dirt, smears, scuffs and soiled surfaces in lobbies, corridors, stairwells and within tenant occupied areas resulting from the Work.

.1 Perform cleaning, dusting and washing operations, carpet vacuuming (including shampooing if deemed required by Departmental Representative) and floor washing as necessary to thoroughly clean all soiled surfaces.

.8 Remove snow and ice from access doors used by workforce.

1.4 FINAL CLEANING

.1 In preparation for acceptance of the completed work perform final cleaning.

.2 Remove grease, dust, dirt, stains, labels, fingerprints, marks and other foreign materials, from interior and exterior finished surfaces. Clean and polish surfaces including glass, mirrors, hardware, wall tile, stainless steel, chrome, baked enamel, plastic laminate, mechanical and electrical fixtures.

.3 Replace items with broken pieces, scratches or disfigured.

.4 Clean lighting reflectors, lenses, and other lighting surfaces.

.5 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.6 Wax, seal, shampoo or prepare floor finishes as recommended by manufacturer.

.7 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.

.8 Broom clean and wash exterior paved surfaces and walks; rake clean other surfaces of grounds.

.9 Remove debris and surplus materials from crawl areas, roof areas and other accessible concealed spaces.

.10 Clean equipment, washroom and kitchen fixtures to a sanitary condition. Replace filters of mechanical equipment.

END OF SECTION

1.1 DEFINITIONS

.1 Hazardous Material: Product, substance, or organism that is used for its original purpose, and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

1.2 WASTE MANAGEMENT

.1 Incorporate environmental and sustainable practices in managing waste resulting from work.

.2 Divert as much waste as possible from landfill.

.3 Coordinate work of subtrades and subcontractors to ensure all possible waste reduction and recycling opportunities are taken. Follow waste management requirements specified in trade sections of the Specifications.

.4 Reduce waste during installation of new materials. Undertake practices which will optimize full use of materials and minimize waste.

.5 Develop innovative procedures to reduce quantity of waste generated by construction such as by delivering materials to site with minimal packaging etc.

.6 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.

.7 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.

.8 Send leftover material resulting from installation work for recycling whenever possible.

.9 Establish methods whereby hazardous and toxic materials and their containers used on site are properly handled, stored and disposed in accordance with applicable federal, provincial and municipal laws and regulations.

1.3 DISPOSAL REQUIREMENTS

.1 Burying or burning of rubbish and waste materials is prohibited.

.2 Disposal of volatile materials, mineral spirits, oil, paint, and other hazardous materials into waterways, storm, or sanitary sewers is prohibited.

.3 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.

.4 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.

.5 Transport and dispose of waste intended for waste processing plant or landfill facility in separated condition and to Operator's rules and recommendations in support of their effort to recycle, reduce and divert certain waste stream from general landfill.

.6 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.

.7 Sale of salvaged items by Contractor to other parties not permitted on site.

END OF SECTION

1.1 SECTION INCLUDES

.1 Administrative procedures preceding inspection and acceptance of Work by Departmental Representative.

1.2 RELATED SECTIONS

.1 Section 01 78 00: Closeout Submittals.

1.3 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.

.1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.

.2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.

.1 Address defects, faults and outstanding items of work identified by such inspections.

.2 Advise Departmental Representative when all deficiencies identified have been rectified.

.3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:

.1 Project record as-built documents;

.2 Final Operations and Maintenance manuals;

.3 Maintenance materials, parts and tools;

.4 Compliance certificates from applicable authorities;

.5 Reports resulting from designated tests;

.6 Demonstration and training complete with user manuals;

.7 Manufacturer's Guarantee certificates.

.8 Testing, adjusting and balancing of equipment and systems complete with submission of test reports.

.9 Commissioning of equipment and systems specified.

.4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

END OF SECTION

1.1 SECTION INCLUDES

.1 Project Record Documents.

.2 Operations and Maintenance data.

1.2 RELATED SECTIONS

.1 Section 01 79 00: Demonstration and Training.

1.3 PROJECT RECORD DOCUMENTS

.1 Departmental Representative will provide electronic files, in pdf format, of contract drawings and Specifications Manual specifically for printing by Contractor for "As-Built" purposes.

.2 Maintain at site one set of the contract drawings and specifications to record actual As-Built site conditions.

.3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.

.4 As-Built Drawings:

.1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).

.2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.

.3 Stamp all drawings with "As-Built". Label and place Contractor's signature and date.

.4 Show all modifications, substitutions and deviations from what is shown on the contract drawings.

.5 Record following information:

.1 Depths of various elements of foundation in relation to first floor level.

.2 Horizontal and vertical location of exterior underground utilities and appurtenances referenced to permanent surface improvements.

.3 Horizontal and vertical location of various elements in relation to Geodetic Datum;

.4 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;

.5 Field changes of dimension and detail;

.6 Location of all capped or terminated services and utilities.

.7 Chases for mechanical, electrical and other services;

.8 Ceiling and floor elevations;

.9 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;

.10 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;

.11 All structural steel installations to be fully dimensioned;

.12 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;

.13 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;

.14 All change orders issued over the course of the contract must be documented on the finished As-Built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-Built Specifications: legibly mark in red each item to record actual construction, including:

.1 Changes made by Addenda and Change Orders.

.2 Mark up both copies of specifications; stamp "As-Built", sign and date similarly to drawings as per above clause.

.6 Maintain As-Built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

.7 Submit on paper and in electronic format as pdf files. Forward pdf and in the native program format, MS Word, Autocad dwg and photograph jpg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.4 REVIEWED SHOP DRAWINGS

.1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations and Maintenance Manuals.

.2 Submit full sets at same time and as part of the contents of the Operation and Maintenance Manuals specified.

1.5 OPERATIONS & MAINTENANCE MANUAL

.1 O&M Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

.2 Manual Language: final manuals to be in English language.

.1 Upon review and acceptance by Departmental Representative, submit final copies. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.

.1 Submit final O&M Manuals in electronic format as well as one (1) hardcopy.

.3 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to Functional Performance Testing (FPT) during Commissioning of the work.

.4 Binding:

.1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.

.2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.

.3 Where multiple binders are needed, correlate data into related consistent groupings.

.4 Identify contents of each binder on spine.

.5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.

.6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.

.7 Type lists and notes. Do not hand write.

.8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.5 Manual Contents:

.1 Cover sheet containing:

.1 Date submitted.

.2 Project title, location and project number.

.3 Names and addresses of Contractor, and all Sub-Contractors.

.2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.

.3 List of maintenance materials.

.4 List of spare parts.

.5 List of special tools.

.6 Original or certified copy of warranties and product guarantees.

.7 Copy of approval documents and certificates issued by Inspection Authorities.

.8 Copy of reports and test results performed by Contractor as specified.

.9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:

.1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.

.2 Nameplate information including equipment number, make, size, capacity, model number and serial number.

.3 Parts list.

.4 Installation details.

.5 Operating instructions.

.6 Maintenance instructions for equipment.

.7 Maintenance instructions for finishes.

.6 Shop drawings:

.1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.

.2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.

.3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.

.7 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:

.1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Servicing and lubrication schedule, and list of lubricants required.

.7 Manufacturer's printed operation and maintenance instructions.

.8 Sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports.

.15 Additional requirements as specified in individual specification sections.

.8 Materials and Finishes Maintenance Data:

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. [Provide information for re-ordering custom manufactured products.]

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.6 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

.1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.

.2 Tag all items with associated function or equipment.

.3 Provide items of same manufacture and quality as items in Work.

.4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.

.5 Clearly mark as to contents indicating:

.1 Part number.

.2 Identification of equipment or system for which parts are applicable.

.3 Installation instructions or intended use as applicable.

.4 Name, address and telephone number of nearest supplier.

.6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

END OF SECTION

1.1 RELATED SECTIONS

.1 Section 01 78 00 - Operations and Maintenance Manual

1.2 DESCRIPTION

.1 Demonstrate scheduled operation and maintenance of equipment and systems to Government of Canada personnel following successful commissioning.

.2 Departmental Representative will provide a list of Government of Canada personnel to receive instructions,

.3 Cooperate with Departmental Representative in coordinating time and attendance of Government of Canada personnel with manufacturer's training Representative(s).

1.3 QUALITY CONTROL

.1 Ensure that only personnel from own forces, Subcontractors or Suppliers competent and fully knowledgeable in the particular material component, equipment or system installation are used to provide training and demonstrations.

.2 When specified in individual Sections, obtain the manufacturers authorized Representative to demonstrate operation of equipment and systems, instruct Government of Canada personnel, and provide written report that demonstration and instructions have been completed.

.3 Upon request, provide evidence to Departmental Representative of individual Trainor's knowledge and qualifications.

1.4 SUBMITTALS

.1 Submit schedule of time, date and complete list of equipment and systems for which demonstration and training sessions will be provided. Submit schedule a minimum of 2 weeks prior to designated dates, for Departmental Representative's approval.

.2 Submit report within 1 week after completion of demonstration, that demonstration and instructions have been satisfactorily completed. Provide time and date of when each demonstration was actually given, with list of persons present.

1.5 CONDITIONS FOR DEMONSTRATIONS

.1 Prior to carrying out demonstration and training, ensure that equipment has been inspected and tested, is fully operational, has been performance verified and TAB has been carried out.

.2 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.6 PREPARATION

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated personnel are present.

1.7 DEMONSTRATION AND INSTRUCTIONS

.1 Include the following items within the demonstration and training:

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each of equipment.

.2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

.3 Review contents of manual in detail to explain all aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

.5 Provide other specific training and instructions as specified in trade sections.

1.8 TIME ALLOCATED FOR INSTRUCTIONS

.1 Observe the allocated time period specified in trade sections. Provide additional time when required to ensure all personnel fully understand all aspects of the information and instructions being provided. Allow for questions by participants.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 General requirements relating to commissioning of project's components and systems, specifying general requirements to performance verification of components, equipment, sub-systems, systems, and integrated systems.

.2 Related Sections:

.1 Section 01 91 14 - Commissioning (Cx) Training

.3 Acronyms:

.1 Cx - Commissioning.
.2 CxA – Commissioning Agent.
.3 EMCS - Energy Monitoring and Control Systems.
.4 O&M - Operation and Maintenance.
.5 PI - Product Information.
.6 PV - Performance Verification (Functional Testing).
.7 TAB - Testing, Adjusting and Balancing.

1.2 GENERAL

.1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:

.1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.

.1 Systems are to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be operated interactively with each other as intended in accordance with Contract Documents and design criteria.

.2 During these checks, adjustments are to be made to enhance performance to meet environmental or user requirements.

.3 Design Criteria: as per client's requirements or determined by designer to meet Project functional and operational requirements.

1.3 COMMISSIONING (CX) OVERVIEW

.1 Cx to be a line item of Contractor's cost breakdown.

.2 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.3 Cx is conducted in concert with activities performed during each stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.

.4 Departmental Representative will issue Interim Acceptance Certificate when:

.1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.

.2 Equipment, components and systems have been commissioned.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx; correct deficiencies, re-verify equipment and components within the non-functional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.

.2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items are to be borne by Contractor. Above mentioned costs are to be in the form of progress payment reductions or hold-back assessments.

1.5 PRE-CX REVIEW

.1 Before Construction:

.1 Review contract documents, confirm by writing to Departmental Representative.

.1 Adequacy of provisions for Cx.

.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:

.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:

.1 Have completed Cx Plan up-to-date.

.2 Ensure installation of related components, equipment, sub-systems, and systems are complete.

.3 Fully understand Cx requirements and procedures.

.4 Have Cx documentation shelf-ready.

.5 Understand completely, design criteria, intent and special features.

.6 Submit complete start-up documentation to Departmental Representative and/or CxA.

.7 Have Cx schedules up-to-date.

.8 Ensure systems have been cleaned thoroughly.

.9 Complete TAB procedures on systems; submit TAB reports to Departmental Representative and/or CxA for review and approval.

.10 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative and/or CxA in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 SUBMITTALS

.1 Data for Commissioning.

.1 The Contractor will receive a request from the CxA requesting specific information needed about each piece of commissioned equipment or system.

.2 Typically this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any Departmental Representative-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the CxA.

.3 The CxA may request further documentation necessary for the commissioning process.

.4 This data request may be made prior to normal submittals.

.5 Much of this information is contained in the regular O&M manual submittals normally submitted in the project. Typically, this information is required prior to the regular formal O&M manual submittals.

.2 Contractor's responsibility for deviations in submittals from requirements of the Contract Documents is not relieved by the CxA's review.

1.8 COMMISSIONING DOCUMENTATION

.1 CxA to review and evaluate Cx documentation.

.2 Provide completed and evaluated Cx documentation to Departmental Representative.

1.9 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule.

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:

.1 Approval of Cx reports.

.2 Verification of reported results.

.3 Repairs, retesting, re-commissioning, re-verification, and any necessary seasonal testing.

1.10 COMMISSIONING MEETINGS

.1 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.

.2 Continue Cx meetings as required until commissioning deliverables have been addressed.

.3 At approximately 50% construction completion stage, CxA is to call a separate Cx kick-off meeting to discuss the Cx scope, review construction progress, discuss schedule of equipment start-up activities and prepare for Cx.

.4 Thereafter Cx meetings to be held as required until project completion.

.5 Meetings will be scheduled and chaired by CxA, who will record and distribute minutes.

.6 The General Contractors to ensure subcontractors and relevant manufacturer representatives are present at 50% and subsequent Cx meetings as required.

1.11 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. This includes disassembly and re-assembly after approval, starting, testing and adjusting, and supply any testing equipment that is required.

1.12 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days' notice to all attending parties, individually, prior to commencement.

.2 Departmental Representative and/or CxA may witness start-up and testing.

1.13 MANUFACTURER'S INVOLVEMENT

.1 Factory testing: manufacturer to:

.1 Coordinate time and location of testing.

.2 Provide testing documentation for approval by Departmental Representative and/or CxA.

.3 Arrange for Departmental Representative and/or CxA to witness tests, if determined necessary.

.4 Obtain written approval of test results and documentation from Departmental Representative and/or CxA before delivery to site.

.2 Obtain manufacturer's installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative and CxA.

.1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.

.2 Modified procedures detrimental to equipment performance should be review with manufacturer before start-up.

.3 Integrity of warranties:

.1 Use manufacturers trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.

.2 Verify with manufacturer that testing as specified will not void warranties.

.4 Qualifications of manufacturer's personnel:

.1 Experienced in design, installation and operation of equipment and systems.

.2 Ability to interpret test results accurately.

.3 To report results in clear, concise, logical manner.

.4 Factory trained and authorized by the manufacturer to complete the intended work.

1.14 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up, testing and Cx in following distinct phases:

.1 Included in delivery and installation:

.1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.

.2 Visual inspection of quality of installation.

.2 Start-up: follow accepted start-up procedures, which includes and is not limited to the following:

.1 Plumbing systems:

.1 "Bump" each item of equipment in its "stand-alone" mode.

.2 Complete pre-start-up checks and complete relevant documentation.

.3 After equipment has been started, test related systems in conjunction with control systems on a system-by-system basis.

.2 HVAC equipment and systems:

.1 "Bump" each item of equipment in its "stand-alone" mode.

.2 At this time, complete pre-start-up checks and complete relevant documentation.

.3 After equipment has been started, test related systems in conjunction with control systems on a system-by-system basis.

.4 Perform TAB on systems. TAB reports to be approved by CxA.

.3 EMCS:

.1 EMCS trending to be available as supporting documentation for performance verification.

.2 Perform point-by-point testing in parallel with start-up.

.3 Carry out point-by-point verification.

.4 Demonstrate performance of systems, to be witnessed by CxA prior to start of 30 day Final Acceptance Test period.

.5 Perform final Cx and operational tests during demonstration period and 30 day test period.

.6 Only additional testing after foregoing has been successfully completed to be "Off-Season Tests".

.4 Pre-Cx activities - LIFE SAFETY SYSTEMS

.1 Include equipment and systems identified in the commissioning plan.

.2 Reports of test results to be witnessed and certified by CxA or by local authority having jurisdiction before verification.

.5 Pre-Cx activities - ELECTRICAL:

.1 Low voltage distribution systems 600 V and under:

.1 Requires independent testing agency to perform pre-energization and post-energization tests.

.2 Emergency power generation systems

.1 Requires manufacturer to perform pre- energization and post-energization tests.

.3 Transfer switches: test by simulating loss of power. Verify availability of power at equipment requiring emergency power.

.4 Uninterruptible power systems: test under full and partial load conditions.

.5 Lighting systems:

.1 To be tested and verification report to be produced by contractor or manufactured representative

.6 Emergency lighting systems:

.1 Tests to include verification of lighting levels and coverage, initially by disrupting normal power.

.6 Fire alarm systems: test after other safety and security systems are completed. Testing to include a complete verification in accordance with ULC requirements. CxA has reviewed and approved reports, demonstrate all devices and zones to CxA.

.7 Low voltage systems: these include:

.1 Clock, communications, low voltage lighting control systems and data communications systems.

.2 Special systems such as Simultaneous Translation systems, MPs Call systems, Messenger Call systems, Division Bell systems.

.8 Pre-Cx activities - STRUCTURAL

.1 Include systems identified in the commissioning plan.

.2 Reports of test results to be witnessed and certified by CxA or by local authority having jurisdiction before verification.

.9 Pre-Cx activities – CIVIL

.1 Include equipment and systems identified in the commissioning plan.

.2 Reports of test results to be witnessed and certified by CxA or by local authority having jurisdiction before verification.

.10 Pre-Cx activities – ARCHITECTURAL

.1 Include equipment and systems identified in the commissioning plan.

.2 Reports of test results to be witnessed and certified by CxA or by local authority having jurisdiction before verification.

.3 Operational testing: document equipment performance.

.4 System PV: include repetition of tests after correcting deficiencies.

.5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.

.4 Document required tests on approved PV forms. These forms can be obtained from the equipment manufactures or from the CxA.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:

.1 Minor equipment/systems: implement corrective measures approved by Departmental Representative and/or CxA.

.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative and/or CxA.

.3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.

.1 Rejected equipment to be removed from site and replaced with new, at cost of contractor.

.2 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP DOCUMENTATION

.1 General Contractors Site Cx Coordinator shall assemble, and ensure completeness of, start-up documentation, and submit to Departmental Representative and CxA for approval before commencement of commissioning.

.2 Start-up documentation to include:

.1 O&M Manuals (to Section 01 78 00 - Closeout Submittals, and details below)

.2 Factory and on-site test certificates for specified equipment.

.3 Pre-start-up inspection reports.

.4 Signed installation/start-up check lists.

.5 Start-up reports; and

.6 Step-by-step description of complete start-up procedures, to permit Departmental Representative or CxA to repeat start-up at any time.

1.16 OPERATION AND MAINTENANCE MANUALS

.1 The contractor shall compile O&M manuals for every piece of equipment and building operating or electrical system with the following format.

.1 Quantity: 4 Copies

.2 Format: 8 ½" x 11" loose leaf binders. Each binder shall be clearly labeled on the spine. Use as many as required. Do not overload binders. There shall be dividers with permanently marked tabs of card stock separating each section and sub section. Tab labels shall not be handwritten.

.3 There shall be a title page and table of contents in the front of each binder for each binder's contents. In each binder, there shall be a main tab for each specification section. Behind the section number tab there shall be the equipment ID tag sub-tab for each piece of major equipment (or group, if small or numerous). These sub-tabs shall be similar to the specification number tabs but of a different color. Behind each equipment name tab shall be the following sections, in the given order, divided by a double weight colored sheet labeled with the title of the section.

.1 Contractor. The first page behind the equipment tab shall contain the name, address and telephone number of the manufacturer and installing contractor and the 24-hour number for emergency service for all equipment in this section, identified by equipment.

.2 Submittal and Product Data. This section shall include all approved submittal data, cut sheets and appropriate shop drawings. If submittal was not required for approval, descriptive product data shall be included.

.3 Operation and Maintenance Instructions. These shall be the written manufacturer's data with the model and features of this installation clearly marked and edited to omit reference to products or data not applicable to this installation. This section shall include data on the following:

.1 Installation, startup and break-in instructions

.2 All starting, normal shutdown, emergency shutdown, manual operation, seasonal changeover and normal operating procedures and data, including any special limitations.

.3 O&M and installation instructions that were shipped with the unit.

.4 Preventative maintenance and service procedures and schedules.

.5 Troubleshooting procedures.

.6 Recommended schedule of maintenance requirements and frequency.

.7 System single–line diagrams.

.8 A parts list, edited to omit reference to items which do not apply to this installation.

.9 A list of any special tools required to service or maintains the equipment.

.10 Performance data, ratings and curves.

.11 Operating instruction for integrated building systems.

.12 Recommended schedule for calibrating sensors and actuators.

.13 Warranty, which clearly lists conditions to be maintained to keep warranty in effect and conditions that would affect the validity of the warranty.

.14 Any service contracts issued.

.4 Supplemental Data. Prepare written text and/or special drawings to provide necessary information, where manufacturer's standard printed data is not available and information is necessary for a proper understanding and operation and maintenance of equipment or systems, or where it is necessary to provide additional information to supplement data included in the manual or project documents.

.5 Control Drawings. Include as-built control shop drawings, point verification, and finalized control graphics.

.6 Test and Balance (TAB) Reports. Include TAB reports created for a particular system or piece of equipment and its components. This section will be provided by the TAB contractor.

1.17 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.

.2 With assistance of manufacturer develop written maintenance program and submit to Departmental Representative for approval before implementation.

.3 Operate and maintain systems for length of time required for commissioning to be completed.

.4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.18 TEST RESULTS

.1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.

.2 Provide manpower and materials, assume costs for re-commissioning.

1.19 START OF PERFORMANCE VERIFICATION

.1 Notify Departmental Representative and CxA at least 21 days prior to start of Cx.

.2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.20 INSTRUMENTS / EQUIPMENT

.1 Submit to CxA for review and approval:

.1 Complete list of instruments proposed to be used.

.2 Listed data including serial number, current calibration certificate, calibration date, calibration expiry date and accuracy.

.2 Provide the following equipment as required:

.1 2-way radios.

.2 Ladders.

.3 Equipment as required to complete work.

1.21 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:

.1 Under actual or accepted simulated operating conditions, over entire operating range, in all modes.

.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

.4 EMCS trending to be available as supporting documentation for performance verification.

1.22 WITNESSING COMMISSIONING

.1 CxA to witness activities and verify results.

1.23 AUTHORITIES HAVING JURISDICTION

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction; arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

.3 Provide copies to Departmental Representative and CxA within 5 business days (Monday to Friday) of test. CxA will include copies in Final Cx Report

1.24 COMMISSIONING CONSTRAINTS

.1 It is necessary to complete Cx of occupancy, weather, and seasonal sensitive equipment and systems before issuance of the Interim Certificate, using, if necessary, simulated thermal loads.

1.25 EXTRAPOLATION OF RESULTS

.1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.26 EXTENT OF VERIFICATION

.1 All energy consuming equipment and related systems including other systems identified by client:

.1 Provide manpower and instrumentation to verify up to 30% of reported results, unless specified otherwise in other sections.

.2 Number and location to be at discretion of CxA.

.3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

.4 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.

.5 Perform additional commissioning until results are acceptable to Departmental Representative and CxA.

1.27 REPEAT VERIFICATIONS

.1 Assume costs incurred by Departmental Representative and/or CxA for premature site visits, third and subsequent verifications where:

.1 Verification of reported results fails to receive Departmental Representative or Cx Agent's approval.

.2 Repetition of second verification again fails to receive approval.

.3 Departmental Representative or CxA deems Contractor's request for second verification or site visit was premature.

1.28 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.29 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.

.2 Report problems, faults or defects affecting Cx to the Departmental Representative and CxA in writing. Stop Cx until problems are rectified. Proceed with written approval from CxA.

1.30 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx, leave systems in normal operating mode.

.2 Except for seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.31 ACTIVITIES DURING WARRANTY PERIOD

.1 Cx activities must be completed before issuance of Interim Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period, including:

.1 Fine tuning of HVAC systems.

.2 Full-scale emergency evacuation exercises.

.2 Equipment and system warranties shall be as defined in Division 01.

1.32 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

.2 Notify Departmental Representative of any system changes on as-built drawings.

1.33 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.34 OCCUPANCY

.1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.

1.35 INSTALLED INSTRUMENTATION

.1 Use instruments installed under Contract for TAB and PV if:

.1 Accuracy complies with these specifications.

.2 Calibration certificates have been deposited with Departmental Representative and CxA.

.2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.36 PERFORMANCE VERIFICATION TOLERANCES

.1 Application tolerances:

.1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.

.2 Instrument accuracy tolerances:

.1 To be of higher order of magnitude than equipment or system being tested.

.3 Measurement tolerances during verification:

.1 Unless otherwise specified actual values to be within +/- 2% of recorded values.

1.37 DEPARTMENTAL REPRESENTATIVE PERFORMANCE TESTING

.1 Performance testing of equipment or system by Departmental Representative or CxA will not relieve Contractor from compliance with specified start-up and testing procedures.

1.38 FINAL SETTINGS

.1 Upon completion of Cx to satisfaction of Departmental Representative, lock control devices in their final positions, indelibly mark settings and include in Cx Reports.

PART 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES:

.1 This Section specifies roles and responsibilities of Commissioning Training.

1.2 RELATED SECTIONS:

.1 Section 01 78 00 - Closeout Submittals.

.2 Section 01 91 13 - Commissioning (Cx) Requirements.

1.3 TRAINEES

.1 Trainees: personnel selected for operating and maintaining this facility including, but not limited to, Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.

.2 Trainees may be available for training during any stage of construction.

1.4 INSTRUCTORS

.1 The Cx Manual will contain:

.1 Descriptions of systems.

.2 Instruction on design philosophy, design criteria, and design intent.

.2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:

.1 Start-Up, operation, shut-down and maintenance of equipment, components and systems.

.2 Control features and reasons for, results of, implications on associated systems of adjustment of set points of control and safety devices.

.3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.

.4 Training to be completed after Installation and Performance Verification are completed.

1.5 TRAINING OBJECTIVES

.1 Training to be detailed and of sufficient duration to ensure:

.1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.

.2 Effective on-going inspection, measurements of system performance.

.3 Proper preventive maintenance, diagnosis, trouble-shooting and maintenance.

.4 Ability to update documentation.

.5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

1.6 TRAINING MATERIALS

.1 Instructors to be responsible for content and quality. Provide copies for all those in attendance.

.2 Training materials to include:

.1 "As-Built" Contract Documents.
.2 Operating Manual.
.3 Maintenance Manual.
.4 Testing, adjusting and balancing and performance verification reports where applicable.

.3 Departmental Representative will review training manuals.

.4 Training materials to be in a format that permits future training procedures to the same degree of detail with or without the instructor.

1.7 SCHEDULING

.1 Contractor to include in schedule time for training. Provide a detailed commissioning schedule indicating all Cx tasks and training.

.2 Deliver training during regular working hours, training sessions to be determined in Commissioning meetings.

.3 Training to be completed prior to Substantial Completion.

1.8 RESPONSIBILITIES

.1 Be responsible for:

.1 Implementation of training activities,
.2 Coordination among instructors,
.3 Quality of training, training materials,

.2 Departmental Representative will evaluate training and materials.

.3 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative. Include list of those in attendance. The Cx manual will provide templates for these submittals.

1.9 TRAINING CONTENT

.1 Training to include demonstrations by Instructors using the installed equipment and systems.

.2 Content includes:

.1 Review of facility and occupancy profile.

.2 Functional requirements.

.3 System philosophy, limitations of systems and emergency procedures.

.4 Review of system layout, equipment, components and controls.

.5 Equipment and system start-up, operation, monitoring, servicing, maintenance, and shut-down procedures.

.6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.

.7 Maintenance and servicing.

.8 Trouble-shooting diagnosis.

.9 Inter-Action among systems during integrated operation.

.10 Review of O&M documentation.

.3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Definitions:

.1 Demolition: destruction of building portions of Building to accommodate new construction following removal of hazardous materials.

.2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

.3 Waste Audit (WA): detailed inventory of materials in building. Indicates quantities of reuse, recycling and landfill.

.1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.

.2 Indicates quantities of reuse, recycling and landfill.

.4 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.2 Reference Standards:

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Site Meetings.

.1 Convene pre-demolition meeting one week prior to beginning work of this Section to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.

.3 Hold project meetings bi-weekly and provide minutes to Departmental Representative.

.4 Ensure key personnel attend.

.5 Reporting Requirements: WMC to complete.

.6 Departmental Representative will provide written notification of change of meeting schedule established upon contract award 24 hours prior to scheduled meeting.

.2 Scheduling: meet project time lines without compromising specified minimum rates of material diversion.

.1 Notify Departmental Representative in writing when unforeseen delays occur.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada.

.2 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

.3 Hazardous Materials:

.1 Provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

.4 Sustainable Design Submittals:

.1 Construction Waste Management:

.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

.2 Erosion and Sedimentation Control: not required.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with applicable Federal regulations and PCA Environmental Policies.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Store and manage hazardous materials in accordance with Section 01 35 43 - Environmental Procedures.

.2 Storage and Protection.

.1 Protect in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

.2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.

.3 Remove and store materials to be salvaged, in manner to prevent damage.

.4 Store and protect in accordance with requirements for maximum preservation of material.

.5 Handle salvaged materials as new materials.

1.6 SITE CONDITIONS

.1 Site Environmental Requirements.

.1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout the project.

.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities as directed by the Departmental Representative.

.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

.2 Existing Conditions.

.1 Remove contaminated or hazardous materials as defined by authorities having jurisdiction as directed by the Departmental Representative from site, prior to start of demolition Work, and dispose of at designated disposal facilities in safe manner.

.1 The project was previously remediated after the fire except for the removal of exterior roof soffits. It is assumed that these roof soffits are the only hazardous materials needed to be removed.

1.7 MEASUREMENT AND PAYMENT

.1 Removal of existing concrete and other materials will be included in the contract price.

.2 Payment under this item will include operations involved in removing, hauling and stockpiling designated concrete specified saw cutting, busting and cleaning of remaining concrete surface.

Part 2 Products

2.1 EQUIPMENT

.1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect and Cap Mechanical Services.

.1 Other Underground Services: remove and dispose of as directed by the Departmental Representative in accordance with Section 33 71 73.02 - Underground Electrical Service.

3.2 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

.2 Post fire demolition and remediation has already taken place. See Appendix A – Post-Fire Building Condition Assessment.

3.3 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Removal of pavements and concrete:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Excavate at least 300 mm below pipe invert, when removing pipes under existing pavement or concrete tunnels.

.5 Obtain written approval of Departmental Representative prior to removal of trees.

.6 Stockpile topsoil for final grading and landscaping:

.1 Provide erosion control and seeding if not immediately used.

.7 Salvage:

.1 Items to be salvaged: embedded steel, top soil, wooden components.

.2 Salvage exterior brick where possible for reuse.

.3 Dismantle items containing materials for salvage and stockpile salvaged materials at locations as indicated.

.8 Disposal of Material:

.1 Dispose of materials not designated for salvage or reuse on site as instructed by Departmental Representative

.2 Trim disposal areas to approval of Departmental Representative

.9 Backfill:

.1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

.5 Carefully remove and salvage any brick from the building. Stockpile on pallets and store on site in a designated location as determined by the Departmental Representative.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.3 Transport material designated for alternate disposal using approved haulers facilities receiving organizations listed in Waste Reduction Workplan and in accordance with applicable regulations.

.1 Written authorization from Departmental Representative is required to deviate from haulers.

.4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

.3 Restore the site as close as possible to pre-construction condition focusing on re-vegetating sloped and cleared areas of the site with existing preserved sod mats, trees and shrubs and native plant/seed mix, trees and shrubs as directed by the Departmental Representative.

3.7 FIELD QUALITY CONTROL

.1 Verification requirements include:

- .1 Materials and resources.
- .2 Construction waste management.
- .3 Resource reuse.
- .4 Recycled content.
- .5 Local/regional materials.
- .6 Wood.
- .7 Salvaged brick.

3.8 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Remove debris, trim surfaces and leave work site clean, upon completion of Work
- .3 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.9 PROTECTION

.1 Repair damage to adjacent materials or property caused by selective site demolition.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 Removal of existing asphalt pavement is included in the contract price.

.2 This item will include operations involved in removing, hauling and stockpiling designated pavement specified saw cutting, milling and cleaning of remaining pavement surface immediately adjacent or affected by the work and material reinstatement.

1.2 REFERENCES

.1 Government of Newfoundland and Labrador, Department of Transportation and Works (DTW), Highway Design

.1 Section 520 Storage or Disposal of Old Asphaltic Pavement.

.2 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

Part 2 Products

2.1 EQUIPMENT

.1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

Part 3 Execution

3.1 PREPARATION

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.

.3 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.2 REMOVAL

.1 Remove existing asphalt pavement to lines and grades established by Departmental Representative in field.

.2 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.

.3 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.

.4 Suppress dust generated by removal process.

3.3 FINISH TOLERANCES

.1 Finished surfaces in areas where asphalt pavement has been removed to be within +/-5 mm of grade specified but not uniformly high or low.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

.4 Waste Management: separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Removed asphalt pavement which is to be recycled in hot mix asphalt concrete under this contract may be stockpiled at designated asphalt plant site.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA O121, Douglas Fir Plywood.

.3 CSA O151, Canadian Softwood Plywood.

.4 CSA S269.1, Falsework for Construction Purposes.

.5 CAN/CSA-S269.3, Concrete Formwork.

1.2 SUBMITTALS

.1 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3, for formwork drawings.

.2 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.

.3 Indicate sequence of erection and removal of formwork/falsework for approval by Departmental Representative.

.4 Each shop drawing submission shall bear stamp and signature of qualified professional engineer licensed in Province of Newfoundland and Labrador, Canada.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Formwork materials:

.1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121.

.2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.

.2 Tubular column forms: round, spirally wound laminated fiber forms, internally treated with release material. Spiral pattern to show in hardened concrete.

.3 Form ties:

.1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.

.2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.

.4 Form liner:

.1 Plywood: medium density overlay Douglas Fir to CSA O121, Canadian Softwood Plywood to CSA O151, T and G thickness as indicated.

.5 Form release agent: chemically active release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps, non-toxic, biodegradable.

.6 Falsework materials: to CSA-S269.1.

.7 Sealant: to Section 07 92 00 - Joint Sealants.

PART 3 EXECUTION

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Fabricate and erect falsework in accordance with CSA S269.1.

.3 Refer to architectural drawings for concrete members requiring architectural exposed finishes.

.4 Do not place shores and mud sills on frozen ground.

.5 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3, to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2-14.

.7 Align form joints and make watertight. Keep form joints to minimum.

.8 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.

.9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.10 Construct forms for architectural concrete, and place ties as indicated and/or as directed. Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

.11 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections. Ensure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.12 Clean formwork in accordance with CSA-A23.1/A23.2-14, before placing concrete.

3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum periods of time after placing concrete.

.1 3 days for walls and sides of beams.

.2 7 days for Suspended Slabs

.3 1 day for footings.

.2 Provide all necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.3 Re-use formwork and falsework subject to requirements of CSA-A23.1A23.2-14.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 American Concrete Institute (ACI)

.1 ANSI/ACI 315, Details and Detailing of Concrete Reinforcement.

.2 ACI 315R, Manual of Engineering and Placing Drawings for Reinforced Concrete Structure.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.3 ASTM A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

.3 Canadian Standards Association (CSA)

.1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of test and Standard Practices for Concrete.

.2 CSA-A23.3-14, Design of Concrete Structures.

.3 CAN/CSA-G30.18, Billet-Steel Bars for Concrete Reinforcement, A National Standard of Canada.

.4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel /Structural Quality Steel.

.5 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.2 SUBMITTALS

.1 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Department Representative, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.

.2 Detail lap lengths and bar development lengths to CSA-A23.3-14, unless otherwise indicated.

.1 Provide Class B tension lap splice unless otherwise indicated.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Department Representative.

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CAN/CSA-G30.18, unless indicated otherwise.

.3 Cold-drawn annealed steel wire ties: to ASTM A497/A497M.

.4 Welded steel wire fabric: to ASTM A185/A185M. Provide in flat sheets only.

.5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.6 Mechanical splices: subject to approval of Department Representative.

.7 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1A23.2, ACI 315, and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Obtain Department Representative's approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Department Representative, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Department Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to commencing reinforcing work.

.2 Upon request inform Department Representative of proposed source of material to be supplied.

PART 3 EXECUTION

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Department Representative.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars which develop cracks or splits.

3.2 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1/A23.2.

.2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.

.3 Prior to placing concrete, obtain Department Representative approval of reinforcing material and placement.

.4 Ensure cover to reinforcement is maintained during concrete pour.

END OF SECTION

PART 1 GENERAL

1.1 MEASUREMENT PROCEDURES

.1 Cast-in-place concrete will not be measured but will be paid for as a fixed price item.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete.
- .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
- .4 ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .5 ASTM D624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .6 ASTM D1751, Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.2 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 Canadian Standards Association (CSA)

- .1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CAN/CSA-A23.2-14, Methods of Test for Concrete.
- .3 CAN3-A266.4, Guidelines for the Use of Admixtures in concrete.
- .4 CAN/CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .5 CSA-A3001, Cementitious Materials for Use in Concrete.

1.3 ACRONYMS AND TYPES

.1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).

- .1 Type GU or GUb - General use cement.

1.4 SUBMITTALS

.1 At least 4 weeks prior to commencing work, inform Department Representative of proposed source of aggregates and provide access for sampling.

.2 Submit testing results and reports for review by Department Representative and do not proceed without written approval when deviations from mix design or parameters are found.

.3 Certificates:

.1 Minimum 4 weeks prior to starting concrete work submit to Department Representative manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:

.1 Portland cement.

.2 Blended hydraulic cement.

.3 Supplementary cementing materials.

.4 Grout.

.5 Admixtures.

.6 Aggregates.

.7 Water.

.8 Waterstops.

.9 Waterstop joints.

.10 Joint filler.

.2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA-A23.1/A23.2-14.

.3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1/A23.2-14.

1.5 SOURCE QUALITY CONTROL

.1 Have all concrete produced and delivered by a ready-mix plant that is a member of the Atlantic Provinces Ready Mixed Concrete Association (APRMCA) and holds a current "Certificate of Ready Mixed Concrete Production Facilities" issued by the Association. Submit a copy of this certificate to the Department Representative for approval.

1.6 QUALITY ASSURANCE

.1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures in accordance with Section 01 45 00 - Quality Control for Department Representative approval for following items:

.1 Falsework erection.

.2 Hot weather concrete.

.3 Cold weather concrete.

.4 Curing.

.5 Finishes.

.6 Formwork removal.

.7 Joints.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Concrete hauling time: maximum allowable time for concrete to be delivered to site of Work and discharged not to exceed 120 minutes after batching.

.1 Modifications to maximum time limit must be agreed to Department Representative and concrete producer as described in CSA A23.1/A23.2-14.

.2 Deviations to be submitted for review by Department Representative.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2-14.

.3 Waste Management and Disposal:

.1 Divert unused concrete materials from landfill to local facility approved by Department Representative.

.2 Provide an appropriate area on the job site where concrete trucks can be safely washed.

.3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Department Representative.

.4 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

.5 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial and National regulations.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Portland cement: to CAN/CSA-A3001, Type GU.

.2 Water: to CAN/CSA-A23.1-14.

.3 Aggregates: to CSA-A23.1-14.

.4 Coarse aggregates to be normal density to CSA-A23.1/A23.2-14.

.5 Admixtures:

.1 Air entraining admixture: to ASTM C260.

.2 Chemical admixtures: to ASTM C494, Department Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.6 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength of 50 MPa at 28 days.

.7 Polyethylene film to ASTM C171, minimum thickness 0.25 mm.

.8 Ribbed waterstops: extruded PVC of sizes indicated shop welded corner and intersecting pieces.

.1 Tensile strength: to ASTM D412, method A, Die "C".

.2 Elongation: to ASTM D412, method A, Die "C", minimum 275%.

.3 Tear resistance: to ASTM D624, method A, Die "B".

.9 Premoulded joint fillers:

.1 Bituminous impregnated fiber board: to ASTM D1751.

.10 Bonding adhesive: as approved by Department Representative.

2.2 MIXES

.1 Proportion normal density concrete in accordance with CSA-A23.1/A23.2-14, to give quality and yield for all concrete as indicated on the contract drawings.

2.3 UNDERSLAB VAPOUR BARRIERS

.1 Slab-on-grade vapour barrier/retarder: Vapor retarder membrane shall be manufactured from virgin polyolefin resins and shall meet or exceed all requirements to ASTM E 1745, Class B, complete with all tape and accessories for a complete installation.

.1 Thickness: Minimum 0.254mm (10 mil)

.2 Tensile Strength to ASTM E 154: Minimum 9.1 N/mm (52 lbs/in)

.3 Puncture Resistance to ASTM D1709: Minimum 2600 g

.4 Permeance to ASTM E154: Maximum 1.047mg/Pa.s.m² (0.0183 perms)

PART 3 EXECUTION

3.1 PREPARATION

.1 Obtain Department Representative approval before placing concrete. Provide 24 h notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

.4 Pumping of concrete is permitted only after approval of equipment and mix.

.5 Ensure reinforcement and inserts are not disturbed during concrete placement.

.6 Prior to placing of concrete obtain Department Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.

.7 Protect previous Work from staining.

.8 Clean and remove stains prior to application for concrete finishes.

.9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.10 Do not place load upon new concrete until authorized by Department Representative.

3.2 CONSTRUCTION

.1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2-14.

.2 Sleeves and inserts.

.1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, columns, except where indicated or approved by Department Representative.

.2 Where approved by Department Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated must be approved by Department Representative.

.3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Department Representative before placing of concrete.

.4 Check locations and sizes of sleeves and openings shown on drawings.

.5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts.

.1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.

.2 With approval of Department Representative, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to be manufacturers' recommendations.

.3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

.4 Set bolts and fill holes with shrinkage compensating grout.

.4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.5 Finishing.

.1 Finish concrete in accordance with CSA-A23.1/A23.2-14.

.2 Use procedures acceptable to Department Representative or those noted in CSA-A23.1/A23.2-14, to remove excess bleed water. Ensure surface is not damaged.

.3 Wet cure using polyethylene sheets placed over sufficiently hardened concrete to prevent damage. Overlap adjacent edges 150 mm and tightly seal with sand on wood planks. Weigh sheets down to maintain close contact with concrete during the entire curing period.

.4 Finish concrete floor to meet requirements of CSA-A23.1/A23.2-14.

.5 Concrete slab and Floor Finish Classification in accordance with Class B Floor with a steel trowel finish for interior floor slabs.

.6 Provide swirl-trowelled finish for exterior walks, ramps, pads.

.7 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.

.6 Waterstops.

.1 Install waterstops to provide continuous water seal.

.2 Do not distort or pierce waterstop in such a way as to hamper performance.

.3 Do not displace reinforcement when installing waterstops.

.4 Use equipment to manufacturer's requirements to field splice waterstops.

.5 Tie waterstops rigidly in place.

.6 Use only straight heat sealed butt joints in field.

.7 Use factory welded corners and intersections unless otherwise approved by Department Representative.

.7 Joint fillers.

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Department Representative.

.2 When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form, isolation, construction and expansion joints as indicated. Install joint filler.

.4 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.8 Dampproof membrane.

.1 Install dampproof membrane under concrete slabs-on-grade inside building.

.2 Lap dampproof membrane minimum 150 mm at joints and seal.

.3 Seal punctures in dampproof membrane before placing concrete. Use patching material at least 150 mm larger than puncture and seal.

3.3 SITE TOLERANCE

.1 Concrete slab and Floor Finish Classification in accordance with CSA-A23.1/A23.2-14 Class B Floor.

.1 Straightedge Value: ±8 mm

.2 Overall F-Number:

.1 F_F: 25

.2 F_L: 20

3.4 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Department Representative in accordance with CSA-A23.1/A23.2-14, and Section 01 45 00 - Quality Control.

.2 Owner shall pay costs of all required testing as per CSA A23.2.

.3 Department Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.4 Non-destructive Methods for Testing Concrete shall be in accordance with CSA-A23.1/A23.2-14.

.5 Provide Certificate of Field Quality Inspection and Testing to Department Representative for inclusion in Commissioning Manual.

.6 Inspection or testing by Department Representative will not augment or replace Contractor quality control nor relieve the Contractor of his contractual responsibility.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-25.20, Surface Sealer for Floors.

.2 Canadian Standards Association (CSA)

.1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.2 PERFORMANCE REQUIREMENTS

.1 Concrete slab and Floor Finish Classification in accordance with Class B Floor with a steel trowel finish for interior floor slabs.

.1 Straightedge Value: ±8 mm

.2 Overall F-Number:

.1 FF: 25

.2 FL: 20

.2 Product quality and quality of work in accordance with Section 01 61 00 - Common Product Requirements.

.3 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

1.3 PRODUCT DATA

.1 Submit WHMIS MSDS - Material Safety Data Sheets. WHMIS MSDS acceptable to Labour Canada and Health and Welfare Canada for concrete floor treatment materials. Indicate VOC content.

.2 Include application instructions for concrete floor treatment.

1.4 ENVIRONMENTAL REQUIREMENTS

.1 Temporary lighting:

.1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.

.2 Electrical power:

.1 Provide sufficient electrical power to operate equipment normally used during construction.

.3 Work area:

.1 Make the work area water tight protected against rain and detrimental weather conditions.

.4 Temperature:

.1 Maintain ambient temperature of not less than 10°C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.

.5 Moisture:

.1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.

.6 Safety:

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.7 Ventilation:

.1 Ventilate area of work as directed by Department Representative by use of approved portable supply and exhaust fans.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Facilities and Controls.

.3 Provide continuous ventilation during and after coating application.

PART 2 PRODUCTS

2.1 SEALING COMPOUNDS

.1 Surface sealer: to CAN/CGSB-25.20, Type 2 - water based.

.2 Surface sealers may not be manufactured or formulated with aromatic solvents formaldehyde halogenated solvents mercury lead cadmium hexavelant chromium and their compounds.

2.2 WET CURE

.1 Clear polyethylene film to ASTM C171, minimum thickness 0.25 mm.

2.3 MIXES

.1 Mixing, ratios and application in accordance with manufacturer's instructions.

2.4 JOINT SEALANT

.1 Joint sealants to Section 07 92 00 – Joint Sealants.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verify that slab surfaces are ready to receive work and elevations are as indicated on drawings by manufacturer.

3.2 PREPARATION OF SLAB

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.

.2 Saw cut control joints to CSA-A23.1/A23.2, 24 hours maximum after placing of concrete.

3.3 APPLICATION

.1 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with sealant.

.2 Apply floor treatment in accordance with Sealer manufacturer's written instructions.

.3 Clean overspray. Clean sealant from adjacent surfaces.

3.4 PROTECTION

.1 Protect finished installation in accordance with manufacturer's instructions.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Concrete masonry units (CMUs) (Non-decorative type).
.2 Decorative concrete masonry units.
.3 Mortar and grout.
.4 Reinforcing steel.
.5 Masonry joint reinforcement.
.6 Ties and anchors.
.7 Embedded flashing.
.8 Miscellaneous masonry accessories.
.9 Cavity-wall insulation.

.2 Related Requirements:

.1 Section 05 50 00 - Metal Fabrications for furnishing steel lintels and shelf angles for unit masonry.
.2 Section 07 84 13 - Penetration Firestopping and Section 07 84 43 - Joint Firestopping for firestopping at openings in masonry walls and fire-resistive joint systems at heads of masonry walls.
.3 Air barrier in exterior masonry wall assemblies.
.4 Section 07 92 00 - Joint Sealants for sealing control and expansion joints in unit masonry.

1.2 DEFINITIONS

.1 Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Shop Drawings: For the following:

.1 Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
.2 Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Show elevations of reinforced walls.

.3 Samples for Verification: For each type and colour of the following:

.1 Decorative concrete masonry units.
.2 Pigmented and coloured-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project**.** Label Samples to indicate types and amounts of pigments used.

.3 Weep holes/vents.

.4 Accessories embedded in masonry.

.4 Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

.5 Sustainability Submittals: For those products and materials required to meet the regional materials requirement specified herein, indicate location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.4 QUALITY ASSURANCE

.1 Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and colour, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

.2 Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including colour for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

.3 Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per CAN/ULC-S101 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

.4 Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Build mockups for each type of exposed unit masonry construction in sizes approximately 1500 mm long by 1200 mm high by full thickness, including face and backup wythes and accessories.

.1 Include a sealant-filled joint at least 400 mm long in each exterior wall mockup.

.2 Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 300 mm wide by 400 mm high.

.3 Include through-wall flashing installed for a 600 mm length in corner of exterior wall mockup approximately 400 mm down from top of mockup; with a 300 mm length of flashing left exposed to view (omit masonry above half of flashing).

.4 Include studs, sheathing, veneer anchors, flashing, and weep holes in exterior masonry-veneer wall mockup.

.2 Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.

.3 Clean one-half of exposed faces of mockups with masonry cleaner as indicated.

.4 Protect accepted mockups from the elements with weather-resistant membrane.

.5 Approval of mockups is for colour, texture, and blending of masonry units; relationship of mortar and sealant colours to masonry unit colours; tooling of joints; and aesthetic qualities of workmanship.

.1 Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Departmental Representative in writing.

.6 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

.5 Reinforcing Steel:

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis.

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

.2 Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

.3 Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

.4 Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

.5 Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

.6 Ship reinforcement and connectors, clearly identified in accordance with drawings.

1.6 PROJECT CONDITIONS

.1 Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

.1 Extend cover a minimum of 600 mm down both sides and hold cover securely in place.

.2 Where 1 wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 600 mm down face next to unconstructed wythe and hold cover in place.

.2 Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

.3 Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

.1 Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

.2 Protect sills, ledges, and projections from mortar droppings.

.3 Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

.4 Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

.4 Cold weather requirements.

.1 Supplement Clause 5.15.2 of CSA-A371 with following requirements.

.1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.

.2 Maintain ambient temperature between 5 degrees C and 50 degrees C and protect site from wind chill.

.2 Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 4 deg C and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

.5 Hot weather requirements.

.1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

.1 Design masonry connectors in accordance with requirements of CSA-A370.

2.2 MASONRY UNITS, GENERAL

.1 Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

.2 Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to CAN/ULC-S101, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.3 CONCRETE MASONRY UNITS (CMUS)

.1 Regional Materials: Use only products that have been manufactured within 800 km of Project site from aggregates that have been extracted, harvested, or recovered, as well as manufactured, within 800 km of Project site, whenever these products are available.

.2 Shapes: Provide shapes indicated and as follows:

.1 Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

.2 Provide bullnose units for outside corners, unless otherwise indicated.

.3 Integral Water Repellent: Provide units made with integral water repellent where units could be exposed to the weather.

.1 Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.

.2 Locations: Provide in block located on the exterior of the building.

.4 Concrete Masonry Units: CAN3-A165 Series (CAN3-A165.1).

.1 Classification: H/ 15/ A/ M; unless otherwise noted.

.2 Size: modular.

2.4 CONCRETE AND MASONRY LINTELS

.1 General: Provide either concrete or masonry lintels, at Contractor's option, complying with requirements below.

.2 Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Section 03 30 00 - Cast-In-Place Concrete.

.3 Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam concrete masonry units with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.5 MORTAR AND GROUT MATERIALS

.1 Use same brand of materials and source of aggregate for entire project.

.2 Mortar: Type S/12.5MPa; CSA A179, *Mortar and Grout for Unit Masonry*.

.1 Site Mixed Mortar: Mortar by proportion specification

.2 Pre-Manufactured Mortar: quality-controlled, plant batched and mixed by property specification to CSA A179 complete with admixtures and colour additives as required. Mortar to be either delivered to job site for ready use as wet mortar or site mixed in a portable powered and controlled silo/mixer or as pre-bagged dry mortar manufactured off-site.

.3 Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.

.1 Colour: To be chosen by Departmental Representative from Manufacturer's full range of mortar colours.

.4 Aggregate: aggregate passing 1.18 mm sieve, where 6 mm thick joints are indicated.

.1 For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

.2 For joints less than 6 mm thick, use aggregate graded with 100 percent passing the 1.18 mm sieve.

.5 Grout: to CSA A179, Table 3.

.6 Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

.7 Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.

.8 Water: Potable.

2.6 REINFORCEMENT

.1 Bar reinforcement: to CSA-A371 and CAN/CSA G30.18.

.1 Fabricate reinforcing in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.

.2 Masonry Joint Reinforcement, General: CSA-A371 and CSA G30.14.

.1 Interior Walls: Mill- galvanized, carbon steel.

.2 Exterior Walls: Hot-dip galvanized carbon or stainless steel.

.3 Provide in lengths of not less than 3 m.

.3 Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

.4 Masonry Joint Reinforcement for Multiwythe Masonry:

.1 Ladder type with 1 side rod at each face shell of hollow masonry units more than 100 mm in width, plus 1 side rod at each wythe of masonry 100 mm or less in width.

2.7 TIES, ANCHORS, CONNECTORS

.1 Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.

.1 Mill-Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 641/A 641M, Class 1 coating.

.2 Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.

.3 Stainless-Steel Wire: ASTM A 580/A 580M, Type 304 or 316.

.4 Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, Z180 zinc coating.

.5 Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.

.6 Stainless-Steel Sheet: ASTM A 666, Type 304 or 316.

.7 Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

.8 Stainless Steel bars: ASTM A 276 or ASTM a 666, Type 304.

.2 Connectors, General: to CSA-A370 and CSA-S304.

.3 Rigid Connectors: Fabricate from steel bars 38 mm wide by 6.4 mm thick by 600 mm long, with ends turned up 50 mm or with cross pins, unless otherwise indicated.

.1 Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

.4 Partition Top Anchors: 6 x 125 x 125 x 150 mm angle to CAN/CSA-G40.20/G40.21 Grade 300 W. Drilled for anchors as required; unless otherwise indicated.

.5 Adjustable Masonry-Veneer Anchors

.1 General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

.1 Structural Performance Characteristics: Capable of withstanding a 445-N load in both tension and compression without deforming or developing play in excess of 1.3 mm.

.2 Screw-Attached, Masonry-Veneer Anchors for Steel Stud Back-up: Units consisting of a wire tie and a metal anchor section; with insulation retainer.

.1 Fabricate sheet metal anchor sections and other sheet metal parts from 1.7 mm minimum thick, steel sheet, galvanized after fabrication.

.2 Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 4.8 mm minimum diameter, hot-dip galvanized steel or stainless-steel wire.

.3 Embedded-Attached Masonry-Veneer Anchors for Unit Masonry Back-up: Units consisting of a wire tie and a metal anchor section, galvanized steel, with insulation retainer.

.1 Fabricate sheet metal anchor sections and other sheet metal parts from 1.7 mm thick, steel sheet, galvanized after fabrication.

.2 Fabricate wire connector sections from 4.8 mm diameter, hot-dip galvanized, and carbon -steel wire.

.4 Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene washer, 4.8 mm diameter by length required to penetrate steel stud flange with not less than 3 exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.

.5 Tie System for Concrete: stainless steel spiral bits, with insulation retainer Back-up

2.8 MISCELLANEOUS ANCHORS

.1 Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM F 568M, Property Class 4.6; with ASTM A 563M hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

.2 Postinstalled Anchors: Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

.1 Corrosion Protection for installations inside of the building envelope's vapour barrier: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns).

.2 Corrosion Protection for other locations: Stainless-steel components complying with ASTM F 738M and ASTM F 836M, Alloy Group 1 or 4 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2.9 EMBEDDED FLASHING MATERIALS

.1 Metal Flashing: Provide metal flashing complying with SMACNA's *Architectural Sheet Metal Manual* and as follows:

.1 Stainless Steel: ASTM A 240/A 240M, Type 304, 0.40 mm thick.

.2 Fabricate continuous flashings in sections 2400 mm long minimum, but not exceeding 3.7 m. Provide splice plates at joints of formed, smooth metal flashing.

.3 Metal Drip Edge: Fabricate from stainless steel. Extend at least 76 mm into wall and 13 mm out from wall, with outer edge bent down 30 degrees and hemmed.

.2 Flexible Flashing: Use the following unless otherwise indicated:

.1 Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-

laminated polyethylene film to produce an overall thickness of not less than 1.02 mm.

.1 Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.

.3 Application: Unless otherwise indicated, use the following:

.1 Where flashing is partly exposed and is indicated to terminate at the wall face, use flexible flashing with a metal drip edge.

.2 Where flashing is fully concealed, use flexible flashing.

.4 Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

.5 Masonry Cavity Firestop: Firestop masonry cavities by installing continuous sheet metal back-up to flexible flashing consisting of commercial quality sheet to ASTM A653-M96, with Z275 designation zinc coating, 0.38 mm minimum thickness. Overlap joins by 50 mm.

.1 Locations: Masonry cavities containing foam insulations.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

.1 Compressible Filler: Premoulded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, or PVC.

.2 Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

.3 Weep/Vent Products: Use one of the following unless otherwise indicated:

.1 Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 3 mm less than depth of outer wythe, in colour selected from manufacturer's standard.

.2 Vinyl Weep Hole/Vent: One-piece, offset, T-shaped units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in colour selected by Departmental Representative.

.4 Cavity Drainage Material: Use any one of the following:

.1 6 mm washed pea gravel, free of fines, full depth of cavity and 250 mm high

.2 Free-draining mesh, made from polymer strands that will not degrade within the wall cavity, full depth of cavity and not less than 250 mm high.

2.11 CAVITY-WALL INSULATION

.1 Unfaced, Mineral-Wool Board Insulation

.1 To CAN/ULC-S702, Type 1; with maximum flame-spread and smoke-developed indexes of zero and zero, respectively, per CAN/ULC S102; passing CAN4 S114 for combustion characteristics.

.2 Nominal density of 70 kg/cu. m, Types I, RSI of 0.74 per 25 mm.

.3 Provide insulation manufactured with 100 percent acrylic binders and no formaldehyde.

.4 Locations: All other locations.

.2 Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.12 MASONRY CLEANERS

.1 Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discolouring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned. Ensure that cleaner used is compatible with concrete masonry units used in project.

.2 Darker colour concrete brick may have special cleaning considerations. Obtain manufacturer's recommended cleaning instructions before cleaning onyx or charcoal concrete brick units.

2.13 MORTAR MIXES

.1 General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, antifreeze compounds, or other admixtures unless otherwise indicated.

.1 Do not use calcium chloride in mortar.

.2 Use masonry cement mortar unless otherwise indicated.

.3 Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar colour is consistent.

.2 Mortar for Unit Masonry: Comply with CSA 179 Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

.1 For reinforced masonry, use Type S.

.2 For exterior, above-grade, load-bearing and non-load-bearing walls, and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

.3 Pigmented Mortar: Use coloured cement product or select and proportion pigments with other ingredients to produce colour required. Do not add pigments to coloured cement products.

.1 Pigments shall not exceed 5 percent of masonry cement by weight.

.2 Mix to match Departmental Representative's sample.

.3 Application: Use pigmented mortar joints as follows:

.1 Exposed joints, only if and where indicated on drawings.

.4 Pointing Mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour and not more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

.5 Use all site mixed mortar within 2½ hours of mixing at temperatures under 25oC and within 1½ hours for temperatures over 25oC. Mortar may be re-tempered within 2 hours of mixing to replace water lost by evaporation by using minimum amounts of water.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

.1 For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

.2 Verify that reinforcing dowels are properly placed.

.2 Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

.1 Do masonry work in accordance with CSA-A371 except where specified otherwise.

.2 Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

.3 Build chases and recesses to accommodate items specified in this and other Sections.

.4 Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

.5 Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

.6 Select and arrange units for exposed unit masonry to produce a uniform blend of colours and textures.

.1 Mix units from several pallets or cubes as they are placed.

.7 Comply with construction tolerances in notes to Clause 5.3 of CSA-A371 and with the following:

.1 For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 3 mm in 3 m, 6 mm in 6 m, or 12 mm maximum.

.2 For vertical alignment of exposed head joints, do not vary from plumb by more than 6 mm in 3 m, or 12 mm maximum.

.3 For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 3 mm in 3 m, 6 mm in 6 m, or 12 mm maximum.

.4 For exposed bed joints, do not vary from thickness indicated by more than plus or minus 3 mm, with a maximum thickness limited to 12 mm. Do not vary from bed-joint thickness of adjacent courses by more than 3 mm.

.5 For exposed head joints, do not vary from thickness indicated by more than plus or minus 3 mm. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 3 mm.

.6 For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1.5 mm except due to warpage of masonry units within tolerances specified for warpage of units.

.7 For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1.5 mm from one masonry unit to the next.

3.3 LAYING MASONRY WALLS

.1 Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

.2 Bond Pattern for Exposed Masonry: Lay exposed exterior decorative masonry in 1/3 running bond; lay interior concrete masonry units in running bond. Do not use units with less than nominal 100 mm horizontal face dimensions at corners or jambs.

.3 Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 100 mm. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 100 mm horizontal face dimensions at corners or jambs.

.4 Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

.5 Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

.6 Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

.7 Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

.8 Fill cores in hollow concrete masonry units with grout 600 mm under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

.9 Supply and install Partition Top Anchors and lateral support and anchorage where masonry walls terminate at the underside of the structure in accordance with CSA-S304.1 spaced at 1200 mm maximum, and as indicated.

.10 Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.

.1 Install compressible filler in joint between top of partition and underside of structure above.

.2 At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 7 Section *Fire Stop Systems*.

3.4 MORTAR BEDDING AND JOINTING

.1 Lay hollow concrete masonry units as follows:

.1 With face shells fully bedded in mortar and with head joints of depth equal to bed joints.

.2 With webs fully bedded in mortar in all courses of piers, columns, and pilasters.

.3 With webs fully bedded in mortar in grouted masonry, including starting course on footings.

.4 With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

.2 Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

.3 Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

.4 Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.5 MASONRY JOINT REINFORCEMENT

.1 General: Supply and install masonry reinforcement in accordance with CSA-A370, CSA-A371, and CSA-S304.1 unless indicated otherwise.

.2 Notify Departmental Representative 48 hours before concealing reinforcement and connectors with the placement of concrete, mortar, or grout.

.3 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.4 General: Install entire length of longitudinal side rods in mortar with a minimum cover of 16 mm on exterior side of walls, 13 mm elsewhere. Lap reinforcement a minimum of 150 mm.

.1 Space reinforcement not more than 400 mm o.c.

.2 Space reinforcement not more than 200 mm o.c. in foundation walls and parapet walls.

.3 Provide reinforcement not more than 200 mm above and below wall openings and extending 300 mm beyond openings.

.1 Reinforcement above is in addition to continuous reinforcement.

.5 Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

.6 Provide continuity at wall intersections by using prefabricated T-shaped units.

.7 Provide continuity at corners by using prefabricated L-shaped units.

.8 Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.6 ANCHORING MASONRY TO STRUCTURAL MEMBERS

.1 General: Supply and install masonry connectors in accordance with CSA-A370, CSA-A371, CAN/CSA-A23.1, and CSA-S304.1 unless indicated otherwise.

.2 Notify Departmental Representative 48 hours before concealing reinforcement and connectors with the placement of concrete, mortar, or grout.

.3 Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

.1 Provide an open space not less than 13 mm in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar and other rigid materials.

.2 Anchor masonry to structural members with connectors embedded in masonry joints and attached to structure.

.3 Space connectors as indicated, but not more than 600 mm o.c. vertically and 900 mm o.c. horizontally.

3.7 CAVITY WALL INSULATION

.1 Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 300 mm o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

.1 Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

.2 Seal all seams in Insulation airtight with tape.

3.8 ANCHORING MASONRY VENEERS

.1 Tie masonry veneer to backing in accordance with NBC 2015, CSA-S304.1, and CSA-A371, and as indicated.

.2 Anchor masonry veneers to wall framing and concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

.1 Fasten connector through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

.2 Embed connector sections and continuous wire in masonry joints.

.3 Locate anchor sections to allow maximum vertical differential movement of ties up and down.

.4 Space connectors as indicated, but not more than 600 mm o.c. vertically and 800 mm o.c. horizontally. Install additional anchors within 300 mm of openings and at intervals, not exceeding 200 mm, around perimeter.

3.9 CONTROL AND EXPANSION JOINTS

.1 General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

.2 Form control joints in concrete masonry using one of the following methods:

.1 Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.

.2 Install preformed control-joint gaskets designed to fit standard sash block.

.3 Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.

.4 Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

.3 Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 7 Section *Joint Sealants*, but not less than 10 mm.

.1 Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.10 LINTELS

.1 Install steel lintels where indicated.

.2 Provide concrete or masonry lintels where shown and where openings of more than 300 mm for brick-size units and 600 mm for block-size units are shown without structural steel or other supporting lintels.

.3 Provide minimum bearing of 200 mm at each jamb, unless otherwise indicated.

.4 Reinforce masonry lintels and bond beams as indicated.

.5 Place and grout reinforcement in accordance with CSA-S304.1, CSA-A371, and CSA-A179.

3.11 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

.1 General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

.2 Install flashing as follows, unless otherwise indicated:

.1 Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

.2 At multi-wythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 200 mm, and 38 mm into the inner wythe.

.3 At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 200 mm; with upper edge tucked under building paper or building wrap, lapping at least 100 mm.

.4 At lintels and shelf angles, extend flashing a minimum of 150 mm into masonry at each end. At heads and sills, extend flashing 150 mm at ends and turn up not less than 50 mm to form end dams.

.5 Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 13 mm back from outside face of wall and adhere flexible flashing to top of metal drip edge.

.3 Masonry Cavity Firestop: Locate sheet metal firestop immediately underneath the Masonry Cavity Flashing. Extend sheet metal firestop 50 mm under veneer, across air

space behind veneer and up face of sheathing at least 50 mm and mechanically secure to back-up at 600 mm o.c., lapping at least 100 mm.

.4 Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

.1 Use specified weep/vent products to form weep holes.

.2 Space weep holes 600 mm o.c., unless otherwise indicated.

.5 Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 *Miscellaneous Masonry Accessories* Article.

.1 Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 50 mm, to maintain drainage.

.6 Install vents in head joints in exterior wythes of first course of masonry immediately below embedded flashing and as follows.

.1 Space vents 600 mm o.c., unless otherwise indicated.

.2 Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.12 REINFORCED UNIT MASONRY INSTALLATION

.1 Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

.1 Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

.2 Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

.2 Supply and install masonry reinforcement in accordance with CSA-A370, CSA-A371, and CSA-S304.1 unless indicated otherwise.

.1 Fabricate reinforcing in accordance with CAN/CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.

.2 Do not field bend reinforcement and connectors except where indicated or authorized by Departmental Representative.

.3 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.4 Replace bars and connectors which develop cracks or splits.

.5 Insure reinforcement is not continuous across movement joints unless otherwise indicated.

.3 Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

.1 Do grout work in accordance with CSA A179 except where specified otherwise.

.2 Limit height of vertical grout pours to not more than 1520 mm.

.3 Notify Departmental Representative 48 hours before concealing reinforcement and connectors with the placement of concrete, mortar, or grout.

3.13 FIELD QUALITY CONTROL

.1 Inspectors: Departmental Representative may engage qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.

.2 Take representative samples of mortar for testing consistency of strength and colour according to CSA A179.

3.14 REPAIRING, POINTING, AND CLEANING

.1 Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

.2 Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

.3 In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

.4 Final Cleaning - General: After mortar is thoroughly set and cured, clean exposed masonry as follows:

.1 Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

.2 Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Departmental Representative's approval of sample cleaning before proceeding with cleaning of masonry.

.3 Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

.4 Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

.5 Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions. Confirm with masonry unit manufacturer that proposed cleaner is compatible with the concrete masonry used on this project.

.6 Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

.7 Clean worksite daily.

.5 Use alternative cleaning solutions and methods for difficult to clean masonry only after consultation with masonry unit manufacturer.

3.15 MASONRY WASTE DISPOSAL

.1 Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

.2 Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

.1 Crush masonry waste to less than 100 mm in each dimension.

.2 Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.

.3 Do not dispose of masonry waste as fill within 450 mm of finished grade.

.3 Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Government of Canada property.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM A792/A792M-15, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.3 CSA International

.1 CSA S16-14, Design of Steel Structures.

.2 CSA S136-12, North American Specification for the Design of Cold Formed Steel Structural Members.

.3 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

.4 CSA W59, Welded Steel Construction, (Metal Arc Welding).

.4 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI 10M, Standard for Steel Roof Deck.

.2 CSSBI 12M, Standard for Composite Steel Deck.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for steel decking and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Newfoundland and Labrador, Canada.

.2 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete fill decks.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect decking from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Zinc Z coated steel sheet: to ASTM A653/A653M structural quality Grade 230, with ZF75, coating, regular spangle surface, for exterior surfaces exposed to weather.

.2 Thickness: 0.91mm (20 gauge).

.3 Closures: as indicated in accordance with manufacturer's recommendations.

.4 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.91 mm minimum. Metallic coating same as deck material.

.5 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

.1 VOC limit 250 g/L maximum

.6 Caulking: to Section 07 92 00 - Joint Sealants.

.1 Sealants: VOC limit 250 g/L maximum

2.2 TYPES OF DECKING

.1 Composite steel roof deck: 0.91 mm minimum base steel thickness, 38 mm deep profile, embossed fluted profile, interlocking side laps.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for steel decking installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed Departmental Representative.

3.2 INSTALLATION

.1 Structural steel work: in accordance with CSA S136.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.3 ERECTION

.1 Erect steel deck as indicated and in accordance with CSA S136 and in accordance with reviewed erection drawings.

.2 Butt ends: to 1.5 to 3 mm gap. Install steel cover plates over gaps wider than 3 mm.

.3 Lap ends: to 50 mm minimum.

.4 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.

.5 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

.6 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.

3.4 CLOSURES

.1 Install closures in accordance with approved details.

3.5 OPENINGS AND AREAS OF CONCENTRATED LOADS

.1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer, except as otherwise indicated.

.3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.6 CONNECTIONS

.1 Install connections in accordance with CSSBI recommendations as indicated.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by steel decking installation.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 01 61 00 - Common Product requirements

.3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal

.4 Section 03 30 00 - Cast-in-Place Concrete.

.5 Section 05 51 33 - Metal Ladders.

.6 Section 09 91 13 - Exterior Painting.

.7 Section 09 91 23 - Interior Painting

1.2 REFERENCES

.1 American Society for Testing and Materials, (ASTM)

.1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.

.2 ASTM A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.3 ASTM A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

.4 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.153, High-Build, Gloss Epoxy Coating.

.3 Canadian Standards Association (CSA)

.1 CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.

.2 CSA S16, Design of Steel Structures.

.3 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.4 CSA W59, Welded Steel Construction (Metal Arc Welding).

.4 The Environmental Choice Program

.1 CCD-047, Architectural Surface Coatings.

.2 CCD-048, Surface Coatings - Recycled Water-borne.

.5 Green Seal Environmental Standards (GS)

.1 GS-11, Paints and Coatings.

.6 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's:

.1 For finishes, coatings, primers and paints.

.2 Shop Drawings

.1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 QUALITY ASSURANCE

.1 Test Reports: Submit Certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: Submit Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

.3 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.

.2 Stainless-Steel Bars and Shapes: ASTM A 276, Type 316L.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat round oval headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m^2 to ASTM A123.

.1 Optional Finish for exterior steel angle lintels: stainless steel to ASTM A276, S304.

.2 Shop coat primer: in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.

.3 Zinc primer: zinc rich, ready mix: in accordance with chemical component limits and restrictions requirements and VOC limits of GS-11.

.4 High Build Epoxy Coating: to CAN/CGAB – 1.153.

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

2.5 SHOP PAINTING

.1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.3 Clean surfaces to be field welded; do not paint.

2.6 ANGLE LINTELS

.1 Steel angles: galvanized prime painted sizes indicated for openings. Provide 150 mm minimum bearing at ends.

.1 Optional stainless steel finish for exterior steel angle lintels.

.2 Weld or bolt back-to-back angles to profiles as indicated.

.3 For non stainless steel angle lintels, apply one shop coat of primer.

2.7 SECURITY BARS IN DUCTS

.1 Construct frames of 35 mm x 35 mm x 3 mm angle steel welded around duct sleeve

.2 Space 10 mm Ø steel bars at 150 mm o.c. and weld to the frame.

PART 3 EXECUTION

3.1 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Provide components for building by other sections in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CAN/CSA-S16, or weld.

.7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

3.2 TRENCH COVERS

.1 Install trench covers in locations as indicated.

3.3 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

.3 Clean worksite daily

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Metal ladders.

.2 Metal ships' ladders and pipe crossovers.

1.2 PERFORMANCE REQUIREMENTS

.1 In addition to all other requirements outlined, design and construct ladders in accordance with occupational health and safety requirements of the jurisdiction governing the project.

.2 Delegated Design: Design ladder and ships' ladders including comprehensive engineering analysis by a professional engineer, using performance requirements and design criteria indicated.

1.3 ACTION SUBMITTALS

.1 Shop Drawings: Show fabrication and installation details for metal fabrications.

.1 Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

.2 Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

.1 Welding: Procedures according to the following:

.1 CSA W47.1, *Certification of Companies for Fusion Welding of Steel*.

1.5 PROJECT CONDITIONS

.1 Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.6 COORDINATION

.1 Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

.2 Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 METALS, GENERAL

.1 Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

.1 Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

.2 Steel sections: to CAN/CSA-G40.20/G40.21 Grade 300 W.

.3 Steel plate: to CAN/CSA-G40.20/G40.21, Grade260 W, pattern smooth.

.4 Abrasive-Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallically bonded to steel.

.5 Steel Tubing: ASTM A 500, cold-formed steel tubing.

.6 Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

.1 General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

.2 Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM F 568M, Property Class 4.6; with hex nuts, ASTM A 563M; and, where indicated, flat washers.

.3 Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 738M; with hex nuts, ASTM F 836M; and, where indicated, flat washers; Alloy Group A4.

.4 Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

.1 Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

.5 Machine Screws: ASME B18.6.7M.

.6 Lag Screws: ASME B18.2.3.8M.

.7 Plain Washers: Round, ASME B18.22M.

.8 Lock Washers: Helical, spring type, ASME B18.21.2M.

.9 Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by an independent testing agency.

.10 Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

.11 Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

.1 Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941M, Class Fe/Zn 5, unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

.1 Welding materials:

.1 To CSA W59 *Welded Steel Construction-Metal Arc Welding*.

.2 Shop Primers: For interior steel surfaces: MPI Approved Product No. 76 or 79, at the option of the fabricator.

.3 Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

.4 Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.5 FABRICATION, GENERAL

.1 Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

.2 Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1 mm unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

.3 Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

.4 Form exposed work with accurate angles and surfaces and straight edges.

.5 Do welding work in accordance with the following unless noted otherwise:

.1 CSA W59 *Welded Steel Construction-Metal Arc Welding*.

.6 Weld corners and seams continuously to comply with the following:

.1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

.2 Obtain fusion without undercut or overlap.

.3 Remove welding flux immediately.

.4 At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

.7 Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

.8 Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

.9 Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

.10 Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

.1 Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 3.2 by 38 mm, with a minimum 150 mm embedment and 50 mm hook, not less than 200 mm from ends and corners of units and 600 mm o.c., unless otherwise indicated.

2.6 METAL LADDERS

.1 Steel Ladders:

.1 Provide steel ladders unless noted otherwise.

.2 Space side rails 406 mm apart unless otherwise indicated.

.3 Side rails: Continuous, 9.5-by-64 mm steel flat bars, with eased edges.

.4 Rungs: 19 mm diameter steel bars.

.5 Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.

.6 Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout, or by providing nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.

.7 Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 12 mm in least dimension.

.8 Support each ladder at top and bottom and not more than 1500 mm o.c. with welded or bolted steel brackets.

.9 Prime and paint ladders, including brackets and fasteners.

2.7 FINISHES, GENERAL

.1 Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

.2 Finish metal ladders after assembly.

2.8 STEEL AND IRON FINISHES

.1 Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

.2 Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

.3 Items Indicated to receive MPI Approved Product No. 76 or shop primers: SSPC-SP 6/NACE No. 3, *Commercial Blast Cleaning.*

.1 Other Items: SSPC-SP 3, *Power Tool Cleaning.*

.4 Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, *Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel,* for shop painting.

.1 Do not apply primer to galvanized surfaces.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

.1 Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

.2 Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

.3 Field Welding: Comply with the following requirements:

.1 Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

.2 Obtain fusion without undercut or overlap.

.3 Remove welding flux immediately.

.4 At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

.4 Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

.5 Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 ADJUSTING AND CLEANING

.1 Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

.1 Apply by brush or spray to provide a minimum 0.05 mm dry film thickness.

.2 Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

.3 Clean work site daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Fixed-in-Place Steel Pipe Bollards with Covers of the following configurations:

.1 In ground.

1.2 ACTION SUBMITTALS

.1 Product Data: For each type of bollard cover required.

PART 2 PRODUCTS

2.1 FERROUS METALS

.1 Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

.2 Pipe: Steel pipe: to ASTM A53/A53M.

2.2 CONCRETE

.1 Concrete mixes and materials: in accordance with CAN/CSA-A23.1.

.1 Compressive strength: 20 MPa minimum at 28 days.

2.3 BOLLARD COVERS

.1 Bollard Covers: Smooth, high-impact resistant, UV resistant, one-piece PVC bollard cover with integral dome cap, sized to snugly fit diameter of pipe. Length to suit installation requirements. Minimum of 6 mm wall thickness

.1 Colour: If not otherwise indicated, then selected by Departmental Representative from manufacturer's full colour range.

2.4 METAL BOLLARDS

.1 Fabricate metal bollards from Schedule 40 steel pipe.

.1 Size: 150 mm diameter unless otherwise noted.

.2 Where bollards are indicated to receive controls for door operators, provide necessary cut-outs for controls and holes for wire.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Set bollards in ground and backfill with concrete, unless noted otherwise.

.2 Install bollard with top 1,500 mm above finished grade, unless otherwise noted.

.3 Insure bollard cover extends full length of exposed portion of pipe.

.4 Insure pipe extends down full depth of hole and extends up full height of bollard cover.

.5 Mark bollard locations on site and notify Departmental Representative. Adjust locations if so directed by Departmental Representative. Proceed with excavation only after 48 hours from providing notice.

.6 Take precautions to minimize impact of excavation and placement of concrete on adjacent surfaces. Protect finished surfaces with plywood or similar materials.

.7 Excavate hole to depth of 1200 mm or to rock-bearing, whichever is lesser. Maintain sides of hole straight and plumb walls whenever possible. Excavate hole 100 mm wider than bollard all around.

.8 Place pipe in hole in correct position, plumb, level. Adjust height of pipe as may be required to maintain correct height. Fill hole with concrete to within 100 mm of finish grade and allow to set.

.9 Fill pipe full with concrete, unless noted otherwise.

.1 Coordinate installation of conduit for electrical controls.

.10 Slide bollard cover over pipe, securing cover in place using construction adhesive.

.11 Reinstate finish grade with materials to match adjacent grade finish.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

- .1 Rooftop equipment bases and support curbs.
- .2 Wood blocking and nailers.
- .3 Wood furring.
- .4 Wood sleepers.
- .5 Plywood blocking within walls.
- .6 Plywood backing panels.

.2 Types of items not described in this Section:

- .1 Framing with dimension lumber.
- .2 Framing with engineered wood products.
- .3 Utility shelving.
- .4 Lumber treated with fire-retardant.

.3 Related Requirements

- .1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Section 09 91 23 - Interior Painting for priming and finish paint of equipment backer boards prior to use.
- .3 Section 07 92 00 - Joint Sealants.
- .4 Section 09 29 00 - Gypsum Board
- .5 Section 09 91 23 - Interior Painting

1.2 REFERENCES

.1 American National Standards Institute/National Particleboard Association (ANSI/NPA)

- .1 ANSI/NPA A208.1-2009, Particleboard.

.2 ASTM International

- .1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A153/A153M-09, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- .3 ASTM A563M-07, Standard Specification for Carbon and Alloy Steel Nuts
- .4 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
- .5 ASTM B633-13, Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
- .6 ASTM C578-11a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

.7 ASTM C954-15, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness

.8 ASTM C1289-11, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.9 ASTM C1396/C1396M-11, Standard Specification for Gypsum Board.

.10 ASTM D1761-06, Standard Test Methods for Mechanical Fasteners in Wood.

.11 ASTM D3498-03, Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems

.12 ASTM D5456-11, Standard Specification for Evaluation of Structural Composite Lumber Products.

.13 ASTM E488/E488M-15, Standard Test Methods for Strength of Anchors in Concrete Elements

.14 ASTM F568M-07, Standard Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-11.3-M87, Hardboard.

.2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.3 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction and amendment.

.4 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.4 CSA International

.1 CAN/CSA-A123.2-03(R2008), Asphalt Coated Roofing Sheets.

.2 CAN/CSA-A247-M86(R1996), Insulating Fiberboard.

.3 CSA/O80, Wood Preservation

.4 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.5 CSA O112.9-10, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).

.6 CSA O121-08, Douglas Fir Plywood.

.7 CAN/CSA O122-06(R2011), Structural Glued-Laminated Timber.

.8 CSA O141-05(R2009), Softwood Lumber.

.9 CSA O151-09, Canadian Softwood Plywood.

.10 CSA O153-M1980(R2008), Poplar Plywood.

.11 CSA O325-07, Construction Sheathing.

.12 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.

.13 CAN/CSA-Z809-08, Sustainable Forest Management.

.5 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.6 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2010.

.7 South Coast Air Quality Management District (SCAQMD), California State, Regulation

.8 XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2011, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.9 Sustainable Forestry Initiative (SFI)

.1 SFI-2010-2014 Standard.

.10 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

1.3 DEFINITIONS

.1 Dimension Lumber: Lumber of 38 mm actual or greater but less than 114 mm actual in least dimension.

.2 Lumber grading agencies, and the abbreviations used to reference them, include the following:

.1 NLGA: National Lumber Grades Authority.

1.4 ACTION SUBMITTALS

.1 Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

.1 Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

.2 For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

.3 Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wood from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse and return of pallets, as specified in Waste Reduction Workplan.

PART 2 PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

.1 Certified Wood: Lumber and plywood shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, *FSC Principles and Criteria for Forest Stewardship.*

.2 Lumber: In accordance with:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 Softwood Plywood panels: to CAN/CSA-O325.0.

.4 Hardwood Veneer Plywood Panels: to HPVA HP-1.

.5 Provide dressed lumber, S4S, unless otherwise indicated.

.6 Maximum Moisture Content of Lumber: 19 percent for 38 mm actual thickness or less, no limit for more than 38 mm actual thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

.1 Preservative Treatment by Pressure Process: to CSA O80 Series 8, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated with inorganic boron (SBX).

.1 Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Acceptable Preservative Treatments are Alkaline Copper Quaternary (ACQ) and/or Copper Azole (CA).

.2 Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

.3 Mark lumber with treatment quality mark of an inspection agency approved by the Canadian Lumber Standards Accreditation Board.

.4 Application: Treat items indicated on Drawings, and the following, unless otherwise noted.

.1 Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapour barriers, and waterproofing.

.2 Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.

.3 Furring attached directly to the interior of below-grade exterior masonry or concrete walls.

.1 Surface treat wood materials with wood preservative and not pressure treated when wood materials are in direct contact with modified bituminous roofing membranes.

2.3 MISCELLANEOUS LUMBER

.1 General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

.1 Blocking.

.1 Items requiring blocking include but are not limited to shelves, washroom accessories, projection screens and millwork.

.2 Nailers.

.3 Rooftop equipment bases and support curbs.

.4 Furring.

.2 For items of dimension lumber size, provide Construction or No. 2 grade lumber and any of the following species:

.1 Spruce-pine-fir; NLGA.

.3 For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

.1 Spruce-pine-fir, Construction or No. 2 Common grade; NLGA.

.4 For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

.5 For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

.6 For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD

.1 Telecommunication and Electrical Equipment Backing Panels: Veneer-Faced Panel Products (Hardwood Plywood) to HPVA HP-1, Grade B or better veneer, in thickness indicated or, if not indicated, not less than 18.5 mm thickness.

.1 Apply two coats of paint finish to all sides of backing panels in accordance with Section 09 91 23 - Interior Painting prior to installation of equipment.

.2 Plywood Blocking: DFP or CSP sheathing grade or PP standard sheathing grade, T&G edge.

2.5 FASTENERS

.1 General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

.1 Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

.2 Nails, Brads, and Staples: CSA B111.

.3 Power-Driven Fasteners: NES NER-272.

.4 Wood Screws: ASME B18.6.1.

.5 Screws for Fastening to Metal Framing: ASTM C 954, length as recommended by screw manufacturer for material being fastened.

.6 Lag Bolts: ASME B18.2.3.8M.

.7 Bolts: Steel bolts complying with ASTM F 568M, Property Class 4.6; with ASTM A 563M hex nuts and, where indicated, flat washers.

.8 Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by an independent testing and inspecting agency.

.1 Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2.6 MISCELLANEOUS MATERIALS

.1 Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

.1 Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

.2 Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.6 mm.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

.1 Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

.2 Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

.3 Framing Standard: Comply with more stringent of NBCC 2015, Part 9 and these specifications.

.4 Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

.5 Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

.6 Do not splice structural members between supports unless otherwise indicated.

.7 Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

.1 Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 406 mm o.c.

.8 Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

.9 Comply with manufacturer's instructions for applying field treatment to cut surfaces of preservative-treated lumber.

.1 Use inorganic boron for items that are continuously protected from liquid water.

.2 Use copper naphthenate for items not continuously protected from liquid water.

.10 Securely attach rough carpentry work to substrate by anchoring and fastening.

.11 Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD SLEEPER, BLOCKING, AND NAILER INSTALLATION

.1 Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

.2 Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 WOOD FURRING INSTALLATION

.1 Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

.2 Furring to Receive Plywood or Hardboard Paneling: Install 19-by-63 mm actual-size furring at 406 mm o.c.

3.4 PROTECTION

.1 Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply borate treatment. Apply borate solution by spraying.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Gypsum board sheathing.

.2 Related Requirements:

.1 Vapour and weather barriers for application overtop of gypsum sheathing.

1.2 TYPES OF ITEMS NOT DESCRIBED IN THIS SECTION:

.1 Gypsum board products used on the interior of a building.

1.3 ACTION SUBMITTALS

.1 Product Data: For each type of gypsum sheathing, sealant, and tape used.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

1.5 WARRANTY

.1 Warranty: Manufacturer's standard form in which gypsum sheathing manufacturer agrees to repair or replace gypsum sheathing that deteriorates during the warranty period.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

.1 Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per CAN/ULC-S101, *Fire Endurance Tests of Building Construction and Materials* by a testing and inspecting agency acceptable to authorities having jurisdiction.

2.2 WALL SHEATHING

.1 Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

.1 Type: Regular, unless otherwise indicated.

.2 Thickness: as indicated on drawings.

2.3 FASTENERS

.1 Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to

be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

.1 For steel framing less than 0.84 mm thick, use screws that comply with ASTM C 1002.

.2 For steel framing from 0.84 to 2.84 mm thick, use screws that comply with ASTM C 954.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

.1 Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

.2 Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

.3 Securely attach to substrate using screws spaced in accordance with gypsum sheathing manufacturer.

.4 Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

.5 Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 GYPSUM SHEATHING INSTALLATION

.1 Comply with GA-253 and with manufacturer's written instructions.

.1 Fasten gypsum sheathing to wood framing with screws.

.2 Fasten gypsum sheathing to cold-formed metal framing with screws.

.3 Install boards with a 9.5 mm gap where non-load-bearing construction abuts structural elements.

.4 Install boards with a 6.4 mm gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

.2 Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

.3 Horizontal Installation: Install sheathing horizontally. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

.1 Space fasteners approximately 200 mm o.c. and set back a minimum of 9.5 mm from edges and ends of boards.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.5 Section 06 10 53 - Miscellaneous Rough Carpentry.

.6 Section 07 92 00 - Joint Sealants

.7 Section 09 91 23 - Interior Painting

.8 Mechanical Sections

.9 Electrical Sections

1.2 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI A208.2-94, Medium Density Fiberboard (MDF).

.2 ANSI/BHMA A156.9-2001, Cabinet Hardware Standards.

.2 American Society for Testing and Materials (ASTM)

.1 ASTM D523-14, Standard Test Method for Specular Gloss

.2 ASTM D570-98, Standard Test Method for Water Absorption of Plastics

.3 ASTM D635-14, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position

.4 ASTM D648-07, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

.5 ASTM D695-15, Standard Test Method for Compressive Properties of Rigid Plastics

.6 ASTM D696-08, Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between −30°C and 30°C with a Vitreous Silica Dilatometer

.7 ASTM D785-08, Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials

.8 ASTM D790-10, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

.9 ASTM D792-13, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement

.10 ASTM D2240-05, Standard Test Method for Rubber Property—Durometer Hardness

.11 ASTM D2369-10, Standard Test Method for Volatile Content of Coatings

.12 ASTM D2832-92(R1999), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.13 ASTM D3801-10, Standard Test Method for Measuring the Comparative Burning Characteristics of Solid Plastics in a Vertical Position

.14 ASTM D5116-97, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.15 ASTM E84-15, Standard Test Method for Surface Burning Characteristics of Building Materials

.16 ASTM E648-15, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

.17 ASTM E3801-10, Standard Test Method for Measuring the Comparative Burning Characteristics of Solid Plastics in a Vertical Position

.18 ASTM E1333-96, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.

.3 Architectural Woodwork Manufacturers Association of Canada (AWMAC)

.1 AWMAC Quality Standards for Architectural Woodwork, 2003.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.2 CAN/CGSB-11.3-87, Hardboard

.5 Canadian Standards Association (CSA)

.1 CSA B111-74(R1998), Wire Nails, Spikes and Staples.

.2 CSA O112.4-M1977(R1999), Standards for Wood Adhesives.

.3 CSA O112.5-Series-M-1977(R1999), Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).

.4 CSA O112.7-Series M-1977(R1999), Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).

.5 CSA O115-M1982(R2001), Hardwood and Decorative Plywood.

.6 CSA O121-M89(R2003), Douglas Fir Plywood.

.7 CAN/CSA O141-91(R2005), Softwood Lumber.

.8 CSA O151-2004, Softwood Plywood.

.9 CSA O153-M1980(R2003), Poplar Plywood.

.10 CSA Z760-94, Life Cycle Assessment.

.6 Environmental Choice Program (EPC)

.1 ECP-44-92, Adhesives.

.2 ECP-45-92, Sealants and Caulking Compounds.

.3 ECP-76-98, Surface Coatings.

.7 International Organization for Standardization (ISO)

.1 ISO 14040-97, Environmental Management-Life Cycle Assessment - Principles and Framework.

.2 ISO 14041-98, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.

.8 National Electrical Manufacturers Association (NEMA)

.1 NEMA LD-3-2005 - High Pressure Decorative Laminates.

.9 National Hardwood Lumber Association (NHLA)

.1 Rules for the Measurement and Inspection of Hardwood and Cypress , January 1996.

.10 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber, 2000.

1.3 SUBMITTALS

.1 Product Data: For each type of product, including panel products and finishing materials and processes.

.2 Product Data: For each type of product, including panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, and for each type of casework hardware and accessories..

.3 Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

.1 Show details full size.

.2 Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

.3 Show locations and sizes of cut-outs and holes for electrical switches and outlets and other items installed in architectural wood cabinets.

.4 Samples for Verification:

.1 Plastic laminates 300 by 300 mm, for each type, colour, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.

.2 Thermoset decorative panels, 200 by 250 mm, for each colour, pattern, and surface finish, with edge banding on one edge.

.3 Exposed casework hardware and accessories, one unit for each type and finish.

.5 Product Certificates: For the following:

.1 Thermoset decorative panels.

.2 High-pressure decorative laminate.

.3 Adhesives.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in *Field Conditions* Article.

1.5 FIELD CONDITIONS

.1 Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

.2 Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

.1 Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

.3 Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate wood waste in accordance with the Waste Management Plan and place in designated areas or reuse.

.2 Do not burn scrap at the project site.

.3 Fold up metal banding, flatten, and place in designated area for recycling.

1.7 QUALITY ASSURANCE

.1 Fabricator: Shop that employs skilled workers who custom fabricate products similar to those required for this Project.

.2 Installer: Fabricator of products.

.3 Mock-ups: Build mock-ups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Build mock-ups of typical architectural wood cabinets as shown on Drawings.

.2 Subject to compliance with requirements, approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

.4 Materials and workmanship shall meet or exceed recommendations and requirements of AWMAC Quality Standards for Architectural Woodwork Manual.

.5 Reference to Custom or Economy grade in this Section shall be as defined in the AWMAC Manual.

.6 Items without a grade specified shall be Custom grade.

.7 Installer shall be responsible for supplying field dimensions that will affect the work of this Section.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.1 Protect millwork against dampness and damage during and after delivery.

.2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect architectural woodwork from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Waste Reduction Workplan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse by manufacturer of padding, as specified in Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.9 COORDINATION

.1 Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural cabinets can be supported and installed as indicated.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

.1 Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

.1 Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 75 mm wide.

.2 Wood Moisture Content: 8 to 13 percent.

.2 Machine stress-rated lumber is acceptable for all purposes.

.3 The manufacturing process must adhere to Lifecycle Assessment (LCA) Standards as per ISO 14040/14041 LCA Standard, CSA Z760 94 Life Cycle Assessment.

.4 Hardwood lumber: maple or birch species, in accordance with following standards:

.1 National Hardwood Lumber Association (NHLA).

.2 AWMAC custom grade, moisture content as specified.

.5 Douglas fir plywood (DFP): to CSA O121, standard construction.

.6 Hardwood plywood (Veneer-Faced Panel Products):

.1 to CSA O115, birch or maple species to AWMAC stain grade, natural select white.

.7 Baltic birch plywood: interior grade BB/MR to GOST 3916.1-96 standards.

.8 Hardboard

.1 To CAN/CGSB-11.3.

.2 Manufactured such that formaldehyde emissions do not exceed 0.15 ppm (180 microg/m^3) when tested in accordance with ASTM E1333.

.3 If manufactured using a wet process:

.1 be made by a process that does not release matter in the undiluted product plant effluent generating a BOD5 in excess of 50 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment;

.2 be made by a process that does not release TSS in excess of 60 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment;

.4 Contain at least 50 % recycled materials.

2.2 LAMINATE MATERIALS

.1 Colours, Patterns, and Finishes: Provide materials and products that result in colours and textures of exposed laminate surfaces complying with the following requirements:

.1 **PLAM1**:

.1 Colour and Type: Dark Grey Quartz with Matte finish to be chosen by Departmental Representative from manufacturer's standard range of products.

.2 **PLAM2**:

.1 Colour and Type: Mid toned, straight grained wood finish to be chosen by Departmental Representative from manufacturer's wood grain line of products; complete with softgrain finish and manufacturer's scratch and scuff resistant technology.

.3 **PLAM3**:

.1 Chemical Resistant Plastic laminate.

.2 Colour: Dark Grey colour to be chosen by Departmental Representative from manufacturer's standard range.

.3 Type and Thickness: Compact Substrate Grade R3; Thickness 25mm-Finish CT.

.4 **MEL1**:

.1 Colour: Light Grey colour with suede finish to be chosen by Departmental Representative from manufacturer's standard range.

.2 Type and Thickness: 19 mm thermally fused, c/w 3mm grey PVC edging to match melamine colour.

.2 Laminated plastic for flatwork: to NEMA LD3, Grade HGS, 1.2 mm thick; based on solid, wood grain or printed pattern colour range with satin finish.

.3 Laminated plastic for postforming work: to NEMA LD3, Grade VGS, 1.0 mm thick, based on solid, wood grain or printed pattern colour range with satin finish.

.4 Chemical resistant plastic laminate countertops: to NEMA LD3 for HGP post forming laminate and Scientific Equipment and Furniture Association SEFA No. 81 approved.

.5 Laminated plastic backing sheet for concealed surface of casework backs: Grade BK, not less than 0.5 mm thick or same thickness as face laminate.

.6 Laminated plastic liner sheet for semi-exposed shelves, interior of case bodies and all surfaces of drawer boxes: Grade VGS or CLS, white colour.

.7 Thermofused melamine: to NEMA LD3 Grade VGL, M3.

.1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).

.8 Nails and staples: to CSA B111.

.9 Wood screws: stainless steel or steel, type and size to suit application.

.10 Splines: wood or type recommended by manufacturer.

.11 Sealant: See Section 07 92 00 - Joint Sealants.

.12 Laminated plastic adhesive:

.1 Test for acceptable VOC emissions in accordance with ASTM D2369 and ASTM D2832.

.2

2.3 CASEWORK

.1 Casework shall be frameless construction type, with flush overlay interface style

.2 Casework

.1 Furring, blocking, nailing strips, grounds and rough bucks and sleepers.

.1 S2S is acceptable.

.2 Board sizes: "Standard" or better grade.

.3 Dimension sizes: "Standard" light framing or better grade, to NLGA grading rules.

.2 Framing softwood plywood species, standard grade.

.3 Case bodies ends, divisions and bottoms.

.1 19mm thick plywood, with 1.15mm thick plastic laminate on exposed surfaces, solid colour melamine on non-exposed surfaces.

.2 Edge Banding: plastic laminate, thickness and colour to match case body.

.4 Casework doors

.1 19mm thick softwood plywood with 1.15mm thick plastic laminate.

.2 Edge banding: PVC, colour to match plastic laminate.

.5 Shelves

.1 Plywood, laminated with thermofused melamine VGL grade M3, 19mm thick.

.2 Edge banding: plastic laminate standard grade 1.15mm thick.

.6 Drawers

.1 Fabricate drawers to AWMAC custom grade supplemented as follows:

.1 Sides & Back:

.1 For drawers over 150mm height: particle board, 13mm thick, laminated with thermofused melamine, VGL grade M3; complete with edge banding, plastic laminate standard grade (1.15mm), colour to match plastic laminate.

.2 For drawers up to 150mm height: sides to be metal integral side slide system; bands to be 13mm particle board core laminated with thermofused melamine.

.2 Bottoms:

.1 Particle board, 13mm, laminated with thermofused melamine; complete with edge banding, plastic laminate standard grade (1.15mm), color to match.

.3 Fronts:

.1 Particle board, 19mm thick, with 1.15mm thick plastic laminate, PVC edge banding colour to match plastic laminate.

.3 Countertops

.1 Stainless Steel Countertop **STS1**:

.1 16 gauge (1.6mm) brushed stainless steel, 38mm thick front nosing edge, adhered to 2 layers of 19mm thick plywood core c/w welded seams, integral backsplash.

.2 Plastic Laminated Countertop: Factory laminated post-formed type complete with standard 12mm bullnose edge and butt backsplash 100mm high, in locations indicated on millwork drawings (A-800 series). Core – particle board, grade R or plywood, ¾" thick for 11/2" thick overall front nosing edge.

.1 See Part 2.2 for PLAM types.

.3 Hardwood Countertop **WD1**:

.1 19mm Laminated Hardwood countertop, factory finished with stain and grain to match PLAM2, adhered to 19mm plywood, c/w 40mm hardwood edge to match, provide sample for review by Departmental Representative

2.4 SHOP FINISHING

.1 General: Finish architectural wood casework at fabrication shop as specified in this Section. Defer only final touch-up, cleaning, and polishing until after installation.

.2 Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural wood cabinets, as applicable to each unit of work.

.1 Back-priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of cabinets.

.3 Transparent Finish

.1 Grade: Same as item to be finished.

.2 Provide any one of the following finishes for woodwork intended for a transparent finish.

.1 AWMAC Finish System: Synthetic penetrating oil.

.2 AWMAC Finish System: Nitrocellulose lacquer.

.3 AWMAC Finish System: Catalyzed lacquer.

.4 AWMAC Finish System: Acrylic lacquer.

.5 AWMAC Finish System: Conversion varnish.

.6 AWMAC Finish System: Catalyzed vinyl.

.3 Staining: If not otherwise indicated, staining is not required.

.4 Filled Finish for Open-Grain Woods

.1 After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.

.2 Apply wash-coat sealer after staining and before filling.

.5 Sheen: if not otherwise indicated provide satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

.4 Opaque Finish

.1 Provide anyone of the following finishes for woodwork intended for an opaque finish.

.1 AWMAC Finish System: Nitrocellulose lacquer.

.2 AWMAC Finish System: Catalyzed lacquer.

.3 AWMAC Finish System: Acrylic lacquer.

.4 AWMAC Finish System: Conversion varnish.

.5 AWMAC Finish System: Catalyzed vinyl.

.2 Colour: If not otherwise indicated then selected by Departmental Representative from paint manufacturer's full colour range.

.3 Sheen: if not otherwise indicated provide satin, 31-45 gloss units measured on 60-degree gloss meter per ASTM D 523.

2.5 HARDWARE

.1 Casework hardware to: ANSI-A156.9, Grade 1

.2 Hardware Finishes

.1 Exposed Hardware: If not otherwise indicated provide Satin Stainless Steel: BHMA 630 to BHMA A156.18. In room 122 provide non-reflective hardware as per the drawings.

.2 Concealed Hardware: Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

.3 Hinges: concealed hinge, self-closing, 120 to 125 degree of opening, full overlay type for screw attachment complete with mounting plates.

.4 Drawer Slides: BHMA A156.9, B05091.

.1 For cabinets used as part of a domestic kitchen cabinet arrangement or kitchenette arrangement in staff rooms, lunch rooms, board rooms, and other similar locations:

.1 Standard Duty (Grade 1, Grade 2, and Grade 3): Side mounted and extending under bottom edge of drawer; partial-extension type; epoxy-coated steel with polymer rollers.

.2 Trash Bin Slides for trash bins not more than 500 mm high and 400 mm wide: Grade 1HD-200.

.2 For all other millwork:

.1 Drawers 610 mm wide or less: full extension all ball bearing, rail mount, full extension + 25 mm over travel slides, hold-in detent, 45 kg load rating, and progressive movement.

.2 Drawers 762 mm wide or less: fully concealed under-mount slide with ball bearing and polymer rollers, full extension, 45 kg load rating.

.3 Drawers 1067 mm wide or less or designated for files: all ball bearing, rail/bracket mount, full extension + 25 mm over travel slides, hold-in detent, 91 kg load rating, and sequential movement.

.4 Speciality Slides, as required, complete with ball-bearing glides.

.5 Adjustable Shelf Standards and Supports:

.1 If not otherwise indicated provide to BHMA A156.9, B04071; with shelf rests, B04081. Steel construction, adjustable in 13mm increments, zinc finish.

.2 Workstation Tops and Vanities: 457x305mm heavy duty workstation bracket, 3mm steel construction, minimum 450 kg. load capacity (per pair), white textured powder-coat finish.

.3 Shelves: 250x250mm heavy duty shelf bracket, 2.5mm steel construction, minimum 225 kg. load capacity (per pair), white textured powder-coat finish.

.6 Adjustable Shelf pegs and Hole Liners

.1 6 mm shelf pegs with integral "L"-shaped shelf support with hole for optional screw attachment, with metal hole liners, nickel plated finish.

.7 Drawer and Door Handles:

.1 If not otherwise indicated provide recessed stainless steel pulls; or equivalent.

.8 Locks: inlay or rim style deadbolt or cam lock system nickel finish, master keyed, keyed alike in groups. Provide locks for all cabinets and drawers.

.1 For Door: BHMA A156.11, E07121. 6 pin/tumbler cylinder type, mortised strike.

.2 For Drawer: BHMA A156.11, E07041. 6 pin/tumbler cylinder type, mortised strike.

.3 Provide 2 keys per lock.

.9 Hasps: Non-reflective, black hasps to accommodate standard lock (supplied by Departmental Representative). When hasp is closed, all mounting screws are concealed.

.10 Door and Drawer Bumpers: Plastic, polyurethane, neoprene or similar bumper, c/w tack or similar, but not of the self-adhesive type.

.11 Cutlery Tray

.1 Moulded polystyrene cutlery tray, custom cut to fit drawer size.

.12 Casters:

.1 Provide casters rated to a minimum 50kg per caster, approximate wheel diameter 75 mm, total caster height 100mm, swivel and lockable, recommended for linoleum sheet flooring.

2.6 FABRICATION

.1 Set nails and countersink screws apply wood filler to indentations, sand smooth and leave ready to receive finish.

.2 Shop install cabinet hardware for doors, shelves and drawers. Mortise shelf standards fully into casework.

.3 Shelving to cabinetwork to be adjustable unless otherwise noted.

.4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

.6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.7 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.8 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.

.9 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.

.3 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets.

.4 Use draw tight joint fasteners in countertop joints.

.5 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.

.6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.

.7 Apply water resistant building paper or bituminous coating over wood framing members in contact with masonry or cementitious construction.

.8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

.9 Install in locations where shown on floor plans.

.1 Provide grommets for cable passage through surfaces, 75 mm diameter, plastic, black colour.

.2 Install cable grommets in locations shown and in other locations determined by Departmental Representative during shop drawing stage.

.10 Provide locks on all drawers and cabinets.

3.2 ADJUSTING AND CLEANING

.1 Clean millwork and cabinet work inside cupboards and drawers and outside surfaces.

.2 Remove excess glue from surfaces.

.3 Clean, lubricate, and adjust hardware.

.4 Clean worksite daily

3.3 PROTECTION

.1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Extruded-Polystyrene Board Insulation
.2 Unfaced, Mineral-Wool Board Insulation

.2 Types of Items not specified in this Section:

.1 Glass-fibre board insulation.
.2 Insulation installed in masonry cavity walls.
.3 Insulated drainage panels installed with waterproofing.
.4 Insulation specified as part of an Exterior Insulation Finishing System.
.5 Insulation specified as part of roofing construction.
.6 Insulation installed as part of a perimeter fire-resistive joint system.
.7 Insulation installed in spandrel panels in curtain wall and store front framing

.3 Related Requirements

.1 Section 01 33 00 - Submittal Procedures
.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal
.3 Section 03 30 00 - Cast in Place Concrete
.4 Section 06 10 53 - Miscellaneous Rough Carpentry

1.2 REFERENCES

.1 ASTM International

.1 ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

.2 Canadian General Standards Board (CGSB)

.1 CGSB 71-GP-24M-AMEND-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.

1.3 ACTION SUBMITTALS

.1 Product Data: Provide for each type of product indicated.

.1 Include GPW calculations.

1.4 QUALITY ASSURANCE

.1 Surface-Burning Characteristics: As determined by testing identical products according to CAN/ULC-S102, *Test for Surface Burning Characteristics of Building Materials and Assemblies* by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

.2 Protect foam-plastic board insulation as follows:

.1 Do not expose to sunlight except to necessary extent for period of installation and concealment.

.2 Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.

.3 Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

.3 Develop Construction Waste Management Plan related to Work of this Section.

.4 Packaging Waste Management: remove for reuse by manufacturer of packaging materials as specified in Construction Waste Management Plan.

PART 2 PRODUCTS

2.1 MATERIALS

.1 The product shall be manufactured with low Global Warming Potential (GWP).

2.2 FOAM-PLASTIC BOARD INSULATION

.1 Extruded-Polystyrene Board Insulation: CAN/ULC S701, of type and minimum compressive strength indicated below, with maximum flame-spread index of 500, per CAN/ULC-S102.

.1 Regular, Type 4 shiplapped: typical uses, unless noted otherwise.

.2 High Density, Type 4, having a compressive strength of not less 414kPa: under slabs exposed to passenger vehicles, and other locations if so indicated.

.3 Extra High Density Type 4, having a compressive strength of not less than 690kPa: under slabs exposed to truck, bus, or heavy equipment, and other locations if so indicated.

.2 Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

2.3 MINERAL-WOOL BOARD INSULATION

.1 Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.

.2 Unfaced, Mineral-Wool Board Insulation: CAN/ULC-S702, Type 1; with maximum flame-spread index of 25, per CAN/ULC-S102.

.1 Nominal density of 70 kg/cu. m, Types I, RSI of 0.74 per 25 mm.

2.4 THERMAL SPACERS

.1 Fibre reinforced thermal assembly clip designed to support horizontal z-girts and cladding systems and insulation.

.1 Conductivity (U-Value): maximum of 0.35 W/m^2 K

2.5 SEALANT

.1 Spray-foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 24 to 32 kg/cu. m density; flame-spread index of 25 or less according to CAN/ULC-S102; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

.1 Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

.1 Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

.2 Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

.3 Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

.4 Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

.5 Foam-Plastic Board Insulation: Fill voids in completed installation with spray-foam sealant.

.6 Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

.1 Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.3 INSTALLATION OF BELOW-GRADE INSULATION

.1 On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

.1 If not otherwise indicated, extend insulation a minimum of 1500 mm below exterior grade line.

.2 On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

.1 If not otherwise indicated, extend insulation a minimum of 1500 mm in from exterior walls.

3.4 INSTALLATION OF ABOVE-GRADE INSULATION

.1 Surface Mounted Installations: Bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

.2 Installation Within Framed Construction: Install in cavities formed by framing members according to the following requirements:

.1 Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

.2 Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

.3 Maintain 76 mm clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

3.5 PROTECTION

.1 Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

3.6 INSULATION SCHEDULE

.1 Extruded-polystyrene board insulation:

.1 Below grade.

.2 Other locations where specifically indicated.

.2 Unfaced, mineral-wool board insulation.

.1 Exterior envelope including cavity walls.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes fibre wool blanket insulation used for its acoustical, thermal, or fire-resistant properties and installed:

.1 Within framing.

.2 On top of suspended ceilings.

.2 Types of Items not Described in this Section:

.1 Glass fibre blanket insulation.

.2 Mineral fibre board insulation.

.3 Insulation installed as part of a perimeter fire-resistive joint system.

1.2 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

.1 Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to CAN/ULC-S101 by an independent testing agency.

.2 STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 MINERAL-WOOL BLANKET INSULATION

.1 Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.

.2 Unfaced, Mineral-Wool Blanket Insulation: CAN/ULC-S702, Type I.

.1 Polywrap-sealed when installed above ceilings and used as air plenums.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

.1 Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

.2 Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

.3 Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

.4 Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

.1 Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

.1 Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

.2 Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

.3 Maintain 76 mm clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

.4 For metal-framed wall cavities where cavity heights exceed 2438 mm, support unfaced blankets mechanically.

3.3 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

.1 Where mineral-fibre blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 1219 mm beyond face of partitions below.

3.4 PROTECTION

.1 Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Section 01 45 00 – Testing and Quality Control.

.3 Section 01 51 00 - Temporary Utilities.

1.2 REFERENCES

.1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)

.2 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S101-1989, Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC-S102-1988(R2000), Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC-S705.1-01, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.

.4 CAN/ULC-S705.2-02, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

.5 CAN/ULS-S124 Test for the Evaluation of Protective Coverings for Foamed Plastic.

1.3 TEST REPORTS

.1 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01 45 00 - Quality Control.

.2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.4 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

1.5 MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up 10 m^2 minimum, of spray in place urethane foam insulation including one inside corner and one outside corner. Mock-up may be part of finished work.

.3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with waterproofing work.

1.6 SAFETY REQUIREMENTS

.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

.1 Workers must wear gloves, respirators, dust masks, long sleeved clothing, eye protection, protective clothing, and any other necessary PPE when applying foam insulation.

.2 Workers must not eat, drink or smoke while applying foam insulation.

1.7 PROTECTION

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal all materials and by-products for recycling in accordance with Waste Management Plan.

.4 Fold up metal banding, flatten and place in designated area for recycling.

.5 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions and CAN/ULC-S705.2.

.6 Divert metal drums from landfill to metal recycling facility as approved by Engineer Consultant and to CAN/ULC-S705.2.

1.9 ENVIRONMENTAL REQUIREMENTS

.1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

Part 2 Products

2.1 MATERIALS

.1 Insulation: spray polyurethane to CAN/ULC-S705.1.

.2 Primers: in accordance with manufacturer's recommendations for surface conditions.

.3 Cementitious Fireproofing: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application or conveyed in a dry state and mixed with atomized water at place of application.

- .1 Bond Strength: Minimum 19-kPa cohesive and adhesive strength based on field testing according to ASTM E 736.
- .2 Density: Not less than 350 kg/cu. m and as specified in the approved fire-resistance design, according to ASTM E 605.
- .3 Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than 9 mm.
- .4 Combustion Characteristics: CAN/ULC-S114.
- .5 Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- .6 Provide copies of the Certificate or proof that the contractor and installers at site are approved by the manufacturer
- .7 Provide site supervision at the time of product application to ensure that the product is installed as per manufacturer's specifications.

.4 Sprayed Intumescing fireproofing: Applied over spray-on foamed plastic insulation to meet the following criteria;

- .1 All conditions and limitations of the CCMC report 14036-R.
- .2 Product is to be applied to the 20- minute-to-flash-over performance level in CAN/ULC-S9705.
- .3 Application of primer with 3mil WFT thickness and intumescing coating with 24mil WFT.

.5 Provide copies of the Certificate or proof that the contractor and installers at site are approved by the manufacturer

.6 Provide site supervision at the time of product application to ensure that the product is installed as per manufacturer's specifications.

.7 Provide signage at approximately 6m regular intervals in the attic space to indicate that the thermal barrier is to be maintained over the sprayed foam. Exact wording "Intumescing thermal barrier applied over spray-foam insulation to be maintained at all times."

Part 3 Execution

3.1 APPLICATION

.1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions. Use primer where recommended by manufacturer.

.2 Apply sprayed foam insulation in thickness as indicated.

.3 Limit individual application pass thickness to maxim 75mm per pass.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 01 45 00 – Testing and Quality Control.

.4 Section 01 51 00 - Temporary Facilities and Controls.

1.2 REFERENCES

.1 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)

.2 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC-S102, Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC-S705.1, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Material Specification.

.4 CAN/ULC-S705.2, Standard for Thermal Insulation Spray Applied Rigid Foam, Medium Density, Installer's Responsibilities-Specification.

1.3 TEST REPORTS

.1 Submit test reports, verifying qualities of foam sealant meet or exceed requirements of this specification.

.2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

1.4 SAFETY REQUIREMENTS

.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

.1 Workers must wear gloves, respirators, dust masks, eye protection, protective clothing when applying foam sealant.

.2 Workers must not eat, drink or smoke while applying foam sealant.

1.5 PROTECTION

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Facilities and Controls.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.5 Dispose of waste foam sealant daily in location designated by Departmental Representative and decontaminate empty drums in accordance with foam sealant manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Apply foam sealant only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Low expanding, one-component, polyurethane foam sealant, curing to a semi-rigid, closed cell urethane foam providing a RSI of 0.9 per 25.4 mm. To meet the following physical properties:

.1	Density:	25.7 kg/m^3
.2	Compressive Strength Parallel @ 10%:	69-96 psi
.3	Tensile Strength:	103 psi
.4	Water Vapour Transmission:	5.97 perms
.5	Flame Spread:	20
.6	Smoke Development:	70

PART 3 EXECUTION

3.1 APPLICATION

.1 Apply foam sealant to clean surfaces in accordance manufacturer's printed instructions. Surfaces to be free of dust, dirt, oil and other foreign materials.

.2 Cover surfaces not intended to be foamed.

.3 Apply foam sealant to perimeter of openings indicated and to thickness as recommended by manufacturer. Trim excess cured foam from finished area.

.4 Cover exposed urethane foam sealants to protect from adverse affects from ultraviolet light (sunlight).

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 03 30 00 - Cast-in-Place Concrete.

.4 Section 06 10 53 – Miscellaneous Rough Carpentry.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

.2 Underwriters Laboratories Canada (ULC)

.1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

.1 Submit manufacturer's printed product literature, specifications and datasheet and include:

.1 Product characteristics.
.2 Performance criteria.
.3 Limitations.

.2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.3 Quality assurance submittals:

.1 Certificates: submit certificates certifying that materials comply with specified performance characteristics and physical properties.
.2 Instructions: submit manufacturer's installation instructions and comply with written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

1.4 MOCK-UPS

.1 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.

.2 Mock-up will be used to judge workmanship, substrate preparation, and material application.

.3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with vapour barrier work.

.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

PART 2 PRODUCTS

2.1 USE OF PRODUCTS

.1 Polyethylene film sheet vapour retarders to be used as shown on drawings in interior partitions only.

2.2 SHEET VAPOUR RETARDER

.1 Polyethylene film: to CAN/CGSB-51.34, 0.15mm thick with a water vapour permeance of not greater than 45 ng/(P·s·m^2), flame spread rating of less than 150 to CAN/ULC S102.

2.3 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.

.2 Sealant: compatible with vapour retarder, recommended by vapour retarder manufacturer, to Section 07 92 00 - Joint Sealants.

.3 Staples: minimum 6 mm leg.

.4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Use sheets of largest practical size to minimize joints.

.3 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.

.2 Lap sheet over sealant and press into sealant bead.

.3 Install staples through lapped sheets at sealant bead into substrate.

.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.3 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.1 Attach first sheet to substrate.

.2 Apply continuous bead of sealant over solid backing at joint.

.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.

.4 Install staples through lapped sheets at sealant bead into substrate.

.5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.5 CLEANING

.1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Clean worksite daily

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section includes metal-faced composite wall panels installed to the rainscreen principle.

.1 Dry system, without face sealants; unless otherwise noted.

.2 Wet system, with face sealants, only where specifically noted.

.2 Related Work:

.1 Section 07 21 13 - Board Insulation for exterior wall insulation.

.2 Section 07 62 00 - Sheet Metal Flashing and Trim for field-formed flashings and other sheet metal work not part of metal-faced composite wall panel assemblies.

1.2 DEFINITION

.1 Metal-Faced Composite Wall Panel Assembly: Metal-faced composite wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete weather tight wall system.

1.3 PERFORMANCE REQUIREMENTS

.1 General Performance: Metal-faced composite wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

.2 Design system as a *Pressure Equalized Rainscreen* based on guidelines published by the National Research Council of Canada. Incorporate means of draining moisture to the exterior.

.3 Panel removal: System shall be non-progressive, allowing removal of any individual panel without necessitating removal of adjacent work.

.4 Delegated Design: Design metal-faced composite wall panel assembly, including comprehensive engineering analysis by a professional engineer, using performance requirements and design criteria indicated.

.5 Air Infiltration: Air leakage through assembly of not more that 0.3 L/s per sq. m. of wall area when tested according to ASTM E 283 at the following test pressure difference:

.1 Test-Pressure Difference: 300Pa

.6 Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test pressure difference:

.1 Test-Pressure Difference: 300Pa

.7 Water Penetration under Dynamic Pressure: No water penetration when tested according to AAMA 501.1

.8 Structural Performance: Metal wall panel assemblies shall withstand the effects of the following loads and stresses within limits and under conditions indicated, based on testing to ASTM E 330:

.1 Structural movement:

.1 Accommodate movement of supporting structural framing and without causing bowing, buckling, delamination, oil canning, excessive stress on fasteners, or any other detrimental effects.

.2 Wind Loads:

.1 Calculated as per the National Building Code of Canada (2015) for project location, type of building and adjacent site conditions, but in no case less than 1.4 KPa and in no case less than loadings containing in *Cladding Wind Load Estimates*, if so attached with this project Manual.

.2 Design wall system to resist wind loads, positive and negative, without causing rattling, vibration or excessive deflection of panels, overstressing of fasteners, clips or other detrimental effects on wall system.

.3 Deflection Limit: Panels must return to an essentially flat condition after design wind load is removed with permanent set not to exceed L/800.

.9 Fire-Performance:

.1 Surface-Burning Characteristics: Provide materials with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

.1 Flame-Spread Index: 25 or less.

.2 Smoke-Developed Index: 450 or less.

.2 Non-combustible Characteristics for Non-Combustible Cores: Provide core material with the following combustibility characteristics as determined by testing identical products per CAN/ULC-S134 or another testing and inspecting agency acceptable to authorities having jurisdiction:

.10 Panel flatness tolerance applies to even rises and falls across panel. Local bumps and depressions will not be accepted. Fabricate panels not exceeding the following tolerances:

.1 1.5 mm in a convex direction, measured perpendicularly to normal plane.

.2 1.5 mm in a concave direction, measured perpendicularly to normal plane.

.11 Maximum deviation from vertical and horizontal alignment of erected panels: 6 mm in 6 m.

.12 Maximum deviation from panel flatness shall be 3 mm in 1.5 m panel in any direction for assembled units (non-accumulative).

.13 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of

components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and night-time-sky heat loss.

.1 Temperature Change (Range): 67 deg C, ambient; 100 deg C, material surfaces.

1.4 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal-faced composite wall panel and accessory.

.2 Shop Drawings: Show fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory-, shop-, and field-assembled work.

.1 Accessories: Include details of the following items, at a scale of not less than 1:10:

.1 Flashing and trim.

.2 Anchorage systems.

.3 Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

.1 Metal-Faced Composite Wall Panels: Minimum 300 x 300 mm. Include fasteners, closures, and other metal-faced composite wall panel accessories.

.1 Composite Panels: Include four-way joint.

.2 Trim and Closures: 300 mm long. Include fasteners and other exposed accessories.

.3 Accessories: 300 mm long Samples for each type of accessory.

.4 Exposed Gaskets: 300 mm long.

.5 Exposed Sealants: For each type and colour of joint sealant required. Install joint sealants in 13 mm wide joints formed between two 150 mm long strips of material matching the appearance of metal-faced composite wall panels adjacent to joint sealants.

1.5 INFORMATIONAL SUBMITTALS

.1 Coordination Drawings: Exterior elevations, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

.1 Wall panels and attachments.

.2 Girts and stud framing.

.3 Wall-mounted items including doors, windows, louvers, and lighting fixtures.

.4 Penetrations of wall by pipes and utilities.

.2 Product Test Reports: Based on evaluation of comprehensive tests performed by a testing agency, for each product.

.1 Submit test reports for pressure equalization performance based on AAMA 508 and based on full scale measurements in the field for pressure equalization.

.3 Field quality-control reports.

.4 Warranties: Samples of warranty.

1.6 CLOSEOUT SUBMITTALS

.1 Maintenance Data: For metal wall panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

.1 Source Limitations: Obtain each type of metal-faced composite wall panel from single source from single manufacturer.

.2 Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

.1 Build mock-up of typical corner panel, including soffit, as shown on Drawings; approximately one bay wide by one story high by full thickness, including supports, attachments, and accessories.

.1 Include four-way joint for metal-faced composite wall panels.

.2 Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Departmental Representative specifically approves such deviations in writing.

.3 Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

.3 Preinstallation Conference: Conduct conference at Project site.

.1 Meet with Departmental Representative, metal-faced composite wall panel Installer, metal-faced composite wall panel manufacturer's representative, and installers whose work interfaces with or affects metal-faced composite wall panels including installers of doors, windows, and louvers.

.2 Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

.3 Review methods and procedures related to metal-faced composite wall panel installation, including manufacturer's written instructions.

.4 Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.

.5 Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal-faced composite wall panels.

.6 Review governing regulations and requirements for inspections.

.7 Review temporary protection requirements for metal-faced composite wall panel assembly during and after installation.

.8 Review wall panel observation and repair procedures after metal-faced composite wall panel installation.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver components, sheets, metal-faced composite wall panels, and other manufactured items so as not to be damaged or deformed. Package metal-faced composite wall panels for protection during transportation and handling.

.2 Unload, store, and erect metal-faced composite wall panels in a manner to prevent bending, warping, twisting, and surface damage.

.3 Store metal-faced composite wall panels vertically, covered with suitable weather tight and ventilated covering. Store metal-faced composite wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal-faced composite wall panels in contact with other materials that might cause staining, denting, or other surface damage. Do not allow storage space to exceed 49 deg C.

.4 Retain strippable protective covering on metal-faced composite wall panel for period of panel installation.

1.9 PROJECT CONDITIONS

.1 Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal-faced composite wall panels to be performed according to manufacturer's written instructions and warranty requirements.

.2 Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal-faced composite wall panel fabrication and indicate measurements on Shop Drawings.

1.10 COORDINATION

.1 Coordinate metal-faced composite wall panel assemblies with rain drainage work, flashing, trim, and construction of studs, soffits, and other adjoining work to provide a leak proof, secure, and noncorrosive installation.

1.11 WARRANTY

.1 Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-faced composite wall panel assemblies that fail in materials or workmanship within warranty period.

.1 Failures include, but are not limited to, the following:

.1 Structural failures, including rupturing, cracking, or puncturing.

.2 Deterioration of metals and other materials beyond normal weathering.

.2 Warranty Period: Two years from date of Substantial Completion.

.2 Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal-faced composite wall panels that show evidence of deterioration of factory-applied finishes within warranty period.

.1 Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

.1 Colour fading more than 5 Hunter units when tested according to ASTM D 2244.

.2 Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

.3 Cracking, checking, peeling, or failure of paint to adhere to bare metal.

PART 2 PRODUCTS

2.1 PANEL MATERIALS

.1 Aluminum Sheet: Coil-coated sheet, ASTM B 209M, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.

.1 Surface: Smooth, flat finish.

.1 Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both colour coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

.2 Mica Fluoropolymer: AAMA 620. 2-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in colour coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

.3 Metallic Fluoropolymer: AAMA 620. 3-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both colour coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

.4 FEVE Fluoropolymer: AAMA 620. 3-coat fluoropolymer finish containing 100 percent FEVE resin in colour coat and clear top coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

.2 Exposed Anodized Finishes:

.1 Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

.2 Colour Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

.3 Concealed Finish: Apply pretreatment and manufacturer's standard white or light-coloured acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.013 mm.

.2 Panel Sealants:

.1 Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal-faced composite wall panels and remain weather tight; and as recommended in writing by panel manufacturer.

2.2 MISCELLANEOUS METAL FRAMING

.1 Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, Z180 hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.

.2 Subgirts: Manufacturer's standard C- or Z-shaped sections 1.63 mm nominal thickness.

.3 Zee Clips: 2.01 mm nominal thickness.

.4 Cold-Rolled Furring Channels: Minimum 13 mm wide flange.

.1 Nominal Thickness: As required to meet performance requirements.

.2 Furring Brackets: Adjustable, corrugated-edge type of steel sheet with nominal thickness of 1.02 mm.

.3 Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 1.57 mm diameter wire, or double strand of 1.22 mm diameter wire.

.5 Fasteners for Miscellaneous Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten miscellaneous metal framing members to substrates.

2.3 MISCELLANEOUS MATERIALS

.1 Aluminum Extrusions: ASTM B 221M, alloy and temper recommended by manufacturer for type of use and finish indicated.

.2 Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching colour of metal-faced composite wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

2.4 METAL-FACED COMPOSITE WALL PANELS

.1 General: Provide factory-formed and -assembled, metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weather tight system.

.1 Core: Unless otherwise indicated, provide standard core.

.2 Products: Subject to compliance with requirements, provide one of the following:

.2 Aluminum-Faced Composite Wall Panels: Formed with 0.50 mm thick, aluminum sheet facings.

.1 Panel Thickness: As required to meet performance requirements but in no case less than 4 mm.

.2 Core: If not otherwise indicated, provide standard core.

.3 Exterior Finish: To suit colour selected.

.4 Exterior Colour: Anodized Dark Bronze or Classic Bronze colour chosen by Departmental Representative from full line of manufacturers colours.

.3 Attachment System Components: Formed from extruded aluminum.

.1 Include manufacturer's standard perimeter extrusions with integral weather stripping, panel stiffeners, panel clips, and anchor channels.

.4 Fabrication Tolerances:

.1 Panel Bow: Maximum 0.80% per lineal foot panel dimension (width or length).

.2 Panel Dimensions: Make allowance for field adjustments, in manner recommended by manufacturer, where final dimensions cannot be established by field measurement prior to panel manufacturing.

.3 Fabricate panel lines, breaks and angles sharp and true. Fabricate panel surfaces free from warp or buckle.

2.5 ACCESSORIES

.1 Wall Panel Accessories: Provide components required for a complete metal-faced composite wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal-faced composite wall panels unless otherwise indicated.

.2 Flashing and Trim: Formed from 0.46 mm minimum thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal-faced composite wall panels.

2.6 FABRICATION

.1 General: Fabricate and finish metal-faced composite wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

.2 Fabricate metal-faced composite wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weather tight seals.

.3 Metal-Faced Composite Wall Panels: Factory form panels in a continuous process with no glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.

.1 Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.

.2 Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.

.3 Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant or bond tape.

.4 Dimensional Tolerances:

.1 Panel Bow: 0.8 percent maximum of panel length or width.

.2 Squareness: 5 mm maximum.

.4 Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's *Architectural Sheet Metal Manual* that apply to design, dimensions, metal, and other characteristics of item indicated.

.1 Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

.2 Seams for Aluminum: Fabricate non-moving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

.3 Seams for Other Than Aluminum: Fabricate non-moving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

.4 Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

.5 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

.6 Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal-faced composite wall panel manufacturer.

.1 Size: As recommended by SMACNA's *Architectural Sheet Metal Manual* or metal-faced composite wall panel manufacturer for application, but not less than thickness of metal being secured.

2.7 GENERAL FINISH REQUIREMENTS

.1 Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

.2 Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

.3 Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other

components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal-faced composite wall panel supports, and other conditions affecting performance of the Work.

.1 Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal-faced composite wall panel manufacturer.

.2 Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal-faced composite wall panel manufacturer.

.3 Verify that weather-resistant sheathing paper or air barrier has been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

.2 Examine roughing-in for components and systems penetrating metal-faced composite wall panels to verify actual locations of penetrations relative to seam locations of panels before panel installation.

.3 For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

.4 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal-faced composite wall panel manufacturer's written instructions.

3.3 METAL-FACED COMPOSITE WALL PANEL INSTALLATION

.1 General: Install metal-faced composite wall panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts unless otherwise indicated. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.

.1 Commence metal-faced composite wall panel installation and install minimum of 27.8 sq. m in presence of factory-authorized representative.

.2 Shim or otherwise plumb substrates receiving metal-faced composite wall panels.

.3 Flash and seal metal-faced composite wall panels at perimeter of all openings. Do not begin installation until weather barrier and flashings that will be concealed by panels are installed.

.4 Install flashing and trim as metal-faced composite wall panel work proceeds.

.5 Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing.

.6 Provide weather tight escutcheons for pipe and conduit penetrating exterior walls.

.2 Fasteners:

.1 Aluminum Wall Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior and aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

.3 Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal-faced composite wall panel manufacturer.

.4 Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weather tight performance of metal-faced composite wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by panel manufacturer.

.1 Prepare joints and apply sealants to comply with requirements in Section 07 92 00 - *Joint Sealants.*

.5 Attachment System Installation, General: Install attachment system required to support metal-faced composite wall panels and to provide a complete weather tight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

.1 Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.

.2 Do not begin installation until weather barrier and flashings that will be concealed by composite panels are installed.

.6 Rainscreen-Principle Installation: Provide manufacturer's standard pressure-equalized, rainscreen-principle system with vertical channel that provides support and complete secondary drainage system, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Attach wall panels by engaging horizontal support pins into notches in vertical channels and into flanges of wall panels. Leave horizontal and vertical joints with open reveal.

.1 Install wall panels to allow individual panels to *free float* and be installed and removed without disturbing adjacent panels.

.2 Do not apply sealants to joints unless otherwise indicated on Drawings. Drawings may describe panels requiring sealant as *Wet System.*

3.4 ACCESSORY INSTALLATION

.1 General: Install accessories with positive anchorage to building and weather tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

.1 Install components required for a complete metal-faced composite wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

.2 Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's *Architectural Sheet Metal Manual.* Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

.1 Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

.2 Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 3 m with no joints allowed within 610 mm of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 25 mm deep, filled with mastic sealant (concealed within joints).

3.5 ERECTION TOLERANCES

.1 Installation Tolerances: Shim and align metal-faced composite wall panel units within installed tolerance of 6 mm in 6 m, non-accumulative, on level, plumb, and location lines as indicated and within 3 mm offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

.1 Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust completed metal-faced composite wall panel installation, including accessories.

.2 Metal-faced composite wall panels will be considered defective if they do not pass tests and inspections.

.3 Additional tests and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

.4 Prepare test and inspection reports.

3.7 CLEANING

.1 Remove temporary protective coverings and strippable films, if any, as metal-faced composite wall panels are installed unless otherwise indicated in manufacturer's written

installation instructions. On completion of metal-faced composite wall panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.

.2 After metal-faced composite wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

.3 Replace metal-faced composite wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

.4 Clean worksite daily

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 06 10 53 - Miscellaneous Rough Carpentry.

.4 Section 07 62 00 - Sheet Metal Flashing and Trim.

.5 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME)

.1 ASME B18.6.3, Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series).

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.32, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-93.4, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished, Residential.

.3 CGSB 93.5, Installation of Metal Residential Siding, Soffits and Fascia.

.3 Canadian Standards Association (CSA)

.1 CSA B111, Wire Nails, Spikes and Staples.

1.3 SUBMITTALS

.1 Product data: submit manufacturer's printed product literature, specifications and data sheet.

.1 Submit two copies of WHMIS MSDS - Material Safety Data. Indicate VOC's for caulking materials during application and curing.

.2 Submit duplicate 300 x 300 mm samples of siding material, of colour and profile specified.

.3 Shop drawings to indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, metal furring, and related work.

.4 Submit manufacturer's installation instructions.

1.4 WARRANTY

.1 Provide a written guarantee, signed and issued in the name of the owner, covering the metal cladding/siding material for 10 (ten) years and workmanship for a period of 2 (two) years from the date of Substantial Completion.

.2 Areas which prove to be defective in any way shall be repaired or replaced and any damage to other work as a result of such defects shall be repaired at no cost to the Owner.

PART 2 PRODUCTS

2.1 STEEL CLADDING AND COMPONENTS

.1 Finish coating: Siliconized-Polyester System: Primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.

.2 **HMS1**:

.1 Colour: Solid dark Charcoal colour chosen by Departmental Representative from manufacturer's standard range.

.2 Gloss: medium.

.3 Thickness: 0.65 mm base metal thickness.

.4 Profile: preformed interlocking joints, fastener holes prepunched, profile to have 108mm wide proud ribbed design, maximum depth 15mm similar to the following;

2.2 ACCESSORIES

.1 Exposed trim: inside corners, outside corners, cap strip, drip cap, undersill trim, starter strip and window/door trim of same material, colour and gloss as cladding, with fastener holes pre-punched.

2.3 FASTENERS

.1 Nails: to CSA B111. Screws to ASME B18.6.3. Purpose made aluminum alloy stainless steel.

2.4 CAULKING

.1 Sealants: Section 07 92 00 – Joint Sealants.

2.5 SHEATHING MEMBRANE

.1 Exterior wall sheathing membrane: to CAN2-51.32, single ply spunbound olefin type coated.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install cladding in accordance with CGSB 93.5, and manufacturer's written instructions

.2 Install one layer exterior wall sheathing membrane horizontally by stapling or nailing lapping edges 150 mm.

.3 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.

.4 Install outside corners, fillers and closure strips with carefully formed and profiled work.

.5 Install soffit and fascia cladding as indicated.

.6 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.

.7 Attach components in manner not restricting thermal movement.

.8 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00 - Joint Sealants.

3.2 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

.2 Clean work site daily

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Formed Products:

.1 Formed roof drainage sheet metal fabrications.

.2 Formed low-slope roof sheet metal fabrications.

.3 Formed wall sheet metal fabrications.

.2 Formed equipment support flashing.Types of items you will not find described in this Section:

.1 Manufactured Products:

.1 Manufactured through-wall flashing and counterflashing.

.2 Manufactured reglets and counterflashing.

.2 Gutters with girth greater than 380 mm.

.3 Downspouts fabricated from sheet metal.

.4 Downspout tie-in to weeping tile system.

.5 Built-in gutters.

.6 Wood nailers, curbs, and blocking.

.7 Installing sheet metal flashing and trim integral with roofing.

.8 Sheet metal flashing and trim integral with metal wall panels.

.9 Manufactured roof specialties not part of sheet metal flashing and trim.

.10 Set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

.11 Manufactured sheet metal expansion-joint covers.

.1 Related Requirements:

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 01 78 00 - Closeout Submittals.

.4 Section 06 10 53 - Miscellaneous Rough Carpentry for wood nailers, curbs, and blocking.

1.2 REFERENCES

.1 The Aluminum Association Inc. (AAI)

.1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.

.2 AAI DAF45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A153/A153M (2009), Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

.2 ASTM A167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.3 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.

.4 ASTM A606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.5 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.6 ASTM A666 (2015), Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar

.7 ASTM A755/A755M (2015), Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products

.8 ASTM A792/A792M (2010), Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

.9 ASTM B32-04, Standard Specification for Solder Metal.

.10 ASTM B209M (2009), Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)

.11 ASTM B370-03, Standard Specification for Copper Sheet and Strip for Building Construction.

.12 ASTM C920 (2014), Standard Specification for Elastomeric Joint Sealants

.13 ASTM C1311 (2014), Standard Specification for Solvent Release Sealants

.14 ASTM D523-89(1999), Standard Test Method for Specular Gloss.

.15 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.16 ASTM D1187/D1187M (1997), Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal

.17 ASTM F2329/F2329M (2015), Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners

.3 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 2012.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.5 Canadian Standards Association (CSA International)

.1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.

.2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.

.3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.6 Green Seal Environmental Standards

.1 Standard GS-03-93, Anti-Corrosive Paints.

.2 Standard GS-11-97, Architectural Paints.

.3 Standard GS-36-00, Commercial Adhesives.

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.8 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule #1113-04, Architectural Coatings.

.2 SCAQMD Rule #1168-05, Adhesives and Sealants.

1.3 PERFORMANCE REQUIREMENTS

.1 General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

.2 Fabricate and install roof edge flashing and copings capable of resisting forces according to recommendations calculated in accordance with the NRC Wind-RCI for area of roof that flashing and copings are located.

.1 Field-of-Roof Uplift Resistance Pressure: -2.0 kPa.

.2 Perimeter Uplift Resistance Pressure: -2.4 kPa.

.3 Corner Uplift Resistance Pressure: -4.2 kPa.

.4 Perimeter and Corner width: 4.3m

.2 Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

.1 Temperature Change (Range): 67 deg C, ambient; 100 deg C, material surfaces.

1.4 ACTION SUBMITTALS

.1 Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied colour finishes involving colour selection.

1.5 QUALITY ASSURANCE

.1 Fabricator: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project.

.2 Sheet Metal Flashing and Trim Standard: Comply with SMACNA's Architectural Sheet Metal Manual unless more stringent requirements are specified or shown on Drawings.

.3 Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

.1 Build mock-up of typical roof eave, including any built-in gutter, fascia, fascia trim, apron flashing, and other trims specified or required approximately 3.0 m

long, including supporting construction cleats, seams, attachments, underlayment, and accessories.

.2 Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mockups unless Departmental Representative specifically approves such deviations in writing.

.3 Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

.2 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Materials and Resources Credit and MRc2.2 Construction Waste Management: Divert 75% From Landfill: prepare Construction Waste Management plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 SHEET METALS

.1 General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

.2 Aluminum Sheet: (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

.1 Surface: Smooth, flat.

.2 Exposed Coil-Coated Finishes, unless otherwise noted:

.1 Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both colour coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

.2 Colours: If not otherwise indicated then selected by Departmental Representative from full range of industry colours.

.3 Concealed Finish: Pretreat with manufacturer's standard white or light-coloured acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.013 mm.

.3 Metallic-Coated Steel Sheet: Restricted flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

.1 Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, Z275 coating designation; structural quality.

.2 Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZM150 coating designation, Grade 275; structural quality.

.3 Surface: Smooth, flat.

.4 Exposed Coil-Coated Finish, unless otherwise noted:

.1 Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both colour coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

.2 Colours: If not otherwise indicated then selected by Departmental Representative from full range of industry colours.

.5 Concealed Finish: Pretreat with manufacturer's standard white or light-coloured acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.013 mm.

.4 Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.

.1 Finish: 2D (dull, cold rolled).

.2 Surface: Smooth, flat.

.3 Locations: use only in locations where not exposed to view; or in locations where no other material option is permitted.

2.2 UNDERLAYMENT MATERIALS

.1 Self-Adhering, High-Temperature Sheet: Minimum 0.76 to 1.0 mm thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

.1 Thermal Stability: ASTM D 1970; stable after testing at 116 deg C.

.2 Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 29 deg C.

.2 Slip Sheet: Building paper, 0.16-kg/sq. m minimum, rosin sized.

2.3 MISCELLANEOUS MATERIALS

.1 General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.

.2 Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.

.1 General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

.1 Exposed Fasteners: Heads matching colour of sheet metal using plastic caps or factory-applied coating.

.2 Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

.3 Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

.2 Fasteners for Zinc-Coated (Galvanized) and aluminum-Zinc Alloy-Coated Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

.3 Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 13 mm wide and 3 mm thick.

.4 Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

.5 Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

.6 Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL

.1 General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's *Architectural Sheet Metal Manual* that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

.1 Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

.2 Obtain field measurements for accurate fit before shop fabrication.

.3 Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

.4 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

.2 Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 6 mm in 6 m on slope and location lines as indicated and within 3 mm offset of adjoining faces and of alignment of matching profiles.

.3 Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

.4 Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 25 mm deep, filled with butyl sealant concealed within joints.

.5 Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

.6 Fabricate cleats and attachment devices of sizes as recommended by SMACNA's Architectural Sheet Metal Manual for application, but not less than thickness of metal being secured.

.7 Seams: Fabricate non-moving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

.8 Do not use graphite pencils to mark metal surfaces.

2.5 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

.1 Roof-Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 2400 mm long, but not exceeding 3 m long, sections. Furnish with 150 mm wide, joint cover plates.

.1 Joint Style: Butt, with 300 mm wide, concealed backup plate Butt, with 300 mm wide, concealed backup plate and 150 mm wide, exposed cover plates.

.2 Fabricate from any one of the following materials, unless otherwise noted:

.1 Aluminum: 1.27 mm thick.

.2 Galvanized Steel: 0.71 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 0.71 mm thick.

.2 Copings: Fabricate in minimum 2400 mm long, but not exceeding 3 m long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Mitre corners, seal, and solder or weld watertight.

.1 Coping Profile: as indicated.

.2 Joint Style: Butt, with 300 mm wide, concealed backup plate.

.3 Fabricate from one of the following materials unless otherwise noted:

.1 Aluminum: 1.27 mm thick.

.2 Galvanized Steel: 1.02 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 1.02 mm thick.

.4 Fabricate cleats and support clips from one of the following materials unless otherwise noted:

.1 Aluminum: 1.27mm thick.

.2 Galvanized Steel: 1.61 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 1.1 mm thick.

.3 Roof, Roof to Wall Transition, Roof to Roof Edge Flashing (Gravel Stop) Transition, Roof to Roof Edge Flashing (Gravel Stop) and Fascia Cap Transition, and Expansion-Joint Cover: Fabricate from any one of following materials unless otherwise noted:

.1 Aluminum: 1.27 mm thick.

.2 Galvanized Steel: 0.86 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 0.86 mm thick.

.4 Base Flashing: Fabricate from any one of following materials unless otherwise noted:

.1 Aluminum: 1.02 mm thick.

.2 Galvanized Steel: 0.71 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 0.71 mm thick.

.5 Counterflashing: Fabricate from any one of following materials unless otherwise noted:

.1 Aluminum: 0.81 mm thick.

.2 Galvanized Steel: 0.56 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 0.56 mm thick.

.6 Flashing Receivers: Fabricate from any one of following materials unless otherwise noted:

.1 Aluminum: 0.81 mm thick.

.2 Galvanized Steel: 0.56 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 0.56 mm thick.

.7 Roof-Penetration Flashing: Fabricate from any one of following materials unless otherwise noted:

.1 Galvanized Steel: 0.71 mm thick.

.2 Aluminum-Zinc Alloy-Coated Steel: 0.71 mm thick.

.8 Roof-Drain Flashing: Fabricate from any one of following materials unless otherwise noted:

.1 Stainless Steel: 0.40 mm thick.

2.6 WALL SHEET METAL FABRICATIONS

.1 Through-Wall Flashing: Fabricate continuous flashings in minimum 2400 mm long, but not exceeding 3.6 m long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 150 mm beyond each side of wall openings. Form with 50 mm high, end dams where flashing is discontinuous. Fabricate from any one of the following materials, unless otherwise noted:

.1 Stainless Steel: 0.40 mm thick.

.2 Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 100 mm beyond wall openings, unless otherwise noted. Form head and sill flashing with 50 mm high, end dams. Fabricate from any one of the following materials, unless otherwise noted:

.1 Aluminum: 0.81 mm thick.

.2 Stainless Steel: 0.40 mm thick.

.3 Galvanized Steel: 0.56 mm thick.

.4 Aluminum-Zinc Alloy-Coated Steel: 0.56 mm thick.

.3 Wall Expansion-Joint Cover: Fabricate from any one following materials, unless otherwise noted:

.1 Aluminum: 1.02 mm thick.

.2 Stainless Steel: 0.48 mm thick.

.3 Galvanized Steel: 0.71 mm thick.

.4 Aluminum-Zinc Alloy-Coated Steel: 0.71 mm thick.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

.1 Equipment Support Flashing: Fabricate from any one of the following materials, unless otherwise noted:

.1 Stainless Steel: 0.48 mm thick.

.2 Galvanized Steel: 0.71 mm thick.

.3 Aluminum-Zinc Alloy-Coated Steel: 0.71 mm thick.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

.1 Verify compliance with requirements for installation tolerances of substrates.

.2 Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

.2 For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

.1 General: Install underlayment as indicated on Drawings.

.2 Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 150 mm staggered 600 mm between courses. Overlap side edges not less than 90 mm. Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

.1 General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

.1 Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

.2 Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

.3 Space cleats not more than 300 mm apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

.4 Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

.5 Install sealant tape where indicated and where needed.

.6 Torch cutting of sheet metal flashing and trim is not permitted.

.7 Do not use graphite pencils to mark metal surfaces.

.2 Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

.1 Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

.2 Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet.

.3 Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 3 m with no joints allowed within 600 mm of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 25 mm deep, filled with sealant concealed within joints.

.4 Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 32 mm for nails and not less than 19 mm for wood screws, metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

.5 Seal joints as shown and as required for watertight construction.

.1 Where sealant-filled joints are used, embed hooked flanges of joint members not less than 25 mm into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 4 and 21 deg C, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 4 deg C.

.2 Prepare joints and apply sealants to comply with requirements in Section 07 92 00 - *Joint Sealants*.

.6 Rivets: Rivet joints in uncoated aluminum where indicated and where necessary for strength.

3.4 ROOF FLASHING INSTALLATION

.1 General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's *Architectural Sheet Metal Manual*. Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

.2 Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in according to NRC Wind-RCI Wind Uplift Calculations for location and

use of building. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at 400 mm centers.

.3 Copings: Anchor to resist uplift and outward forces calculated in accordance with the NRC Wind-RCI for area of roof that flashing and copings are located

.1 Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 400 mm centers.

.2 Anchor interior leg of coping with screw fasteners and washers at 500 mm centers.

.4 Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 100 mm over base flashing. Install stainless-steel draw band and tighten.

.5 Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 100 mm over base flashing. Lap counterflashing joints a minimum of 100 mm and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 900 mm centers.

.6 Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

.1 General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

.2 Through-Wall Flashing: Installation of through-wall flashing is specified in Section 04 22 00 - Concrete Unit Masonry.

.3 Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 100 mm beyond wall openings unless otherwise indicated.

3.6 MISCELLANEOUS FLASHING INSTALLATION

.1 Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 ERECTION TOLERANCES

.1 Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 6 mm in 6 m on slope and location lines as indicated and within 3 mm offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING AND PROTECTION

.1 Clean off excess sealants.

.2 Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

.3 Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

.4 Clean worksite daily

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Penetrations in fire-resistance-rated walls.

.2 Penetrations in horizontal assemblies.

.3 Penetrations in non-rated fire separations.

.4 Identification of vertical fire separations.

.2 Related Work:

.1 Section 07 84 43 - Joint Firestopping for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in non-rated fire separations.

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.2 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

.1 Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.3 INFORMATIONAL SUBMITTALS

.1 Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

.2 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.4 QUALITY ASSURANCE

.1 Installer Limitations: Have penetration fire stopping systems installed by single installer for entire project.

.2 Source Limitations: Obtain primary penetration firestopping materials from single source from single manufacturer. Provide secondary materials, including safing insulation, from source recommended by manufacturer of primary materials.

.3 Firestopping colour to be 'red' or 'terra cotta'.

.4 Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

.1 Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.

.2 Penetration firestopping is identical to those tested per testing standard referenced in *Penetration Firestopping* Article. Provide rated systems complying with the following requirements:

.1 Penetration firestopping products bear classification marking of qualified testing and inspecting agency.

.3 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council (September 7, 1994, as may be amended from time to time).

.5 Preinstallation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

.1 Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

.2 Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.6 COORDINATION

.1 Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

.2 Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

.3 Notify Departmental Representative's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 PRODUCTS

2.1 PENETRATION FIRESTOPPING

.1 Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

.2 Provide penetration firestopping with ratings determined per CAN/ULC-S115, *Fire Tests of Firestop Systems*.

.3 Firestopping of Penetrations in non-rated Fire Separations

.1 Firestop sealant to CAN/ULC-S115.

.4 Firestopping of Penetrations in Firewalls or Horizontal Fire Separations

.1 Provide firestopping for a penetration in a firewall or a horizontal fire separation having a FT Rating not less than the fire-resistance rating of construction penetrated.

.5 Firestopping of Penetrations in Fire Separations for Combustible Drain, Waste, and Vent Piping:

.1 Provide firestopping of a penetration containing a combustible drain, waste and vent piping is by a fire stop system that has an F rating not less than the fire-resistance rating required for the fire separation when subjected to the fire test method in CAN/ULC-S115, *Fire Tests of Firestop Systems*, with a pressure differential of 50 Pa between the exposed and unexposed sides, with the higher pressure on the exposed side, and the piping is not located in a vertical shaft.

.6 Firestopping of Other Penetrations in Fire Separations:

.1 Provide firestopping for a penetration in a fire separation or a membrane forming part of an assembly required to have a fire-resistance rating that is not a firewall or a horizontal fire separation having a F-Rating not less than the following for the fire resistance rating of constructed penetrated.

Fire-Resistance Rating of Fire Separation	F Rating
45 min	45
1 h	45
1.5 h	1
2 h	1.5
3 h	2
4 h	3

.7 Exposed Penetration Firestopping: Provide products with flame-spread index of less than 25, as determined CAN/ULC-S102, *Test for Surface Burning Characteristics of Building Materials and Assemblies*.

.8 VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

.1 Sealants: 250 g/L.

.2 Sealant Primers for Nonporous Substrates: 250 g/L.

.3 Sealant Primers for Porous Substrates: 775 g/L.

.9 Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

.1 Permanent forming/damming/backing materials, including the following:

.1 Slag-wool-fibre or rock-wool-fibre insulation.

.2 Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.

.3 Fire-rated form board.

.4 Fillers for sealants.

.2 Temporary forming materials.

.3 Substrate primers.

.4 Collars.

.5 Cable Management Sleeves

.1 Use sleeves whenever possible.

.2 Re-penetrable type; smoke and gas tight assembly, consisting of wall sleeve, collars and hand operated mechanism to open/close smoke seal fabric membrane, thus permitting insertion/removal of cables from either side without jeopardizing integrity of fire separation.

.3 Diameter of sleeve to accommodate current number of cables plus 100% more. If 100% more cables exceed sleeve capacity; provide additional sleeves necessary to accommodate extra quantity.

2.2 FILL MATERIALS

.1 Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

.2 Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

.3 Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

.4 Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

.5 Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibres, or silicone compounds.

.6 Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

.7 Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

.8 Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fibre cloth cases filled with a combination of mineral-fibre, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

.9 Silicone Foams: Multi-component, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

.10 Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

.1 Grade: Pourable (self-levelling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of non-sag grade for both opening conditions.

2.3 MIXING

.1 For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

2.4 VERTICAL FIRE SEPARATION IDENTIFICATION

.1 Vertical fire separations: conventional latex spray paint, bright red colour.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

.1 Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.

.2 Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.

.3 Remove laitance and form-release agents from concrete.

.2 Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

.3 Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

.1 General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

.2 Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

.1 After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

.3 Install fill materials for firestopping by proven techniques to produce the following results:

.1 Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.

.2 Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

.3 For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION OF PENETRATION FIRESTOPPING

.1 Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 150 mm of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

.1 The words *Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage*.

.2 Contractor's name, address, and phone number.

.3 Designation of applicable testing and inspecting agency.

.4 Date of installation.

.5 Manufacturer's name.

.6 Installer's name.

3.5 IDENTIFICATION OF VERTICAL FIRE SEPARATIONS

.1 Identify all vertical fire separations using spray paint and 25 mm stencilled lettering.

.2 Wording:

.1 For non-rated fire separations *This partition designed as a non-rated fire separation*.

.2 For ¾ hour rated fire separations *This partition designed as a ¾ hour fire separation*.

.3 For 1 hour rated fire separations *This partition designed as a 1 hour fire separation*.

.4 For 2 hour rated fire separations *This partition designed as a 2 hour fire separation*.

.3 Placement:

.1 Rooms with finished ceilings: Place label above finished ceiling within 50 mm of where the wall intersects the floor/roof deck above.

.2 M&E, storage, and industrial rooms with no finished ceilings: Place label within 50 mm of where the wall intersect the floor/roof deck above.

.3 Finished spaces with no ceilings; Review with Departmental Representative for location of labelling prior to starting work.

.4 Spray lettering on either side of vertical fire separation. Repeat lettering every 10 metres on each side of separation, with a minimum of one set of labelling for every wall segment. Insure lettering is level and in alignment with each other.

3.6 FIELD QUALITY CONTROL

.1 Departmental Representative may engage a qualified testing agency to perform tests and inspections.

.2 Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

.3 Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.7 CLEANING AND PROTECTION

.1 Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

.2 Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediate-

ly cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

.3 Clean worksite daily

3.8 PENETRATION FIRESTOPPING SCHEDULE

.1 Use firestopping materials as required to achieve the required rating for the following locations:

.1 Firestopping with No Penetrating Items
.2 Firestopping for Metallic Pipes, Conduit, or Tubing
.3 Firestopping for Nonmetallic Pipe, Conduit, or Tubing
.4 Firestopping for Electrical Cables
.5 Firestopping for Insulated Pipes
.6 Firestopping for Miscellaneous Electrical Penetrants
.7 Firestopping for Miscellaneous Mechanical Penetrants
.8 Firestopping for Groupings of Penetrants

.2 Use firestopping material that is reusable (sleeves) as required to achieve the required rating for the following locations:

.1 Firestopping for Cable Trays with Electric Cables:

END OF SECTION

PART 1 GENERAL

.1 Section Includes:

.1 Joints in or between fire-resistance-rated constructions

.2 Joints at exterior curtain-wall/floor intersections.

.3 Joints in non-rated fire separations.

.4 Sealing joints which may otherwise be noted on drawings as being firestopped.

.2 Related Work:

.1 Section 07 84 13 - Penetration Firestopping for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers.

.3 Types of items not described in this Section:

.1 Fire-resistive expansion joint systems.

1.2 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.3 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Product Schedule: For each joint fire stopping system. Include location and design designation of qualified testing agency.

.1 Where Project conditions require modification to a qualified testing agency's illustration for a particular joint fire stopping system condition, submit illustration, with modifications marked, approved by joint fire stopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

.1 Installer Certificates: From Installer indicating joint fire stopping systems have been installed in compliance with requirements and manufacturer's written recommendations.

.2 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for joint fire stopping systems.

1.5 QUALITY ASSURANCE

.1 Installer Limitations: Have joint fire stopping systems installed by single installer for entire project.

.2 Source Limitations: Obtain primary joint firestopping materials from single source from single manufacturer. Provide secondary materials, including safing insulation, from source recommended by manufacturer of primary materials.

.3 Firestopping colour to be 'red' or 'terra cotta'.

.4 Fire-Test-Response Characteristics: Joint fire stopping systems shall comply with the following requirements:

.1 Joint fire stopping system tests are performed by a testing agency acceptable to authorities having jurisdiction.

.2 Joint fire stopping systems are identical to those tested per testing standard referenced in *Joint Fire Stopping Systems* Article. Provide rated systems complying with the following requirements:

.1 Joint fire stopping system products bear classification marking of testing agency.

.5 Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations: Do not install joint fire stopping systems when ambient or substrate temperatures are outside limits permitted by joint fire stopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

.2 Install and cure joint fire stopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

.1 Coordinate construction of joints to ensure that joint fire stopping systems are installed according to specified requirements.

.2 Coordinate sizing of joints to accommodate joint fire stopping systems.

.3 Notify Departmental Representative's testing agency at least seven days in advance of joint fire stopping system installations; confirm dates and times on day preceding each series of installations.

PART 2 PRODUCTS

2.1 JOINT FIRE STOPPING SYSTEMS

.1 Where required, provide joint fire stopping systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint fire stopping systems are installed. Joint fire stopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

.2 Joints in or between Fire-Resistance-Rated Construction: Provide joint fire stopping systems with ratings determined per ASTM E 1966 or UL 2079:

.1 Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies, and roofs or roof/ceiling assemblies.

.2 Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.

.3 Joints at Exterior Curtain-Wall/Floor Intersections: Provide joint fire stopping systems with rating determined by ASTM E 119 based on testing at a positive pressure differential of 0.01-inch wg 2.49 Pa or ASTM E 2307.

.1 Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.

.4 Joints in Non-Rated Fire Separations: Provide joint fire stopping systems with ratings determined per UL 2079.

.1 L-Rating: Not exceeding 5.0 cfm/ft 0.00775 cu. m/s x m of joint at 0.30 inch wg 74.7 Pa at both ambient and elevated temperatures.

.5 Exposed Joint fire stopping systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per CAN/ULC-S102, *Test for Surface Burning Characteristics of Building Materials and Assemblies*.

.6 VOC Content: Joint fire stopping system sealants shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

.1 Architectural Sealants: 250 g/L.

.2 Sealant Primers for Nonporous Substrates: 250 g/L.

.3 Sealant Primers for Porous Substrates: 775 g/L.

.7 Accessories: Provide components of joint fire stopping systems, including primers and forming materials that are needed to install fill materials and to maintain ratings required. Use only components specified by joint fire stopping system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Surface Cleaning: Clean joints immediately before installing joint fire stopping systems to comply with joint fire stopping system manufacturer's written instructions and the following requirements:

.1 Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.

.2 Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.

.3 Remove laitance and form-release agents from concrete.

.2 Priming: Prime substrates where recommended in writing by joint fire stopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

.3 Masking Tape: Use masking tape to prevent fill materials of joint fire stopping system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing joint fire stopping system's seal with substrates.

3.3 INSTALLATION

.1 General: Install joint fire stopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

.2 Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

.1 After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of joint fire stopping system.

.3 Install fill materials for joint fire stopping systems by proven techniques to produce the following results:

.1 Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.

.2 Apply fill materials so they contact and adhere to substrates formed by joints.

.3 For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

.1 Identify joint fire stopping systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches 150 mm of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

.1 The words *Warning - Joint fire stopping system - Do Not Disturb. Notify Building Management of Any Damag*e.

.2 Contractor's name, address, and phone number.

.3 Designation of applicable testing agency.

.4 Date of installation.

.5 Manufacturer's name.

.6 Installer's name.

3.5 FIELD QUALITY CONTROL

.1 Inspecting Agency: Departmental Representative may engage a testing agency to perform tests and inspections.

.2 Where deficiencies are found or joint fire stopping systems are damaged or removed due to testing, repair or replace joint fire stopping systems so they comply with requirements.

.3 Proceed with enclosing joint fire stopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTING

.1 Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint fire stopping system manufacturers and that do not damage materials in which joints occur.

.2 Provide final protection and maintain conditions during and after installation that ensure joint fire stopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint fire stopping systems immediately and install new materials to produce joint fire stopping systems complying with specified requirements.

.3 Clean worksite daily

3.7 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

.1 Use firestopping materials as required to achieve the required rating for the following locations:

.1 Floors and Roofs

.1 Fire-rated floor/roof assembly with fire-rated floor/roof assembly.

.2 Fire-rated floor/roof assembly with fire-rated wall assembly.

.3 Fire-rated floor/roof assembly with an exterior wall assembly.

.2 Walls

.1 Fire rated wall assembly with fire-rated wall assembly.

.2 Fire-rated wall assembly with an exterior wall assembly.

.3 Fire-rated wall assembly with the underside of a fire-rated floor/roof assembly.

.4 Fire-rated wall assembly with underside of non-rated floor/roof assembly.

.3 Other joints in fire rated assemblies.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

- .1 Silicone joint sealants.
- .2 Urethane joint sealants.
- .3 Polysulfide joint sealants.
- .4 Latex joint sealants.
- .5 Solvent-release-curing joint sealants.
- .6 Preformed joint sealants.
- .7 Acoustical joint sealants.
- .8 Security grade sealants used inside secure blocks inside detention facilities.

.2 Types of items you will not find described in this Section:

- .1 Masonry control and expansion joint fillers and gaskets.
- .2 Building expansion joints.
- .3 Sealing joints in fire-resistance-rated construction.
- .4 Structural and other glazing sealants.
- .5 Plastic glazing sealants.
- .6 Sealing perimeter joints at gypsum board.
- .7 Sealing tile joints.
- .8 Sealing edge mouldings at perimeters with acoustical sealant at acoustical panel ceilings and acoustical tile ceilings.
- .9 Sealing joints in pavements, walkways, and curbing.

.3 Related Sections:

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 61 00 - Common Product Requirements.
- .4 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Section 04 22 00 - Concrete Unit Masonry for masonry control and expansion joint fillers and gaskets.
- .6 Section 08 80 00 - Glazing for glazing sealants.
- .7 Section 09 29 00 - Gypsum Board for sealing perimeter joints.

1.2 REFERENCES

.1 National Building Code of Canada (2015).

.1 ASTM International

- .1 ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.

.2 ASTM C570 (2009), Standard Specification for Oil- and Resin-Base Caulking Compound for Building Construction

.3 ASTM C638 (2009), Standard Descriptive Nomenclature of Constituents of Aggregates for Radiation-Shielding Concrete

.4 ASTM C732 (2006), Standard Test Method for Aging Effects of Artificial Weathering on Latex Sealants

.5 ASTM C790 (1990), Standard Guide for Use of Latex Sealants

.6 ASTM C834 (2014), Standard Specification for Latex Sealants

.7 ASTM C882/C882M (2013), Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear

.8 ASTM C920 (2014) , Standard Specification for Elastomeric Joint Sealants

.9 ASTM C1193 (2013), Standard Guide for Use of Joint Sealants

.10 ASTM C1247 (2014, Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids

.11 ASTM C1248 (2012), Standard Test Method for Staining of Porous Substrate by Joint Sealants

.12 ASTM C1311 (2014), Standard Specification for Solvent Release Sealants

.13 ASTM C1330 (2013), Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants

.14 ASTM D695 (2015), Standard Test Method for Compressive Properties of Rigid Plastics

.15 ASTM E90 (2009), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Element

.2 Canadian General Standards Board (CGSB)

.1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).

.2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).

.4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.3 ACTION SUBMITTALS

.1 Product Data: For each joint-sealant product indicated.

.2 Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- 13 mm wide joints formed between two 6-inch- 150 mm long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

.3 Joint-Sealant Schedule: Include the following information:

.1 Joint-sealant application, joint location, and designation.
.2 Joint-sealant manufacturer and product name.
.3 Joint-sealant formulation.
.4 Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

.1 Warranties: Sample of warranties.

1.5 SUBMITTALS

.1 Product Data: For each joint-sealant product indicated.

.2 Samples for Initial Selection: Manufacturer's colour charts consisting of strips of cured sealants showing the full range of colours available for each product exposed to view.

.3 Joint-Sealant Schedule: Include the following information:

.1 Joint-sealant application, joint location, and designation.
.2 Joint-sealant manufacturer and product name.
.3 Joint-sealant formulation.
.4 Joint-sealant colour.

.4 Product Test Reports: Based on evaluation of comprehensive tests performed by a testing agency, indicating that sealants comply with requirements.

.5 Warranties: Sample of warranties.

1.6 QUALITY ASSURANCE

.1 Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

.2 Mock-ups: Install sealant in mock-ups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

.3 Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

.1 Do not proceed with installation of joint sealants under the following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 5 deg C.

.2 When joint substrates are wet.

.3 Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

.4 Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect joint sealants from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse by manufacturer of padding, as specified in Waste Reduction Workplan.

1.9 WARRANTY

.1 Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within warranty period.

.2 Warranties specified in this article exclude deterioration or failure of joint sealants from the following:

.1 Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

.2 Disintegration of joint substrates from natural causes exceeding design specifications.

.3 Mechanical damage caused by individuals, tools, or other outside agents.

.4 Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.1 MATERIALS, GENERAL

.1 Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

.2 VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when:

.1 Architectural Sealants: 250 g/L.

.2 Sealant Primers for Nonporous Substrates: 250 g/L.

.3 Sealant Primers for Porous Substrates: 775 g/L.

.3 Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

.1 Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

.4 Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

.5 Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

.6 Colours of Exposed Joint Sealants: As selected by Departmental Representative from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

.1 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

.2 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

.3 Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.4 Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.5 Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.

.6 Single-Component, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade P, Class 100/50, for Use T.

.7 Multicomponent, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

.8 Multicomponent, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type M, Grade P, Class 100/50, for Use T.

.9 Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.10 Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

2.3 URETHANE JOINT SEALANTS

.1 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

.2 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

.3 Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

.4 Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type S, Grade NS, Class 25, for Use T.

.5 Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

.6 Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

.7 Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT.

.8 Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use T.

.9 Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

.10 Immersible, Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Uses T and I.

.11 Immersible, Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Uses T and I.

.12 Immersible Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Uses T and I.

.13 Immersible Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type M, Grade P, Class 25, for Use T and I.

2.4 LATEX JOINT SEALANTS

.1 Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

2.5 SOLVENT-RELEASE-CURING JOINT SEALANTS

.1 Acrylic-Based Joint Sealant: ASTM C 1311.

.2 Butyl-Rubber-Based Joint Sealant: ASTM C 1311.

2.6 SECURITY SEALANTS

.1 Available Products: Subject to compliance with requirements, products that may be incorporated into the Work are limited to the following:

.1 Dynapoxy EP-430 Fast as marketed by Pecora Corp.
.2 Dynapoxy EP 1200 as marketed by Pecora Corp.
.3 Anchorfix 2001 as marketed by Sika Inc.
.4 Anchorfix 3001 as marketed by Sika Inc.
.5 Anchorfix 2 Arctic as marketed by Sika Inc.

2.7 PREFORMED JOINT SEALANTS

.1 Preformed Silicone Joint Sealants: Manufacturer's standard sealant consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

.2 Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 160 kg/cu. m and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

2.8 ACOUSTICAL JOINT SEALANTS

.1 Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.9 JOINT SEALANT BACKING

.1 General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

.2 Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O, (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

.3 Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.10 MISCELLANEOUS MATERIALS

.1 Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

.2 Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

.3 Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

.1 Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

.2 Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

.1 Concrete.

.2 Masonry.

.3 Unglazed surfaces of ceramic tile.

.4 Exterior insulation and finish systems.

.3 Remove laitance and form-release agents from concrete.

.4 Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

.1 Metal.

.2 Glass.

.3 Porcelain enamel.

.4 Glazed surfaces of ceramic tile.

.2 Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

.3 Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

.1 General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

.2 Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

.3 Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

.1 Do not leave gaps between ends of sealant backings.

.2 Do not stretch, twist, puncture, or tear sealant backings.

.3 Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

.4 Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

.5 Install sealants using proven techniques that comply with the following and at the same time backings are installed:

.1 Place sealants so they directly contact and fully wet joint substrates.

.2 Completely fill recesses in each joint configuration.

.3 Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

.6 Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

.1 Remove excess sealant from surfaces adjacent to joints.

.2 Use tooling agents that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces.

.3 Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

.4 Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

.5 Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

.1 Use masking tape to protect surfaces adjacent to recessed tooled joints.

.7 Installation of Preformed Silicone-Sealant System: Comply with the following requirements:

.1 Apply masking tape to each side of joint, outside of area to be covered by sealant system.

.2 Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 10 mm . Hold edge of sealant bead 6 mm inside masking tape.

.3 Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.

.4 Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.

.8 Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.

.9 Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 CLEANING

.1 Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

.2 Clean worksite daily

3.5 PROTECTION

.1 Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

.1 Joint-Sealant Colour: As selected by Departmental Representative from manufacturer's full range of colours.

.2 Use Security Sealants for the following rooms:

.1 122.

.3 Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

.1 Joint Locations:

.1 Isolation and contraction joints in cast-in-place concrete slabs.

.2 Tile control and expansion joints.

.3 Joints between different materials listed above.

.4 Other joints as indicated.

.2 Joint Sealant: any one of the following:

.1 Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing; Single component, pourable, traffic grade, neutral curing.

.2 Urethane Joint Sealant: Single component, nonsag, traffic grade; Single component, pourable, traffic grade; Multicomponent, nonsag, traffic grade, Class 50; Multicomponent, nonsag, traffic grade, Class 25.

.3 Preformed Joint Sealant: Preformed foam sealant.

.4 Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion.

.1 Joint Locations:

.1 Joints in pedestrian plazas.

.2 Other joints as indicated.

.2 Joint Sealant: any one of the following:

.1 Urethane Joint Sealant: Immersible, single component, nonsag, traffic grade; Immersible, single component, pourable, traffic grade; Immersible, multicomponent, nonsag, traffic grade; Immersible, multicomponent, pourable, traffic grade.

.5 Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

.1 Joint Locations:

.1 Construction joints in cast-in-place concrete.

.2 Control and expansion joints in unit masonry.

.3 Joints in glass unit masonry assemblies.

.4 Joints in exterior insulation and finish systems.

.5 Joints between metal panels.

.6 Joints between different materials listed above.

.7 Perimeter joints between materials listed above and frames of doors windows and louvers.

.8 Control and expansion joints in ceilings and other overhead surfaces.

.9 Other joints as indicated.

.2 Joint Sealant: any one of the following:

.1 Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50; Single component, nonsag, neutral curing, Class 50; Single component, nonsag, acid curing; Multicomponent, nonsag, neutral curing.

.2 Urethane Joint Sealant: Single component, nonsag, Class 100/50; Single component, nonsag, Class 50; Multicomponent, nonsag, Class 50.

.3 Preformed Joint Sealant: Preformed silicone; Preformed foam.

.6 Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

.1 Joint Locations:

.1 Isolation joints in cast-in-place concrete slabs.

.2 Control and expansion joints in tile flooring.

.3 Other joints as indicated.

.2 Joint Sealant: any one of the following:

.1 Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing; Single component, pourable, traffic grade, neutral curing; Multicomponent, pourable, traffic grade, neutral curing.

.2 Urethane Joint Sealant: Single component, nonsag, traffic grade; Single component, pourable, traffic grade; Multicomponent, nonsag, traffic grade, Class 50.

.3 Preformed Joint Sealant: Preformed foam.

.7 Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

.1 Joint Locations:

.1 Control and expansion joints on exposed interior surfaces of exterior walls.

.2 Perimeter joints of exterior openings where indicated.

.3 Tile control and expansion joints.

.4 Vertical joints on exposed surfaces of interior unit masonry and concrete walls and partitions.

.5 Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.

.6 Other joints as indicated.

.2 Joint Sealant: any one of the following:

.1 Latex.

.2 Acrylic based.

.3 Butyl rubber based.

.8 Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

.1 Joint Sealant Location:

.1 Joints between plumbing fixtures and adjoining walls, floors, and counters.

.2 Tile control and expansion joints where indicated.

.3 Other joints as indicated.

.2 Joint Sealant: Any one of the following:

.1 Silicone Joint Sealant: Mildew resistant, single component, nonsag, neutral curing; Single component, nonsag, mildew resistant, acid curing.

.9 Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

.1 Joint Location:

.1 Acoustical joints where indicated.

.2 Other joints as indicated.

.2 Joint Sealant: Acoustical.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Steel frame products including frames, transom frames (glazed or paneled), side-light and window assemblies, fire-rated and non-rated.

.2 Steel panels, fixed or removable, flush or rebated, similar in construction to steel doors, for use in steel frame product.

.3 Steel doors, swing type, flush, with or without embossed face sheets, with or without glazed or louvered openings, fire-rated and non-rated.

.4 Louvers, fire rated and non-rated.

.2 Related Work

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 01 61 00 - Common Product Requirements.

.4 Section 01 78 00 - Closeout Submittals.

.5 Section 04 22 00 - Concrete Unit Masonry for embedding anchors for hollow metal work into masonry construction.

.6 Section 07 21 13 - Board Insulation

.7 Section 08 71 00 - Door Hardware.

.8 Section 09 91 13 - Exterior Painting

.9 Section 09 91 23 - Interior Painting

.3 Types of items you will not find described in this Section:

.1 Detention Doors and Frames.

.2 Sound Control Door Assemblies for packaged, acoustical hollow metal door and frame assemblies.

.3 Lead-lined, hollow metal doors and frames.

.4 Electrical connections including conduit and wiring for door controls and operators.

1.2 REFERENCES

.1 National Building Code of Canada (2015).

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A153/A153M (2009), Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

.2 ASTM A924/A924M (2014), Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

.3 ASTM A653/A653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.4 ASTM B29-03, Standard Specification for Refined Lead.

.5 ASTM B749-03, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.

.6 ASTM C143/C143M (2015), Standard Test Method for Slump of Hydraulic-Cement Concrete

.7 ASTM C476 (2010), Standard Specification for Grout for Masonry

.8 ASTM C553 (2013), Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications

.9 ASTM C592 (2013), Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type)

.10 ASTM C578 (2015), Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

.11 ASTM C1289 (2099), Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

.3 American National Standards Institute (ANSI)

.1 ANSI/SDI A250.8, Recommended Specifications for Standard Steel Doors and Frames

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

.2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.

.5 Canadian Standards Association (CSA International)

.1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).

.6 Canadian Steel Door Manufacturers' Association (CSDMA)

.1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2000.

.2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.

.7 National Fire Protection Association (NFPA)

.1 NFPA 80-99, Standard for Fire Doors and Fire Windows.

.2 NFPA 252-03, Standard Methods of Fire Tests of Door Assemblies.

.8 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1113-04, Architectural Coatings.

.2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

.9 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S106-15, Standard Method for Fire Tests Of Window And Glass Block Assemblies

.2 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.3 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.4 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.5 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.

.6 CAN4-S105-M85, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.3 DEFINITIONS

.1 Minimum Thickness: Minimum thickness of base metal without coatings.

1.4 SUBMITTALS

.1 Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.

.2 Shop Drawings: Include the following:

.1 Elevations of each door design.

.2 Details of doors, including vertical and horizontal edge details and metal thicknesses.

.3 Frame details for each frame type, including dimensioned profiles and metal thicknesses.

.4 Locations of reinforcement and preparations for hardware.

.5 Details of each different wall opening condition.

.6 Details of anchorages, joints, field splices, and connections.

.7 Details of accessories.

.8 Details of mouldings, removable stops, and glazing.

.9 Details of conduit and preparations for power, signal, and control systems.

.3 Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

.1 Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labelled assemblies.

1.6 QUALITY ASSURANCE

.1 Except as otherwise specified, comply with requirements of *Canadian Manufacturing Standards for Steel Doors and Frames* published by the Canadian Steel Door and Frame Manufacturers' Association.

.2 Source Limitations: Obtain hollow metal work from single source from single manufacturer.

.3 Fire-Rated Door Assemblies: Assemblies complying with CAN4-S104-M that are listed and labelled by a testing agency, for fire-protection ratings indicated.

.1 Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies provide certification by a testing agency that doors comply with standard

construction requirements for tested and labelled fire-rated door assemblies except for size.

.4 Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with CAN4-S104-M that are listed and labelled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated. Label each individual glazed lite.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

.2 Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

.3 Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 102 mm high wood blocking. Do not store in a manner that traps excess humidity.

.1 Provide minimum 6 mm space between each stacked door to permit air circulation.

.4 Waste Management and Disposal:

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.8 PROJECT CONDITIONS

.1 Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 COORDINATION

.1 Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

.2 Steel

.1 Commercial grade steel to ASTM A924-97 (M-97), galvanized to ASTM A653-97 (M-97), Commercial Steel (CS), Type B, A40 (ZF120) minimum unless otherwise noted.

.2 Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*.

.3 Door Core Materials

.1 Honeycomb: Structural small cell 25.4 mm maximum kraft paper 'honeycomb'. Weight: 36.3 kg per ream minimum, density: 16.5 kg/m3 minimum, sanded to required thickness.

.2 Fibreglass: Loose batt type, density 24 kg/m3 minimum, conforming to ASTM C553 or ASTM C592.

.3 Polystyrene: Rigid extruded, fire retardant, closed cell board, Type 1, density: 16 to 32 kg/m3, thermal values: RSI 1.06 (R 6.0) minimum, conforming to ASTM C578.

.4 Polystyrene: Rigid extruded fire retardant, closed cell board. Density; 16 to 32 kg/m3, thermal values; RSI 1.0 (R 6.0) minimum, Type 1, in accordance with ASTM C578.

.5 Polyisocyanurate: Rigid foam. closed cell, faced board, thermal value: RSI 2.17 (R12.3) minimum, conforming to ASTM C1289

2.2 MISCELLANEOUS

.1 Primers

.1 Rust inhibitive touch-up only.

.2 Door Silencers

.1 Single stud rubber/neoprene type.

.3 Exterior Top Caps

.1 Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.4 Frame Thermal Breaks

.1 Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.5 Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

.6 Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

.7 Grout: ASTM C 476, except with a maximum slump of 102 mm, as measured according to ASTM C 143/C 143M.

.8 Glazing: Comply with requirements in Section 08 80 00 - *Glazing*.

.9 Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 0.4 mm dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibres, sulphur components, and other deleterious impurities.

2.3 FABRICATION – GENERAL

.1 Manufacturer door and frame products in accordance with the CSDMA's, *Recommended Dimensional Standards for Commercial Steel Doors and Frames*.

.2 Selected Door and Frame Requirements, unless noted otherwise (uno)

Item	**Location**		
	Interior, Unless noted otherwise	**Exterior, Unless noted otherwise**	**Steel Stiffened, where noted**
Steel Coating	A40 (ZF120) minimum; uno.	A40 (ZF120) minimum, uno. Provide G90 (Z275) coating where noted.	A40 (ZF120) minimum, uno. Provide G90 (Z275) coating where noted.
Doors			
Duty / Min. Steel Thickness	Medium duty / 1.3 mm (18 gauge nominal); uno.	Heavy duty / 1.6 mm (16 gauge nominal); uno.	Extra heavy duty / 2.0 mm (14 gauge nominal), uno.
Design	Flush panel, uno.	Flush panel, uno.	Flush panel, uno
Core,	Honeycomb core, laminated under pressure to face sheets; unless noted otherwise.	Polystyrene or polyisocyanurate core, laminated under pressure to face sheets; unless otherwise noted.	Core reinforced with vertical stiffeners, securely welded to each face at 150mm on centre maximum; voids filled with fibreglass batt type insulation.
Longitudinal Seams	Mechanically interlocked, adhesive assisted with edge seams tack welded, filled and sanded flush with no visible seam; uno.	Mechanically interlocked, adhesive assisted with edge seams tack welded, filled and sanded flush with no visible seam; uno.	Continuously welded the full height of the door filled and ground smooth with no visible seams.
Caps	None, uno.	PVC, uno. Provide steel caps where noted.	Steel cap.
Thermally Broken	No	Yes	No.
Frames			
Duty / Min. Steel Thickness	Medium duty / 1.3 mm (18 gauge nominal); uno. Standard duty / 1.0 mm (20 gauge nominal) for hollow core wood doors.	Heavy duty / 1.6 mm (16 gauge nominal); uno.	Heavy duty / 1.6 mm (16 gauge nominal); uno.
Construction	Full face, punch-mitred, or saw mitred welded construction; uno.	Full face welded construction.	Full face welded construction.
Thermally Broken	No	Yes.	No.

2.4 FABRICATION - FRAME PRODUCTS

.1 General

.1 Provide frame mortised, blanked, reinforced, drilled, and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.2 Protect mortised cut-outs with steel guard boxes except for dry wall applications.

.3 Reinforce frame where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.

.4 Provide anchorage appropriate to floor, wall, and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry, or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.

.5 Provide minimum reinforcing, anchor and other component gauges in accordance with Table 1 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*.

.6 Prepare each door opening for single stud rubber door silencers, three (3) for single.

.7 Provide fire-rated frame products for those openings requiring fire protection. Provide frames, transom and sidelight assemblies listed for conformance with CAN4-S104. Provide window assemblies listed for conformance with CAN4-S106. Ensure all fire-rated frame products bear the label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labelling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and identify the manufacturer. Construct fire-rated frame products as listed for labelling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.8 For each grade frame indicated form from a steel sheet having a minimum thickness of:

.1 Standard Duty grade frames: 1.0 mm

.2 Medium Duty grade frames: 1.3 mm

.3 Heavy Duty and Extra Heavy Duty grade frames: 1.6 mm

.2 Welded Type

.1 Accurately mitre or mechanically join frame products.

.2 Ensure frame product perimeter corner joints shall be as defined in Appendix 2 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*, and as follows

.1 Profile welded; punch-mitred - continuously welded on the profile faces, rabbets, returns and soffit intersections, or saw-mitred - continuously welded on the profile faces, rabbets, returns, stops and soffit intersections. Punch or saw-mitred, at the manufacturer's discretion. All profile welded frame product exposed faces shall be filled and ground to a smooth, uniform, seamless surface.

.2 Face welded; continuously welded on the profile faces, with exposed faces filled and ground to a smooth, uniform, seamless surface.

.3 Tack welded; welded on the faces and returns, with exposed hairline joint intersections.

.3 Ensure joints at mullions, sills and center rails are:

.1 Coped accurately, butted and tightly fitted.

.2 At intersecting flush profile faces, securely welded, filled and ground to a smooth, uniform, seamless surface.

.3 At intersecting recessed profile faces, securely welded to concealed reinforcements, with exposed hairline face seams.

.4 At all other intersecting profile elements have exposed hairline face seams.

.4 Welding: to CSA W59.

.5 Ensure a floor anchor is securely attached to the inside of each jamb profile where frame product is to be installed prior to the adjacent partition. Provide each floor anchor s with two holes for securing to the floor. For conditions that do not permit the use of a floor anchor, substitute with an additional wall anchor, located within 150 mm of the base of the jamb.

.6 Weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling. Do not be used for installation.

.7 Form glazing stops from steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk tamper proof sheet metal screws.

.8 When required due to site access or due to shipping limitations, fabricate frame product for large openings in sections as designated on the submittal drawings, with splice joints for field assembly and welding.

.9 Prior to shipment, mark each frame product with an identification number as shown on submittal drawings.

2.5 FABRICATION - DOORS

.1 General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with requirements of Canadian Manufacturing Standards for Steel Doors and Frames published by the Canadian Steel Door and Frame Manufacturers' Association except as noted.

.1 Longitudinal Edge Profile:

.1 Vertical Edges for Single-Acting Doors: Manufacturer's standard.

.2 Vertical Edges for Double-Acting Doors: Round vertical edges with 54 mm radius.

.2 Provide doors mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.3 Factory prepare holes 12.7 mm diameter and larger, except for mounting and through-bolt holes. Factory-prepare holes less than 12.7 mm when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.

.4 Reinforce doors where required for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.

.5 Provide top and bottom of doors with inverted, recessed, welded steel channels.

.6 Provide minimum reinforcing and component gauges in accordance with Table 1 of the CSDMA, *Recommended Specifications for Commercial Steel Door and Frame Products*.

.7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.8 Provide fire-rated doors for those openings requiring fire protection. Provide products listed for conformance with CAN4-S104. Provide fire-rated doors bearing label of, and be listed by a nationally recognized testing agency having a factory inspection service. Labelling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Construct fire-rated doors as listed for labelling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.9 Prior to shipment, mark each door with an identification number as shown on the submittal drawings.

.10 For each grade door indicated form both face sheets for doors from a steel sheet having a minimum thickness of:

.1 Standard Duty grade doors: 1.0 mm

.2 Medium Duty grade doors: 1.3 mm

.3 Heavy Duty grade doors: 1.6 mm

.4 Extra Heavy Duty grade doors: 2.0 mm

2.6 HOLLOW METAL PANELS

.1 Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal doors.

2.7 FRAME ANCHORS

.1 Jamb Anchors:

.1 Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 1.0 mm thick, with corrugated or perforated straps not less than 50 mm wide by 250 mm long; or wire anchors not less than 4.5 mm thick.

.2 Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 1.0 mm thick.

.3 Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.

.4 Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 9.5 mm diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

.2 Floor Anchors: Formed from same material as frames, not less than 1.0 mm thick, and as follows:

.1 Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

.2 Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 50 mm height adjustment. Terminate bottom of frames at finish floor surface.

2.8 STOPS AND MOULDINGS

.1 Mouldings for Glazed Lites in Doors: Minimum 0.8 mm thick, fabricated from same material as door face sheet in which they are installed.

.2 Fixed Frame Mouldings: Formed integral with hollow metal frames, a minimum of 16 mm high unless otherwise indicated.

.3 Loose Stops for Glazed Lites in Frames: Minimum 0.8 mm thick, fabricated from same material as frames in which they are installed.

.4 Terminated Stops: Where indicated on interior door frames, terminate stops 152 mm above finish floor with a 45-degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

.1 Provide terminated stops only where indicated.

2.9 LOUVERS

.1 Provide louvers for interior doors, where indicated, with blades or baffles formed of 0.5 mm thick, cold-rolled steel sheet set into 0.8 mm thick steel frame.

.1 Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.

.2 Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labelled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same testing and inspecting agency that established fire-resistance rating of door assembly.

2.10 ACCESSORIES

.1 Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

.2 Ceiling Struts: Minimum 6.4 mm thick by 25.4 mm wide steel.

.3 Grout Guards: Formed from same material as frames, not less than 0.4 mm thick.

2.11 FABRICATION

.1 Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

.2 Hollow Metal Doors:

.1 Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

.2 Glazed Lites: Factory cut openings in doors.

.3 Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 19 mm beyond edge of door on which astragal is mounted.

.3 Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

.1 Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

.2 Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

.3 Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

.4 Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

.5 Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

.6 Jamb Anchors: Provide number and spacing of anchors as follows:

.1 Masonry Type: Locate anchors not more than 457 mm from top and bottom of frame. Space anchors not more than 813 mm o.c. and as follows:

.1 Two anchors per jamb up to 1524 mm high.

.2 Three anchors per jamb from 1524 to 2286 mm high.

.3 Four anchors per jamb from 2286 to 3048 mm high.

.4 Four anchors per jamb plus 1 additional anchor per jamb for each 610 mm or fraction thereof above 3048 mm high.

.2 Stud-Wall Type: Locate anchors not more than 457 mm from top and bottom of frame. Space anchors not more than 813 mm o.c. and as follows:

.1 Three anchors per jamb up to 1524 mm high.

.2 Four anchors per jamb from 1524 to 2286 mm high.

.3 Five anchors per jamb from 2286 to 2438 mm high.

.4 Five anchors per jamb plus 1 additional anchor per jamb for each 610 mm or fraction thereof above 2438 mm high.

.5 Two anchors per head for frames above 1066 mm wide and mounted in metal-stud partitions.

.3 Compression Type: Not less than two anchors in each jamb.

.4 Postinstalled Expansion Type: Locate anchors not more than 152 mm from top and bottom of frame. Space anchors not more than 660 mm o.c.

.7 Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

.1 Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

.2 Double-Door Frames: Drill stop in head jamb to receive two door silencers.

.4 Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

.5 Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cut-outs, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Section 08 71 00 - *Door Hardware*.

.1 Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

.2 Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.

.3 Coordinate locations of conduit and wiring boxes for electrical connections with Electrical sections.

.6 Stops and Mouldings: Provide stops and mouldings around glazed lites indicated. Form corners of stops and mouldings with butted or mitred hairline joints.

.1 Single Glazed Lites: Provide fixed stops and mouldings welded on secure side of hollow metal work.

.2 Multiple Glazed Lites: Provide fixed and removable stops and mouldings so that each glazed lite is capable of being removed independently.

.3 Provide fixed frame mouldings on outside of exterior and on secure side of interior doors and frames.

.4 Provide loose stops and mouldings on inside of hollow metal work.

.5 Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

.2 Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

.2 Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

.1 Squareness: Plus or minus 1.6 mm, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

.2 Alignment: Plus or minus 1.6 mm, measured at jambs on a horizontal line parallel to plane of wall.

.3 Twist: Plus or minus 1.6 mm, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

.4 Plumbness: Plus or minus 1.6 mm, measured at jambs on a perpendicular line from head to floor.

.3 Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

.1 General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

.2 Fire-rated doors complete with associated hardware shall be installed in agreement with NBCC 2015 and NFPA 80.

.3 Hollow Metal Frames: Install hollow metal frames of size and profile indicated.

.1 Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

.1 At fire-protection-rated openings, install frames according to NFPA 80.

.2 Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

.3 Install frames with removable glazing stops located on secure side of opening.

.4 Install door silencers in frames before grouting.

.5 Remove temporary braces necessary for installation only after frames have been properly set and secured.

.6 Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

.7 Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

.2 Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

.1 Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

.3 Metal-Stud Partitions: Solidly pack mineral-fibre insulation behind frames.

.4 Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

.5 Concrete Walls: Solidly fill space between frames and concrete with grout, but only when specifically noted. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.

.6 In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

.7 In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

.8 Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.

.9 Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

.1 Squareness: Plus or minus 1.6 mm, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

.2 Alignment: Plus or minus 1.6 mm, measured at jambs on a horizontal line parallel to plane of wall.

.3 Twist: Plus or minus 1.6 mm, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

.4 Plumbness: Plus or minus 1.6 mm, measured at jambs at floor.

.4 Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

.1 Non-Fire-Rated Standard Steel Doors:

.1 Jambs and Head: 3 mm plus or minus 1.6 mm.

.2 Between Edges of Pairs of Doors: 3 mm plus or minus 1.6 mm.

.3 Between Bottom of Door and Top of Threshold: Maximum 9.5 mm.

.4 Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 19 mm.

.2 Fire-Rated Doors: Install doors with clearances according to NFPA 80.

.5 Glazing: Comply with installation requirements in Division 08 80 00 - *Glazing* and with hollow metal manufacturer's written instructions.

.1 Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 230 mm o.c. and not more than 50 mm o.c. from each corner.

3.4 ADJUSTING AND CLEANING

.1 Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

.2 Remove grout and other bonding material from hollow metal work immediately after installation.

.3 Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

.4 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

- .1 Solid-core doors with wood-veneer faces.
- .2 Shop priming and factory finishing flush wood doors.

.2 Types of items you will not find described in this Section:

- .1 Solid-core doors with hardboard, MDF, or plastic-laminate faces.
- .2 Hollow-core doors with wood-veneer and plastic-laminate faces.
- .3 Wood door frames including fire-rated wood door frames.
- .4 Factory fitting flush wood doors to frames and factory machining for hardware.
- .5 Requirements for veneers from the same flitches for both flush wood doors and wood paneling.
- .6 Exterior painting, interior painting and staining and transparent finishing for field finishing doors.
- .7 Lead-lined flush wood doors.
- .8 Glass view panels in flush wood doors.

.3 Related Requirements

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 08 11 13 - Hollow Metal Doors and Frames.
- .4 Section 08 71 00 - Door Hardware.
- .5 Section 08 80 00 - Glazing.

1.2 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).

- .1 Quality Standards for Architectural Woodwork 1998.

.2 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
- .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.3 Canadian Standards Association (CSA International).

- .1 CSA A440.2-98, Energy Performance of Windows and Other Fenestration Systems.
- .2 CSA O115-M1982(R2001), Hardwood and Decorative Plywood.
- .3 CAN/CSA O132.2 Series-90(R1998), Wood Flush Doors.
- .4 CAN/CSA-O132.5-M1992(R1998), Stile and Rail Wood Doors.
- .5 CAN/CSA-Z808-96, A Sustainable Forest Management System: Guidance Document.

.6 CSA Certification Program for Windows and Doors 00.

.4 Environmental Choice Program (ECP).

.1 CCD-045-92, Sealants and Caulking Compounds.

.2 CCD-046-92, Adhesives.

.5 National Fire Protection Association (NFPA).

.1 NFPA 80-1999, Standard for Fire Doors and Fire Windows.

.2 NFPA 252-1999, Standard Method of Fire Tests of Door Assemblies.

.6 Underwriters' Laboratories of Canada (ULC).

.1 CAN-4S104M-80(R1985), Fire Tests of Door Assemblies.

.2 CAN4-S105M-85 (R1992), Fire Door Frames Meeting the Performance Required by CAN4-S104.

1.3 SUBMITTALS

.1 Product Data: For each type of door indicated. Include details of core and edge construction, louvers, and trim for openings.

.2 Sustainability Submittals:

.1 Chain-of-custody certificates certifying that flush wood doors comply with forest certification requirements. Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.

.2 For adhesives and composite wood products, indicating that product contains no urea formaldehyde.

.3 Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

.1 Indicate dimensions and locations of cut-outs.

.2 Indicate doors to be factory finished and finish requirements.

.3 Indicate fire-protection ratings for fire-rated doors.

.4 Samples for Verification:

.1 Factory finishes applied to actual door face materials, approximately 200 by 250 mm, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of colour and grain to be expected in the finished work.

.5 Warranty: Sample of warranty.

1.4 QUALITY ASSURANCE

.1 Non-Rated Wood Flush Doors: complying with CAN/CSA-O132.2 Series 90.

.2 Fire-Rated Wood Doors: Doors complying with CAN4-S104-M that are listed and labelled by a testing agency, for fire-protection ratings indicated.

.1 Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies provide certification by a testing agency that doors comply with standard construction requirements for tested and labelled fire-rated door assemblies except for size.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Comply with requirements of referenced standard and manufacturer's written instructions.

.2 For wood veneer doors, package doors individually in plastic bags or cardboard cartons.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Dispose of polystyrene packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

.3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

.4 Divert unused adhesive material from landfill to official hazardous material collections site approved by Departmental Representative.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

.2 Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 16 and 32 deg C and relative humidity between 43 and 70 percent during the remainder of the construction period.

1.8 WARRANTY

.1 Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within warranty period.

.1 Failures include, but are not limited to, the following:

.1 Warping (bow, cup, or twist) more than 6.4 mm in a 1067-by-2134 mm section.

.2 Telegraphing of core construction in face veneers exceeding 0.25 mm in a 76.2 mm span.

.2 Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

.3 Warranty Period for Solid-Core Interior Doors: 5 years of installation.

PART 2 PRODUCTS

2.1 DOOR CONSTRUCTION, GENERAL

.1 Low-Emitting Materials: provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

.2 Particleboard-Core Doors: to CAN/CSA-O132.2 Series 90

.1 Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware.

.2 Provide doors with either glued-wood-stave or structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

.3 Mineral-Core Doors:

.1 Tested in accordance with CAN4 S104 or NFPA 252 to achieve rating as specified.

.2 Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.

.3 Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.

.4 Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

.5 Pairs: Provide fire-retardant stiles that are listed and labelled for applications indicated without formed-steel edges and astragals. Comply with specified requirements for exposed edges.

2.2 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

.1 Interior Solid-Core Doors:

.1 Grade: Hardwood Veneer Grade II (Good).

.2 Species: Select white maple; unless otherwise noted.

.3 Cut: Quarter sliced, unless otherwise noted

.4 Match between Veneer Leaves: Slip match.

.5 Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

.6 Exposed Vertical Edges: Same species as faces or a compatible species.

.7 Core: Particleboard.

.1 Substitute particleboard core with mineral core when required to achieve the fire rating specified.

.8 Construction: Seven plies, either bonded or non-bonded construction.

2.3 DOORS FOR OPAQUE FINISH

.1 Interior Solid-Core Doors:

.1 Grade: Sound (paint).

.2 Faces: Any closed-grain hardwood of mill option.

.3 Exposed Vertical Edges: Any closed-grain hardwood.

.4 Core: Particleboard.

.1 Substitute particleboard core with mineral core when required to achieve the fire rating specified.

.5 Construction: Five or seven plies. Stiles and rails are bonded to core, and then entire unit abrasive planed before veneering. Faces are bonded to core using a hot press.

2.4 LOUVERS AND LIGHT FRAMES

.1 Wood Louvers: Provide door manufacturer's standard solid-wood louvers, unless otherwise indicated.

.1 Wood Species: Species compatible with door faces.

.2 Metal Louvers: Provide metal louvers only when specifically indicated.

.1 Blade Type: Vision-proof, inverted Y.

.2 Metal and Finish: Hot-dip galvanized steel, 1.0 mm thick, with baked-enamel- or powder-coated finish.

.3 Louvers for Fire-Rated Doors: Provide metal louvers with fusible link and closing device, listed and labelled for use in doors with fire-protection rating of 1-1/2 hours and less.

.1 Metal and Finish: Hot-dip galvanized steel, 1.0 mm thick, with baked-enamel- or powder-coated finish.

.4 Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows, unless otherwise indicated.

.1 Wood Species: Species compatible with door faces.

.2 Profile: Manufacturer's standard shape.

.3 At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

.5 Metal Frames for Light Openings in Fire-Rated Doors: Provide manufacturer's standard frame formed of 1.2 mm thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating greater than 20 minutes.

2.5 FABRICATION

.1 Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

.1 Comply with requirements in NFPA 80 for fire-rated doors.

.2 Openings: Cut and trim openings through doors in factory.

.1 Light Openings: Trim openings with mouldings of material and profile indicated.

.2 Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 - Glazing.

.3 Louvers: Factory-install louvers in prepared openings.

2.6 FACTORY FINISHING

.1 General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

.1 Finish faces, all four edges, edges of cut-outs, and mortises. Stains and fillers may be omitted on bottom edges, edges of cut-outs, and mortises.

.2 Factory finish doors only when specifically indicated.

.3 Transparent Factory Finish:

.1 Grade: Custom.

.2 Finish: AWI conversion varnish or catalyzed polyurethane system.

.3 Effect: Semi filled finish, produced by applying an additional finish coat to partially fill the wood pores.

.4 Staining: As selected by Departmental Representative from full range of manufacturer's stain colour if not specifically indicated elsewhere.

.5 Sheen: Satin, unless otherwise noted.

.4 Opaque Factory Finish:

.1 Grade: Custom.

.2 Finish: AWI conversion varnish or catalyzed polyurethane system.

.3 Colour: As selected by Departmental Representative from full range of manufacturer's colours if not specifically indicated elsewhere.

.4 Sheen: Semi gloss, unless otherwise noted.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine doors and installed door frames before hanging doors.

.1 Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

.2 Reject doors with defects.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 Hardware: For installation, see Section 08 71 00 - Door Hardware.

.2 Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

.1 Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

.3 Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cut-outs, and mortises after fitting and machining.

.1 Clearances: Provide 3.2 mm at heads, jambs, and between pairs of doors. Provide 3.2 mm from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 6.4 mm from bottom of door to top of threshold unless otherwise indicated.

.1 Comply with NFPA 80 for fire-rated doors.

.2 Bevel non-fire-rated doors 3-1/2 degrees at lock and hinge edges.

.3 Bevel fire-rated doors 3-1/2 degrees at lock edge; trim stiles and rails only to extent permitted by labelling agency.

.4 Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

.1 Operation: Rehang or replace doors that do not swing or operate freely.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Access doors and frames for walls and ceilings.

.2 Floor access doors and frames, insulated and non-insulated.

.3 Insulated attic access hatches, without access ladder.

.2 Types of items you will not find described in this Section:

.1 Mortise or rim cylinder locks and master keying for access doors in walls and ceilings.

.2 Connection of floor door drainage couplings to drains.

.3 Blocking out openings for access doors and frames in concrete.

.4 Anchoring and grouting access door frames set in masonry construction.

.5 Roof hatches.

.6 Suspended acoustical tile ceilings.

.7 Heating and air-conditioning duct access doors.

.3 Precedent

.1 This spec section shall take precedent over product specifications for similar access doors and frames found in Mechanical and Electrical Divisions for locations outlined in this Spec.

1.2 SUBMITTALS

.1 Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

.2 Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.3 QUALITY ASSURANCE

.1 Source Limitations: Obtain each type of access door(s) and frame(s) through one source from a single manufacturer.

.2 Fire-Rated Access Doors and Frames: Units complying with CAN4-S104-M that are identical to access door and frame assemblies tested for fire-test-response characteristics and that are listed and labeled by ULC or another testing and inspecting agency acceptable to authorities having jurisdiction:

.3 Size Variations: Obtain Departmental Representative's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.4 COORDINATION

.1 Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical (including but not limited to all concealed valves, balancing arms and controls, fire flaps, and fire dampers), electrical (including but not limited to all concealed junction boxes, controls), or other concealed work, and indicate in the schedule specified in *Submittals* Article.

PART 2 PRODUCTS

2.1 STEEL MATERIALS

.1 Steel Sheet: Uncoated or electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

.2 Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with ZF180 zinc-iron-alloy (galvannealed) coating or Z180 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.

.3 Drywall Beads: Edge trim formed from 0.76-mm zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 STAINLESS-STEEL MATERIALS

.1 Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304 or 316. Remove tool and die marks and stretch lines or blend into finish.

.1 Finish: Manufacturer's standard.

2.3 ACCESS DOORS AND FRAMES IN GENERAL

.1 Provide fire rated door assemblies when installed in fire rated assemblies

.1 Closing: automatic closing type.

.2 Ratings:

.1 Non rated assembly: 20 minute door rating.

.2 45 minute assembly: 45 minute door rating.

.3 1 hour assembly: 45 minute door rating.

.4 1.5 hour assembly: 1 hour door rating.

.5 2 hour assembly: 1 ½ hour door rating.

2.4 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

.1 Door: Minimum 1.5 mm thick sheet metal.

.2 Frame: Minimum 1.5 mm thick sheet metal

.3 Hinges: one of the following:

.1 Spring-loaded, concealed-pin type.

.2 Continuous piano.

.4 Latch: Cam latch; slam latch; or self-latching bolt operated by one of the following:

.1 Hex head wrench.

.2 Pinned hex head wrench.

.3 Spanner head wrench.

.5 Doors in finished gypsum board wall and ceiling assemblies not otherwise having a tile finish.

.1 Type: Flush access doors and trimless frames

.2 Fabricated from one of the following:

.1 Steel sheet.

.2 Metallic-coated steel sheet.

.3 Stainless-steel sheet.

.3 Door: Set flush with surrounding finish surfaces.

.4 Frame: With drywall bead flange.

.5 Rating: Fire rated when installed in fire rated assemblies.

.1 Automatic Closer: Spring type.

.6 Doors in wall assemblies having a tiled finish.

.1 Type: Recessed access doors and trimless frames.

.2 Fabricated from one of the following:

.1 Steel sheet.

.2 Metallic-coated steel sheet.

.3 Stainless-steel sheet.

.3 Locations: Wall access doors.

.4 Door: In the form of a pan recessed 25 mm for gypsum board and tile infill.

.5 Frame: With drywall bead for gypsum board surfaces.

.7 Doors in all other assemblies.

.1 Type: Flush access doors and frames with exposed trim.

.2 Materials: Fabricated from:

.1 Stainless-steel sheet.

.3 Door: Set flush with exposed face flange of frame.

.4 Frame: With 25 mm or 32 mm wide, surface-mounted trim.

2.5 SPECIALTY ACCESS DOORS AND FRAMES

.1 Access door, fire-rated.

.1 Size: 610 mm x 914 mm.

.2 Insulated: 50 mm thick fire-rated mineral wool, 8 R-value.

.3 Frame: CRS 16 Ga, 25 mm flange.

.4 Door: CRS 20 Ga, liner: 20 Ga, self closing.

.5 Finish: White Pwd.

.6 Hinge: flush continuous hinge.

.7 Lock: cylinder lock required.

2.6 FABRICATION

.1 General: Provide access door and frame assemblies manufactured as integral units ready for installation.

.2 Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

.3 Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

.1 Exposed Flanges: Nominal 25 to 38 mm wide around perimeter of frame.

.2 For trimless frames with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.

.3 Provide mounting holes in frames for attachment of units to metal or wood framing.

.4 Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.

.4 Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

.5 Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

.1 For cylinder lock, furnish two keys per lock and key all locks alike.

.2 For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

.6 Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

.1 Comply with manufacturer's written instructions for installing access doors and frames.

.2 Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

.3 Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 INSULATED ATTIC ACCESS HATCH

.1 Ensure structural framing is used to create the rough opening for the hatch. Secure hatch to the structural framing as per manufacturer requirements.

.2 Seal the ceiling's air/vapour barrier to frame of attic access hatch. Fill void between frame and adjacent framing with spray foam sealant.

3.3 ADJUSTING AND CLEANING

.1 Adjust doors and hardware after installation for proper operation.

.2 Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

.3 Clean worksite daily.

END OF SECTION

Part 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Counter doors, electronically operated.

.2 Types of items you will not find described in this Section:

.1 Counter doors, manually operated.
.2 Counter doors with vision panels.
.3 Service doors with and without integral pass doors.
.4 Insulated service doors with and without integral pass doors.
.5 Counter doors.
.6 Fire-rated service doors with and without integral pass doors.
.7 Fire-rated, insulated service doors with and without integral pass doors.
.8 Fire-rated counter doors.
.9 Miscellaneous steel supports.
.10 Finish painting of factory-primed doors.

.3 Related Requirements:

.1 Section 01 33 00 - *Submittal Procedures.*
.2 Section 01 74 21 - *Construction/Demolition Waste Management and Disposal.*
.3 Section 01 78 00 - *Closeout Submittals.*
.4 Section 09 91 23 - *Interior Painting* for finish painting of factory-primed doors.

1.2 REFERENCES

.1 Aluminum Association (AA)

.1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA)

.1 AAMA 609/610-09, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

.3 ASTM International

.1 ASTM A167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
.2 ASTM A276-10, Standard Specification for Stainless Steel Bars and Shapes.
.3 ASTM A480/480M-11, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
.4 ASTM A653/A653M (2015), Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.5 ASTM A666 (2015), Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar

.6 ASTM B209 (2014), Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

.7 ASTM B221/B221M (2014), Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

.4 Architectural Woodwork Manufacturers' Association of Canada (AWMAC)

.1 Architectural Woodwork Standards 2009.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets.

.6 CSA International

.1 CSA O141-05(R2009), Softwood Lumber.

.2 CAN/CSA-Z809-08, Sustainable Forest Management.

.7 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.8 Green Seal Environmental Standards (GS)

.1 GS-11-11, Paints and Coatings.

.2 GS-36-11, Commercial Adhesives.

.9 National Association of Architectural Metal Manufacturers (NAAMM)

.1 Metal Finishes Manual for Architectural and Metal Products

.10 National Fire Prevention Association (NFPA)

.1 NFPA 80-2010, Standard for Fire Doors and Other Opening Protectives.

.11 National Hardwood Lumber Association (NHLA)

.1 Rules for the Measurement and Inspection of Hardwood and Cypress 2007.

.12 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2007.

.13 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2011, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.14 Sustainable Forestry Initiative (SFI)

.1 SFI-2010-2014 Standard.

.15 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.1 MPI #25 Cleaner, Etching, for Galvanized Metal.

.2 MPI #26 Primer, Galvanized Metal, Cementitious.

.3 MPI #46 Undercoat, Enamel, Interior.

.4 MPI #80 Primer Vinyl Wash.

.16 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.

.2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames.

1.3 PERFORMANCE REQUIREMENTS

.1 Operation Cycles: Provide overhead coiling door components and operators capable of operating for not less than number of cycles indicated for each door. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

1.4 SUBMITTALS

.1 Product Data: For each type and size of overhead coiling door and accessory. Include the following:

.1 Construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.

.2 Rated capacities, operating characteristics, and furnished accessories.

.2 Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data. Include plans, elevations, sections, details, and attachments to other work.

.1 Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

.2 Show locations of replaceable fusible links.

.3 Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

.1 Curtain Slats: 305 mm long.

.4 Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

.1 Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

.2 Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

.1 Obtain operators and controls from overhead coiling door manufacturer.

1.6 WASTE MANAGEMENT AND DISPOSAL:

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 PRODUCTS

2.1 DOOR CURTAIN MATERIALS AND CONSTRUCTION

.1 Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

.2 Types of Materials

.1 Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel sheet; complying with ASTM A 653/A 653M, with Z275 zinc coating; nominal sheet thickness (coated) of 0.71 mm and as required to meet requirements.

.3 Endlocks for Counter Doors: Manufacturer's standard locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.

.4 Bottom Bar for Counter Doors: Manufacturer's standard continuous channel or tubular shape, fabricated from manufacturer's standard hot-dip galvanized steel, stainless steel, or aluminum extrusions to match curtain slats and finish.

.5 Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

.6 Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.2 HOOD

.1 General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

.2 Types of Materials

.1 Galvanized Steel: Nominal 0.71 mm thick, hot-dip galvanized steel sheet with Z275 zinc coating, complying with ASTM A 653/A 653M.

2.3 COUNTER DOORS

.1 Integral Metal Sill for Counter Door: Fabricate sills as integral part of frame assembly of Type 304 stainless steel in manufacturer's standard thickness with No. 4 finish.

2.4 LOCKING DEVICES

.1 Types of Devices

.1 Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides.

.2 Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.

.1 Lock Cylinders: Provide cylinders standard with manufacturer and keyed to building keying system.

.2 Keys: Provide three for each cylinder.

2.5 CURTAIN ACCESSORIES

.1 Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

.1 Provide pull-down straps or pole hooks for doors more than 2130 mm high.

2.6 COUNTERBALANCING MECHANISM

.1 General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

.2 Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 2.5 mm/m of span under full load.

.3 Spring Balance: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

.4 Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

.5 Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.7 ELECTRIC DOOR OPERATORS

.1 Equip door with manufacturer's recommended electric door operator unless another type of door operator is indicated.

.2 Coordinate with Electrical.

2.8 TYPICAL DOOR ASSEMBLY

.1 Provide door assemblies meeting the requirements outlined below, unless otherwise noted.

.2 Counter Door: Overhead coiling door formed with curtain of interlocking metal slats.

.3 Operation Cycles: Not less than 20,000.

.4 Door Curtain Material: Contractor's choice of stainless steel or aluminum.

.5 Door Curtain Slats: Flat profile slats of manufacturer's standard height.

.6 Curtain Jamb Guides: Match curtain material and finish. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.]

.7 Hood: Match curtain material and finish.

.1 Shape: Square, unless otherwise noted.

.2 Mounting: As shown on Drawings.

.8 Sill Configuration for Counter Door: No sill.

.9 Locking Devices: Equip door with slide bolt for padlock.

.10 Door Operator: Manufacturer's standard electric operator.

.11 Door Finish:

.1 Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.9 GENERAL FINISH REQUIREMENTS

.1 Comply with NAAMM's Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designating finishes.

.2 Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 DETAILED STEEL DESCRIPTIONS

.1 Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied finish. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

.2 Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

Part 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

.2 Examine locations of electrical connections.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

.2 Install overhead coiling doors, hoods, and operators at the mounting locations indicated for each door.

.3 Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

.4 Fire-Rated Doors: Install according to NFPA 80.

3.3 ADJUSTING

.1 Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

.2 Lubricate bearings and sliding parts as recommended by manufacturer.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED SUPPLY ONLY OF:

.1 Acoustic steel frames.

.2 Acoustic wood and steel doors, swing type.

.3 Door gasketing along perimeter jambs & header.

.4 Door bottom gasketing and threshold

.5 Acoustic glazing (if required).

1.2 RELATED WORK

.1 Section 06 10 53 - Miscellaneous Rough Carpentry

.2 Section 08 14 16 - Flush Wood Doors

.3 Section 08 11 13 - Hollow Metal Doors and Frames

.4 Section 08 71 00 - Door Hardware

.5 Section 09 22 16 - Non-Structural Metal Framing

1.3 REFERENCES

.1 ASTM A480/A480M-06b - General Requirements for Flat-Rolled Stainless Heat-Resisting Steel Plate, Sheet, and Strip.

.2 ASTM A653/A653M-06 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM E90-04 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.4 ASTM E413-04 - Classification for Rating Sound Insulation.

.5 CSDMA Selection and Usage Guide for Steel Doors and Frames, 1990.

.6 HMMA 802-92 - Manufacturing of Hollow Metal Doors and Frames.

.7 HMMA 840-99 - Installation and Storage of Hollow Metal Doors and Frames.

.8 NFPA 80-07 - Standard for Fire Doors and Other Opening Protectives.

.9 UL 10C-98 - Standard for Positive Pressure Fire Tests of Door Assemblies.

.10 ANSI/WDMA I.S. 1A-2004 - Industry Standard for Architectural Wood Flush Doors.

.11 ANSI/ICC A117.1-2003 - Standard for Accessible and Usable Buildings and Facilities.

1.4 PERFORMANCE REQUIREMENTS

.1 Acoustic Performance: Minimum Sound Transmission Class (STC) 50 tested to ASTM E9.

.2 Installed Door and Frame Assembly to conform to ANSI/ICC A117.1.

1.5 SUBMITTALS

.1 Section 01 33 00: Submission procedures.

.2 Shop Drawings: Indicate door and frame elevations, anchor types and closure methods, finishes location of cut-outs for hardware and cut outs for glazing where applicable.

.3 Samples: Submit manufacturer's door finish samples, showing range of colour variation, manufacturer's frame corner sample, as well as perimeter acoustic gasket.

.4 Test Data: Submit test data indicating compliance with the Sound TransmissionClass (STC) requirements. Include laboratory name, test report number, and date of test.

.5 Installation Instructions: Submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

.1 Perform work to requirements of CSDMA (Canadian Steel Door Manufacturers Association) HMMA (Hollow Metal Manufacturers Association) WDMA (Window and Door Manufacturers Association) standards.

.2 Pre-installation Meeting: Convene a pre-installation meeting 2 (two) weeks before start of installation of door and frame assemblies. Require attendance ofparties directly affecting work of this section, including contractor, DepartmentalRepresentative, installer, and manufacturer's representative. Review installationand coordination with other work.

1.7 DELIVERY, STORAGE AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Comply with WDMA I.S. 1A for wood doors.

.3 Comply with HMMA 840 for steel frames.

.4 Weld minimum two temporary jamb spreaders per frame prior to shipment.

.5 Remove frames from wrappings or coverings upon receipt on site and inspect for damage. Leave doors covered for protection until hung.

.6 Store doors in horizontal position, frames in vertical position, spaced withblocking to permit air circulation between components.

.7 Store materials out of water and covered to protect from damage. Use coveringthat allows air circulation and does not permit light to penetrate.

.8 Store doors between 10 to 32 degrees C and 25 to 55 percent relative humidity.

.9 Clean and touch up scratches or disfigurement to metal surfaces on frame orwood surfaces on door.

1.8 WARRANTY

.1 Material and workmanship shall be warranted by manufacturer's standard warranty from the date of supply. Warranty shall apply to replacement or retrofit of product only.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Steel Frames

.1 Steel commercial grade zinc coat steel to ASTM A653/A653M, ZF180, ZF75. Frames shall be 1.6mm thickness.

.2 Primer: Rust inhibitive zinc chromate used for touch-up only.

.2 Wood Doors

.1 Acoustic Core with wood face veneer to meet the standards of Section 08 14 16 (Wood Flush Doors). Visible stiles and rails shall be matching to the species of the face veneer.

.2 All tolerances shall be in compliance with ANSI/NWWDA.

.3 Metal Doors

.1 Steel facing to meet standards of Section 08 11 13 – Hollow Metal Doors and Frames; separated by a core construction designed to meet the required STC; and tested and rated in accordance with ASTM E90; flush seamless face sheets and vertical edges, with continuous welded and smooth joints. Provide edges that are flush or rabbeted as required for perimeter seals.

.2 Acoustic core construction, longitudinal edges, mechanically inter-locked with visible edge seams.

.3 Reinforcement: To CSA G40.20/G40.21, coating designation to ASTM A653/A653M, ZF75.

.4 All tolerances shall be in compliance with ANSI/NWWDA.

2.2 ACCESSORIES

.1 Hinges: Heavy weight butt type by Section 08 71 00 – Door Hardware.

.2 Glazing stops for frames: Formed galvanized steel channel, butted corners;prepared for countersink tamperproof screws for side lite and borrowed liteframes.

.3 Glazing stops for doors: Formed stainless blade stops, mitred corners; preparedfor countersink tamperproof screws.

.4 Glass: Type as tested to achieve STC and fire ratings. Glazing to be factorysupplied and pre-installed.

.5 Primer: Rust inhibitive zinc chromate on frames.

.6 Threshold: To provide a seal for door in closed position.

.7 Astragal: To be supplied loose ready for field assembly by others

.8 Perimeter and bottom acoustic seals: to provide an acoustic seal for door in closed position.

2.3 FABRICATION

.1 Doors:

.1 Fabricate doors to ANSI/WDMA IS1A. Provide suitable thickness, design, and core to achieve specified STC and fire performance ratings.

.2 Reinforce doors where surface-mounted hardware is required.

.3 Drill and tap for mortised, templated hardware.

.4 Astragals: Metal acoustic astragals with integral acoustic seals for double doors.

.2 Frames, Welded Type:

.1 Sheet steel, metal thickness and appropriate to maintain door STC and fire ratings, mitred corners, fully welded seams.

.2 Factory assemble and weld frames.

.3 Mullions for Double Doors (where applicable): Removable type.

.4 Factory install glazing. The acoustic level of the glass shall conform to that of the door/frame unit.

.5 Factory install foam insulation to jambs for STC frames.

.6 Affix permanent metal nameplates to door and frame, indicating manufacturer's name, and STC rating. Note that where concealed vertical rod exit devices are required, the door thickness will be 53mm to accommodate the acoustic structure necessary for reinforcement of the door hardware.

2.4 FINISHES

.1 Metal Frame Finish: factory applied zinc chromate primer.

.2 Factory Door Finish: Catalyzed polyurethane, premium grade, TR-6 finish toWDMA I.S.1A. Clear coat only.

.3 Top and Bottom Rails: Factory sealed with wood sealer.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install components to manufacturer's written instructions.

.2 Install wood doors and frames to ANSI/WDMA IS 1A standards, and inaccordance with NFPA 80, and local authority having jurisdiction.

.3 Coordinate with wall construction for anchor placement.

.4 Set frames plumb, square, level and at correct elevation.

.5 Provide Spray-foam or other sealant to seal airtight all door-frame to wall edges, but ensuring installation as per the manufacturer's instructions.

.6 Allow for deflection to ensure that structural loads are not transmitted to frame.

.7 Adjust operable parts for correct clearances and function.

.8 Install and adjust perimeter and bottom acoustic seals.

.9 Finish paint in accordance with Section 09 91 23 – Interior Painting.

3.2 ERECTION TOLERANCES

.1 Installation tolerances of installed frame for squareness, alignment, twist and plumbness are to be no more than ± 1.5mm.

3.3 FIELD QUALITY CONTROL

.1 Provide manufacturer's representative to instruct installers on theproper installation and adjustment of door assemblies.

.2 Provide manufacturer's representative to inspect door installation, and test minimum ten (10) cycles of operation. Correct any deficient door and frameassemblies, as to meet the minimum STC required for the assembly.

.1 Set frames plumb, square, level and at correct elevation in accordance with manufacturer's installation instructions.

.2 Fire labeled frames shall be installed in accordance with NFPA-80, most current edition.

.3 Secure anchorages and connections to adjacent construction.

.4 Make allowance for deflection to ensure structural loads are not transmitted to frame product.

.5 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.

.3 Perform sound testing by independent testing provider and adjust seals, walls or other systems as necessary to pass sound testing requirements.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Electrically operated steel sectional overhead doors with manual override.

.1 Standard lift.

1.2 DEFINITIONS

.1 Operation Cycle: One cycle of a door is complete when it is moved from the closed position to the fully open position and returned to the closed position.

1.3 REFERENCES

.1 American Society for Testing and Materials, (ASTM).

.1 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy- Coated (Galvannealed) by the Hot-Dip Process

.2 ASTM A 36/A 36M, Standard Specification for Carbon Structural Steel

.3 ASTM A 123/A 123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

.4 ASTM A 229/A 229M, Standard Specification for Steel Wire, Quenched and Tempered for Mechanical Springs

.2 NEMA Industrial Control and Systems

1.4 PERFORMANCE REQUIREMENTS

.1 Structural Performance: Provide sectional overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:

.1 Wind Loads: Determine loads based on the following minimum design wind pressures:

.1 Wind loads as determined in accordance with the National Building Code of Canada (2015) for the particular site location and configuration, but in no case less than 1.5kPa acting inward and outward.

.2 Deflection: design doors to maximum horizontal deflection under full load of not greater than L/240.

.2 Operation-Cycle Requirements: Provide sectional overhead door components and operators capable of operating for not less than 100,000 cycles.

1.5 SUBMITTALS

.1 Product Data: For each type and size of sectional overhead door and accessory. Include the following:

.1 Summary of forces and loads on walls and jambs.

.2 Motors: For electric door installations show nameplate data and ratings, characteristics, and mounting arrangements.

.2 Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's product data.

1.6 QUALITY ASSURANCE

.1 Source Limitations: Obtain sectional overhead doors through one source from a single manufacturer.

.1 Obtain operators and controls from sectional overhead door manufacturer.

.2 Product Options: Drawings indicate size, profiles, and dimensional requirements of sectional overhead doors and accessories and are based on the specific system indicated. Other manufacturers' systems with equal performance and dimensional characteristics may be considered. Refer to Division 01 Section *Product Requirements*.

.3 Electrical Components, Devices, and Accessories: Listed and labelled as defined in NFPA 70, Article 100.

PART 2 PRODUCTS

2.1 STEEL DOOR SECTIONS

.1 Construct door sections including face sheets and frames from zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, Z275 coating to ASTM A 653/A 653M.

.1 Minimum Thickness for Galvanized Steel Section Faces:

.1 Exterior: 1.6 mm.

.2 Interior: 1.2 mm.

.2 Section Face: Manufacturer's standard grooved, ribbed, or fluted.

.2 Fabricate door panels from a single sheet to provide sections not more than 600 mm high and nominally 51 mm deep. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.

.1 For insulated doors, provide door sections with continuous thermal-break construction, separating faces of door.

.3 Enclose open sections with channel end stiles formed from not less than 1.6 mm thick galvanized steel sheet and weld end stiles to door section in place. Provide intermediate stiles formed from not less than 1.6 mm thick galvanized steel sheet, cut to door section profile, and welded in place.

.1 Stile Spacing: Not more than 1200 mm apart.

.4 Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.

.1 Vertical steel stiffeners maximum spacing 305mm.

.5 Provide reinforcement for hardware attachment.

.6 Thermal Insulation: Insulate inner core of steel sections with door manufacturer's standard polyurethane insulation, foamed in place to completely fill inner core of section and pressure bonded to face sheets to prevent delamination under wind load. Enclose insulation completely within steel sections face sheets with no exposed insulation material evident.

.7 Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

.8 Finish: Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

.1 Surface Preparation: Clean galvanized surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants.

.1 Pretreat zinc-coated steel, after cleaning, with a conversion coating of type suited to organic coating applied over it.

.2 Apply manufacturer's standard primer and finish coats to interior- and exterior-door faces after forming, according to coating manufacturer's written instructions for application, thermosetting, and minimum dry film thickness.

.1 Colour: Chosen by Departmental Representative from manufacturer's full line of standard colours, unless otherwise indicated in Schedule.

2.2 TRACKS, SUPPORTS, AND ACCESSORIES

.1 Tracks: Minimum 2.37mm thick galvanized steel track system, 75mm, designed for lift type indicated and clearances shown, and complying with ASTM A 653/A 653M for minimum Z180 zinc coating. Provide complete track assembly including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slope tracks at proper angle from vertical or design to ensure tight closure at jambs when door unit is closed. Continuous angle weld or bolt to track supports.

.1 Provide tracks configured for the following lift types:

.1 Standard, unless otherwise indicated.

.2 Track Reinforcement and Supports: Galvanized steel track reinforcement and support members, complying with ASTM A 36/A 36M and ASTM A 123/A 123M. Secure, reinforce, and support tracks as required for door size and weight, but at a minimum of 450mm o.c., to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.

.1 Support and attach tracks to opening jambs with continuous angle welded to tracks and attached to wall. Support horizontal (ceiling) tracks with continuous angle welded to track and supported by laterally braced attachments to overhead structural members at curve and end of tracks.

.1 Repair galvanized coating on tracks according to ASTM A 780.

.3 Weather seals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of overhead door.

.1 Provide motor-operated doors with combination bottom weatherseal and sensor edge.

.2 Provide continuous flexible seals at door jambs for a weathertight installation.

2.3 HARDWARE

.1 General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.

.1 Use rivets to attach to stiles and stiffeners.

.2 Hinges: Heavy-duty galvanized steel hinges of not less than 1.9 mm thick, uncoated steel at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges where required, for doors exceeding 4.87 m in width, unless otherwise recommended by door manufacturer.

.3 Rollers: Heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 75 mm diameter roller tires for 75 mm wide track and 51 mm diameter roller tires for 51 mm wide track.

.1 Tire Material: Case-hardened steel.

.4 Push/Pull Handles: For push-up-operated or emergency-operated doors, provide galvanized steel lifting handles on each side of door.

.5 Chain Lock Keeper: Suitable for padlock.

.6 Provide safety interlock switch to disengage power supply when door is locked.

.7 Chain retainer: Manual operator chain retainer mounted to floor.

2.4 COUNTERBALANCE MECHANISM

.1 Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from oil-tempered-steel wire complying with ASTM A 229/A 229M, Class II, mounted on a cross-header tube or steel shaft. Connect to door with galvanized aircraft-type lift cables with cable safety factor of at least 5 to 1. Provide springs calibrated to suit door's duty cycle indicated.

.2 Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level shaft and prevent sag.

.3 Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

2.5 OPERATION

.1 Operation: Overhead doors to be electrically operated with a chain driven manual override, equipped as follows:

.1 Heavy duty ½ hp electric side/wall mount motor.

.2 76 mm (3") heavy duty trolley type lift.

.3 High cycle springs rated at a minimum 100,000 cycles.

.2 Controls

.1 Room 124:

.1 Primary automatic activation with proximity card reader. Wall mounted up-down control switch with proximity card reader to permit activation. Equip control switch with keyed switch to disengage all electric controls.

.2 Room 301:

.1 Controlled by push button up-down switch mounted on the sidewall adjacent to overhead door inside the garage only. No exterior door control switch.

2.6 ELECTRIC DOOR OPERATORS

.1 General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycle requirements specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

.2 Disconnect Device: Hand-operated disconnect device or mechanism for automatically engaging chain-and-sprocket operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount disconnect device and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

.3 Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.

.4 Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, Class 2 control circuit, maximum 24-V, ac or dc.

.5 Door-Operator Type: Unit consisting of electric motor and the following:

.1 Electrical trolley type operator.

.1 All locations.

.2 Chain-and-sprocket secondary drive, and quick release for manual operation.

.6 Electric Motors: High-starting torque, reversible, continuous-duty, insulated, electric motors, with overload protection, sized to start, accelerate, and operate door in either direction from any position, at not less than 0.2 m/s and not more than 0.3 m/s, without exceeding nameplate ratings or service factor.

.1 Coordinate wiring with building electrical system.

.2 Provide totally enclosed, nonventilated or fan-cooled motor, fitted with plugged drain, and controller with NEMA ICS 6, Type 4 enclosure.

.1 Locations: exterior, wet, or unheated locations. Room: 301.

.7 Manual Control Station: Momentary-contact, three-button control station with push-button controls labelled *Open*, *Close*, and *Stop*; in English and French.

.1 Provide full-guarded, surface-mounted, heavy-duty-type interior unit with general-purpose, NEMA ICS 6, Type 1 enclosure.

.1 Locations: dry interior locations.

.8 Obstruction Detection Device: Provide each motorized door with external automatic safety sensor capable of protecting full width of door opening. Activation of sensor immediately stops and reverses downward door travel. Provide both of the following:

.1 Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction. Provide 2 sensors;One horizontal, one at a 45° angle (to detect protruding high bumper) with built-in timer. Door shall not close when electric eye senses the presence of an object. Timer will allow door to close automatically after electric eye senses all clear. Setting of timer to be approved by Departmental Representative. Timer can be locked out to keep door in open position.

.2 Pressure-Sensor Edge: Provide each motorized door with an automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

.1 Provide manufacturer's standard pneumatically or electrically actuated automatic bottom bar.

.1 Self-Monitoring Type: Four-wire configured device.

.9 Limit Switches: Adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

.10 Electrical Components, Devices, and Accessories: ULc or CSA listed and labelled.

.11 Conduit for Low Voltage Wiring: rigid metallic conduit, meeting requirements for rigid conduits contained in Division 26.

PART 3 EXECUTION

3.1 INSTALLATION

.1 General: Install door, track, and operating equipment complete with necessary hardware, jamb, and head moulding strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

.2 Fasten vertical track assembly to framing, spaced not less than 600 mm apart. Hang horizontal track from structural overhead framing with angle or channel hangers fastened to framing by welding or bolting or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

3.2 CONTROLS FOR MOTORIZED DOORS

.1 Equip each door with a manual control station to manually open, close, and stop door. Have manual controls override automatic controls. Equip control station with keyed switch to disengage all electric controls. Locate in locations shown on drawings or determined on site with Departmental Representative.

.2 Equip each door with a set of photoelectric sensors mounted 900 mm above the finished floor.

.3 Equip only those doors, if indicated on drawings, with an additional set of photoelectric sensors mounted 2400 mm above the floor and 1200 mm out from the face of the door.

3.3 STARTUP SERVICES

.1 Engage a factory-authorized service representative to perform startup services.

.1 Complete installation and startup checks according to manufacturer's written instructions.

.2 Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

.1 Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion, and with weathertight fit around entire perimeter.

.2 Touch-up Painting: Immediately after welding galvanized track to track supports, clean field welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780.

3.5 MAINTENANCE SERVICE

.1 Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by manufacturer's authorized service representative. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacture's authorized replacement parts and supplies.

3.6 DEMONSTRATION

.1 Engage a factory-authorized service representative to train Government of Canada's maintenance personnel to adjust, operate, and maintain sectional overhead doors.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

- .1 Exterior and interior storefront framing.
- .2 Exterior and interior manual-swing entrance doors and door-frame units.

.2 Related Work:

- .1 Section 07 92 00 - Joint Sealants.
- .2 Section 07 21 20 - Low Expanding Foam Sealant
- .3 Section 08 80 00 - Glazing
- .4 Section 08 71 00 - Door Hardware.

.3 Types of items you will not find described in this Section:

- .1 All-glass entrances and storefronts without aluminum support framing.
- .2 Automatic entrances.
- .3 Revolving entrances.
- .4 Manual-sliding entrances.
- .5 Curtain-wall systems that mechanically retain glazing on four sides.
- .6 Curtain-wall systems that retain glazing with structural sealant.
- .7 Louvers and vents for units installed with aluminum-framed systems.

1.2 PERFORMANCE REQUIREMENTS

.1 General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

- .1 Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
- .2 Dimensional tolerances of building frame and other adjacent construction.
- .3 Failure includes the following:
  - .1 Deflection exceeding specified limits.
  - .2 Thermal stresses transferring to building structure.
  - .3 Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
  - .4 Glazing-to-glazing contact.
  - .5 Noise or vibration created by wind and by thermal and structural movements.
  - .6 Loosening or weakening of fasteners, attachments, and other components.
  - .7 Sealant failure.
  - .8 Failure of operating units.

.2 Structural Loads:

.1 Design Wind Loads: Calculated as per the National Building Code of Canada (2015) for project location, type of building and adjacent site conditions, but in no case less than 1.4 KPa and in no case less than loadings containing in *Cladding Wind Load Estimates*, if so attached with this project Manual.

.2 Deflection of Framing Members:

.1 Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 4.1 m and to 1/240 of clear span plus 6.35 mm for spans greater than 4.1 m or an amount that restricts edge deflection of individual glazing lites to 19 mm, whichever is less.

.3 Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.03 L/s per sq. m of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 300 Pa.

.4 Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 300 Pa.

.5 Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night-time-sky heat loss.

.1 Temperature Change (Range): 67 deg C, ambient; 100 deg C, material surfaces.

.2 Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

.1 High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 82 deg C.

.2 Low Exterior Ambient-Air Temperature: minus 18 deg C.

.3 Interior Ambient-Air Temperature: 24 deg C.

1.3 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

.2 Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

.1 Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.

.3 Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.4 INFORMATIONAL SUBMITTALS

.1 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

.2 Field quality-control reports.

.3 Warranties: Sample of warranties.

1.5 CLOSEOUT SUBMITTALS

.1 Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

1.6 QUALITY ASSURANCE

.1 Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

.1 Do not revise intended aesthetic effects, as judged solely by Departmental Representative, except with Departmental Representative's approval. If revisions are proposed, submit comprehensive explanatory data to Departmental Representative for review.

.2 Accessible Entrances: Comply with applicable provisions in Accessibility Regulations applicable to the project.

.3 Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

.4 Preinstallation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

.1 Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.8 WARRANTY

.1 Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within warranty period.

.1 Failures include, but are not limited to, the following:

.1 Structural failures including, but not limited to, excessive deflection.

.2 Noise or vibration caused by thermal movements.

.3 Deterioration of metals, metal finishes, and other materials beyond normal weathering.

.4 Adhesive or cohesive sealant failures.

.5 Water leakage through fixed glazing and framing areas.

.6 Failure of operating components.

.2 Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within warranty period. Warranty does not include normal weathering.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

.1 Sheet and Plate: ASTM B 209M.

.2 Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221M.

.3 Extruded Structural Pipe and Tubes: ASTM B 429.

.4 Structural Profiles: ASTM B 308/B 308M.

.5 Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

.2 Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pre-treatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

.1 Structural Shapes, Plates, and Bars: CSA-G40.20/G40.21M.

.2 Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.

.3 Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.2 FRAMING SYSTEMS

.1 Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

.1 Framing member sizes: As required for compliance with structural performance criteria, but in no case less than sizes indicated on drawings, and when not indicated on drawings then not less than 50 x 100.

.2 Construction – Frames separating heated from unheated spaces: Thermally broken.

.3 Construction – Frames separating heated from other heated spaces: Non-thermal.

.4 Glazing System: Retained mechanically with gaskets on four sides.

.5 Glazing Plane: Centre of framing members.

.2 Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

.3 Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, non-bleeding fasteners and accessories compatible with adjacent materials.

.1 Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

.2 Reinforce members as required to receive fastener threads.

.3 Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, fabricated from stainless steel.

.4 Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

.5 Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, non-bleeding flashing compatible with adjacent materials.

.6 Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

2.3 GLAZING SYSTEMS

.1 Glazing: to requirements of Section 08 80 00 - *Glazing*.

.1 Type: When not indicated, provide clear safety glass; and if located between heated and unheated spaces, fabricated into insulated glass units.

.2 Glazing Gaskets: Manufacturer's standard compression types; replaceable, moulded, or extruded, of profile and hardness required to maintain watertight seal.

.3 Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

2.4 ENTRANCE DOOR SYSTEMS

.1 Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

.1 Door Construction: 50.8 to 57.2 mm overall thickness, with minimum 3.2 mm thick, extruded aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

.1 Thermal Construction - Doors separating heat from unheated paces: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.

.2 Door Design: Unless otherwise indicated, provide medium stile.

.1 Narrow stile: 54 mm nominal width.

.2 Medium stile: 88.9 mm nominal width.

.3 Wide stile: 127 mm nominal width.

.4 Accessible Doors: Smooth surfaced for width of door in area within 255 mm above floor or ground plane.

.3 Glazing Stops and Gaskets: Square Insert description, snap-on, extruded-aluminum stops and preformed gaskets.

.1 Provide non-removable glazing stops on outside of door.

.2 Entrance Door Hardware: As specified in Section 08 71 00 - *Door Hardware*.

2.5 ACCESSORY MATERIALS

.1 Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section *Joint Sealants*.

.2 Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 0.762 mm thickness per coat.

2.6 FABRICATION

.1 Form or extrude aluminum shapes before finishing.

.2 Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

.1 Profiles that are sharp, straight, and free of defects or deformations.

.2 Accurately fitted joints with ends coped or mitred.

.3 Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.

.4 Physical and thermal isolation of glazing from framing members.

.5 Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

.6 Provisions for field replacement of glazing from interior.

.7 Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

.3 Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

.4 Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

.1 At exterior doors, provide compression weather stripping at fixed stops.

.2 At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

.5 Entrance Doors: Reinforce doors as required for installing entrance door hardware.

.1 At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.

.2 At exterior doors, provide weather sweeps applied to door bottoms.

.6 Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

.7 After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 ALUMINUM FINISHES - TYPES

.1 Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

.2 Colour Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

.1 Colour: When not otherwise indicated, then selected by Departmental Representative from full range of industry colours and colour densities.

.3 High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in colour coat. Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

.1 Colour and Gloss: When not otherwise indicated, then selected by Departmental Representative from manufacturer's full range.

2.8 ALUMINUM FINISHES - SCHEDULE

.1 When not otherwise indicated, provide clear anodic finish.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 General:

.1 Comply with manufacturer's written instructions.

.2 Do not install damaged components.

.3 Fit joints to produce hairline joints free of burrs and distortion.

.4 Rigidly secure non-movement joints.

.5 Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.

.6 Seal joints watertight unless otherwise indicated.

.2 Metal Protection:

.1 Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.

.2 Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

.3 Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

.4 Set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 - *Joint Sealants* to produce weather tight installation.

.5 Install components plumb and true in alignment with established lines and grades, and without warp or rack.

.6 Install glazing as specified in Section 08 80 00 - *Glazing*.

.7 Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

.1 Exterior Doors: Install to produce weather tight enclosure and tight fit at weather stripping.

.2 Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

.8 Install perimeter joint sealants as specified in Section 07 92 00 - *Joint Sealants* to produce weather tight installation.

3.3 ERECTION TOLERANCES

.1 Install aluminum-framed systems to comply with the following maximum erection tolerances:

.1 Location and Plane: Limit variation from true location and plane to 3 mm in 3.7 m; 6 mm over total length.

.2 Alignment:

.1 Where surfaces abut in line, limit offset from true alignment to 1.5 mm.

.2 Where surfaces meet at corners, limit offset from true alignment to 0.8 mm.

.2 Diagonal Measurements: Limit difference between diagonal measurements to 3 mm.

3.4 ADJUSTING

.1 Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

.1 For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 75 mm from the latch, measured to the leading door edge.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 01 78 00 - Closeout Submittals.

.4 Section 07 21 20 - Low Expanding Foam Sealant.

.5 Section 07 92 00 - Joint Sealants.

.6 Section 08 80 00 - Glazing.

1.2 REFERENCES

.1 Aluminum Association (AA),

.1 AA-DAF 45, Designation System for Aluminum Finishes.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.40, Anticorrosive Structural Steel Alkyd Primer.

.2 CAN/CGSB-79.1, Insect Screens.

.3 Canadian Standards Association (CSA)

.1 CSA-A440-00/A440.1, A440, Windows / Special Publication A440.1, User Selection Guide to CSA Standard A440, Windows.

.2 CAN/CSA-Z91, Health and Safety Code for Suspended Equipment Operations.

1.3 SUBMITTALS

.1 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes fasteners, and caulking. Indicate location of manufacturer's nameplates.

.2 Shop drawings to indicate continuation of air barrier and vapour barrier between wall assembly and aluminum window.

.3 Submit one complete full size window sample.

.4 Include frame, sash, sill, glazing and weatherproofing method, and surface finish. Show location of manufacturer's nameplates.

.5 Include 150 mm long samples of head, jamb, sill, meeting rail mullions to indicate profile.

1.4 TEST REPORTS

.1 Submit test reports from independent testing laboratories, certifying compliance with specifications, for:

.1 Windows classifications
.2 Air tightness
.3 Water tightness
.4 Wind load resistance
.5 Condensation resistance
.6 Forced entry resistance
.7 Glazing
.8 Sash strength and stiffness
.9 Mullian deflection - combination and composite windows
.10 Anodized finish

1.5 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for windows for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.6 WARRANTY

.1 Provide a written warranty for work under this section from manufacturer for failure due to defective materials and from contractor for failure due to defective installation and workmanship, for five (5) years respectively from the date of Substantial Completion.

1.7 MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 – Testing and Quality Control.

.2 Construct mock-up showing typical window and spandrel section installed in wall opening. Accepted mock-up may form part of complete work.

.3 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with window work.

.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Materials: to CSA-A440/A440.1 supplemented as follows:

.2 All aluminum windows by same manufacturer.

.3 Sash: aluminum thermally broken.

.4 Main frame: aluminum thermally broken.

.5 Glass: in accordance with Section 08 80 00 – Glazing.

.6 Exterior metal sills: extruded aluminum of type and size to suit job conditions; minimum 3 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors, anchoring devices.

.7 Isolation coating: alkali resistant bituminous paint.

2.2 WINDOW TYPE AND CLASSIFICATION

.1 Types:

.1 Fixed: with insulating glass.

.2 Classification rating: to CSA A440/A440.1.

.1 Air tightness: A3 with operable sashes; without: fixed.
.2 Water tightness: B7.
.3 Wind load resistance: C5.
.4 Condensation resistance: Temperature Index, I.
.5 Forced Entry: F2.

.3 Energy ratings: windows to be Energy Star certified to Canadian Standards Association for various regions of Newfoundland and Labrador as follows:

.1 Zone B.

2.3 FABRICATION

.1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:

.2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3.0 mm for units with a diagonal measurement over 1800 mm.

.3 Face dimensions detailed are maximum permissible sizes.

.4 Brace frames to maintain squareness and rigidity during shipment and installation.

.5 Finish steel clips and reinforcement with 380 g/m² zinc coating to CAN/CGSB-1.40.

2.4 ACCESSORIES

.1 Operable Vents:

.1 Operable vents: zero sight line structural glazed aluminum frame, projecting awning windows with double glazed insulating glass units and concealed tamperproof fasteners.

.2 Ensure operable vents are located a minimum 2100mm above grade.

.3 Main frame depth: 125 mm.

.4 Hardware:

.1 Hinge: heavy duty 4-bar type, stainless steel.

.2 Operator: die-cast zinc, roto-operator with hardened steel gears; painted finish to match window frame.

.3 Limited opening device to 100mm: stainless steel, with key release, concealed application. Supply one release key for each room.

.4 Locks: Provide operating sash with 2 locking claw handles

.5 Screens: to CAN/CGSB-79.1-M, extruded aluminum frame with fibreglass screen cloth. Finish of screen frame to match window frame.

2.5 ALUMINUM FINISHES

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.

.1 Integral colour anodic finish: designation AA- M32, C12, C22, A42, colour to match sample.

2.6 ISOLATION COATING

.1 Isolate aluminum from following components, by means of isolation coating:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

2.7 GLAZING

.1 Glaze windows in accordance with CSA-A440/A440.1 and Section 08 80 00 - Glazing.

2.8 AIR BARRIER AND VAPOUR RETARDER

.1 Provide low expanding, single component polyurethane foam sealant installed at head, jamb and sill perimeter of window for sealing to building air barrier, vapour retarder and window frame. Foam sealant width to be adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder foam interior. Refer to Section 07 21 20 – Low Expanding Foam Sealant.

PART 3 EXECUTION

3.1 WINDOW INSTALLATION

.1 Install in accordance with CSA-A440.

.2 Arrange components to prevent abrupt variation in colour.

.3 Install shims between windows and building frame at each installation screw location. Shim and fasten windows in accordance with manufacturer's recommendations and CAN/CSA A440.4.

3.2 SILL INSTALLATION

.1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.

.2 Cut sills to fit window opening.

.3 Secure sills in place with anchoring devices located at ends joints of continuous sills and evenly spaced 600 mm oc in between.

.4 Fabricate and install sills to provide minimum 2% slope away from window.

.5 Fasten drip deflectors with self tapping stainless steel screws.

.6 Maintain 6.0 to 9.0 mm space between butt ends of continuous sills. For sills over 1200 mm in length, maintain 3.0 to 6.0 mm space at each end.

3.3 CAULKING

.1 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.

.2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE OF WORK

.1 The work of this section includes the supply of the acoustical observation windows with manually operated adjustable louvers, as herein specified, and as show on drawings.

1.2 RELATED WORK

.1 Section 04 22 00 - Concrete Unit Masonry

.2 Section 06 10 53 - Miscellaneous Rough Carpentry

.3 Section 07 92 00 - Joint Sealants

.4 Section 08 80 00 - Glazing

1.3 REFERENCES

.1 ASTM International

.1 ASTM C864-05, Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

.2 ASTME E-773-81, Standard Test Method for Seal Durability of Sealed Insulating Glass Units"

.3 ASTME E-774- 81, Standard Specification for Sealed Insulated Glass Units"

.4 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

.5 CAN/CGSB-12.8-97, Insulating Glass Units

1.4 PERFORMANCE

.1 The product shall have been tested in accordance with Canadian Specification CAN/CGSB-12.8-97 with IGMAC Certification and ASTME E-773-81 "Standard Test Method for Seal Durability of Sealed Insulating Glass Units" and ASTME E-774- 81 "Standard Specification for Sealed Insulated Glass Units", level CBA.

1.5 SUBMITTALS

.1 Product Data: Descriptive data and performance attributes for vision control glass.

.2 Installation Instructions: The installation shall be executed in strict conformity with the approved shop drawings. These drawings shall clearly indicate complete installation details.

.3 Maintenance Instructions: Manufacturer's printed instructions for cleaning and maintenance of glazed units, including operators.

1.6 SYSTEM DESCRIPTION

.1 Control vision through glazed assemblies by means of rotating, cordless, interlocking, horizontal extruded aluminum louvers with rotation controlled manually. Rotation of

louvers results in reduction in or elimination of vision through glazed assemblies. Unit to include insulated pressed steel frame as per Section 08 34 73 -Sound Control Door Assemblies, suitable for installation in an interior concrete masonry wall or gypsum board and metal stud wall . Unit shall be designed to achieve STC50 acoustic performance.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store glass units in upright position, on blocks, in dry and safe location.

.2 Do not place units in direct sunlight.

.3 Handle units using corner protectors.

1.8 WARRANTY

.1 Vision Control Glass in Interior Locations: Furnish manufacturer's written ten (10) year warranty providing coverage against material obstruction of glass units by dust or film formation due to failure of hermetic seal.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Pressed steel frame: as per Section 08 34 73 -Sound Control Door Assemblies

.2 Fasteners: to manufacturer's standard for installation of glazed security barrier framing in masonry walls. Exposed glazing stop fasteners to be tamper resistant type.

.3 Glass: materials to be in accordance with Section 08 80 00: Glass thickness shall be determined by the manufacturer according to application and sizes of glass units. At a minimum glass thicknesses shall be as follows:

.1 For the interior lite: minimum 12mm laminated heavy strength glass consisting of two (2) layers of heat strengthened tempered glass and interlayer of .030 PVB.

.2 For the exterior lite: minimum 6mm laminated heavy strength glass, consisting of two (2) layers of 3mm glass and interlayer of .060 PVB.

.3 Air space: minimum 63.5 mm

.4 Louvers:

.1 The 35 mm louvers shall be made of extruded aluminum, hollow chambered profile with overlap, alloy 6063 T-5. The louvers shall be secured at both ends with molded pivots and shall operate without cords or strings. The louvers shall be mounted horizontally. Provide isolation coating or gaskets to ensure isolation of dissimilar materials.

.5 Spacers: The corrosion-resistant aluminum spacers of 50.8 mm shall be chemically cleaned and shall contain a sufficient quantity of desiccant. They shall be turned into frames by mechanically locked corner keys.

.6 Operators: (Manual Operation)

.1 pivots, pinions, and racks shall be made of UV stabilized materials to ensure dimensional stability, durability, and maintenance-free service never needing lubrication.

.2 The rotation of the blades shall be controlled through a manual knob type operator. The blades shall rotate 180 degrees in a continuous cycle. The axle of the mechanism shall be positioned at 6 3/8" (162 mm) from the bottom or the top of the panel, on the left or right side.

.3 Operators shall be installed on one side (non secure side) only.

.4 Knob to be anti-ligature cone shaped, fully bonded to the operator shaft to prevent removal.

.7 Sealant: Compressed polyisobutylene shall be used as a primary seal and high quality polysulfide as a secondary seal. The contact of both sealants shall provide perfect adhesion as well as insurance against moisture, vapor penetration, resistance to the effects of solvents and oils, and infiltration of any substance.

.8 Desiccant: The air space between the two glass panes shall be dehydrated with desiccant contained in precise proportions in the spacers. The drying agent shall provide a minimum dewpoint of -58.3 C deg. and a moisture-free air space.

.9 Glazing Gaskets: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone or thermoplastic polyolefin rubber, molded or extruded shape to fit glazing-channel, and perimeter-frame, retaining slot

.10 Perimeter Frame: 63.5mm x 112.5mm extruded, insulated, aluminum frame, specifically designed to accept the glass specified.

.11 Affix permanent metal nameplates to window frame assembly, indicating manufacturer's name, frame tag and STC rating where it shall be clearly visible.

PART 3 EXECUTION

3.1 INSTALLATION

.1 General: Install acoustical observation windows in accordance with the requirements as per specifications and manufacturer's recommendations.

.2 Installation should be 1200 mm from finished floor.

.3 Fastening Method: Fasten frames into rough openings using 25mm x 25mm steel angles, using security screws at 100mm on centers.

.4 Apply acoustic sealant to seal the entire perimeter of frame to opening of wall assembly.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

.1 This section includes aluminum, medium duty commercial sliding service windows, and related accessories, as indicated in drawings and specified herein

1.2 RELATED WORK

.1 Section 06 10 53 - Miscellaneous Rough Carpentry

.2 Section 07 92 00 - Joint Sealants

.3 Section 08 80 00 - Glazing

.4 Section 09 29 00 - Gypsum Board

1.3 SUBMITTALS

.1 Product Data: Descriptive data and performance attributes to substantiate that products comply with this specification.

.2 Shop Drawings: Submit for fabrication and installation of windows. Include details, elevations, and hardware.

.3 Installation Instructions: Shop Drawings shall clearly indicate complete installation details.

.4 Maintenance Instructions: Manufacturer's printed instructions for cleaning and maintenance of glazed units, including operators.

1.4 SYSTEM DESCRIPTION

.1 Security window for sliding service window at reception counter shall consist of horizontal sliding panels made of heavy duty aluminum extrusion frames and security glazing, complete with flush pull. Hook lock with thumbturn, top hung track, "slam-latch" hardware, weather stripping and speak-thru's. The unit consists of two panels, one fixed panel , plus one horizontal sliding panel. The fixed end panel includes a hinged drop-down door panel, for mail pass-through, complete with spring-loaded transom latch.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver windows crated to provide protection during transit and job storage.

.2 Store units in upright position, on blocks, and in dry and safe location.

.3 Inspect windows upon delivery for damage. Unless minor defects can be made to meet Departmental Representative's specifications and satisfaction, damaged parts should be removed and replaced.

1.6 PROJECT CONDITIONS

.1 Field measurements: Check opening by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.

1.7 WARRANTY

.1 All material and workmanship shall be warranted against defects for a period of one (1) year from the date of substantial completion.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Frames: Aluminum frame modules shall be constructed of 6063-T5 extruded aluminum minimum 3mm thickness. Frames shall be 100mm x 45mm nominal size, and shall be designed as channel or stop glazing for single pane interior glazing. Overall frame sizes are to be in accordance with the contract drawings.

.2 Slides: Window glides on top-hung nylon slides.

.3 Finish: All aluminum to be clear anodized.

.4 Glazing: Prep windows to receive 13mm (1/2") security glass supplied by Section 08 80 50.

.5 Full Bottom Track: to be hung by two heavy duty roller brackets, each having self-lubricating nylon wheel and ball bearing assembly; running in an extruded track assembly. Provide extruded aluminum door glides and retainer clips along bottom for positive guide no-sway operation of sliding panel.

.6 Drop Down Door Panel/Pass Through: 13mm plywood core with one layer 0.50 aluminum fascia applied each side. All exposed door edges capped with aluminum trim. All perimeter surfaces to be smooth, free of serrations, burrs, or sharp edges.

2.2 ACCESSORIES

.1 Poly-pile weather stripping

.2 Speaker Ports - C.R. Laurence Stainless Steel Speak-thru, model no.SST5, brushed stainless steel finish, complete with cork gaskets; adjustable to suit glass thicknesses from 6mm to 32mm (1/4" - 1-1/4"). **No substitutions.**

.3 Recessed Pull installed interior office side.

.4 Cylinder Lock with Lock Adams Rite Hook Bolt, thumb turn installed on interior office side. **No substitutions.**

.5 Rubber Faced Door Stop to restrict movement at maximum in opening.

.6 Slam Latch for horizontal sliding glass panel. Model to be approved by Departmental Representative.

.7 Spring Loaded Transom Latch (Model #865) manufactured by Sobihco for Drop Down Door Panel. **No substitutions.**

.8 Heavy Duty Hinges: two (2) per drop down door panel.

PART 3 EXECUTION

3.1 INSTALLATION

.1 General: Install acoustical observation windows in accordance with the requirements of specification and as well as manufacturer's recommendations.

.2 Fastening Method: Fasten frames into rough openings using 25mm x 25mm steel angles, using security screws at 100mm on centers.

.3 Apply acoustic sealant to seal the entire perimeter of frame to opening of wall assembly.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 74 21 - Construction / Waste Management And Disposal.

.2 Section 01 78 00 - Closeout Submittals.

.3 Section 08 14 16 - Flush Wood Doors.

.4 Electrical Division: Electrical hook-up.

1.2 REFERENCES

.1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).

.1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-69.18-M90/ANSI/BHMA A156.1-2000, Butts and Hinges.

.2 CAN/CGSB-69.19-93/ANSI/BHMA A156.3-2001, Exit Devices.

.3 CAN/CGSB-69.20-M90/ANSI/BHMA A156.4-2000, Door Controls (Closers).

.4 CAN/CGSB-69.21-M90/ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.

.5 CAN/CGSB-69.22-M90/ANSI/BHMA A156.6-2001, Architectural Door Trim.

.6 CAN/CGSB-69.24-M90/ANSI/BHMA A156.8-2000, Door Controls - Overhead Holders.

.7 CAN/CGSB-69.26-96/ANSI/BHMA A156.10-1999, Power-operated Pedestrian Doors.

.8 CAN/CGSB-69.28-M90/ANSI/BHMA A156.12-1986, Interconnected Locks and Latches.

.9 CAN/CGSB-69.29-93/ANSI/BHMA A156.13-2002, Mortise Locks and Latches.

.10 CAN/CGSB-69.30-93/ANSI/BHMA A156.14-1991, Sliding and Folding Door Hardware.

.11 CAN/CGSB-69.32-M90/ANSI/BHMA A156.16-2002, Auxiliary Hardware.

.12 CAN/CGSB-69.34-93/ANSI/BHMA A156.18-2000, Materials and Finishes.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.

.3 After approval samples will be returned for incorporation in the Work.

.3 Hardware List:

.1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.5 Closeout Submittals

.1 Provide operation and maintenance data for door closers, locksets, door holders electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 – Common Product Requirements.

.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.2 Storage and Protection:

.1 Store finishing hardware in locked, clean and dry area.

1.6 WASTE DISPOSAL AND MANAGEMENT

.1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction / Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Dispose of corrugated cardboard, polystyrene, plastic, packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

1.7 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Supply two sets of wrenches for door closers, locksets, and fire exit hardware.

PART 2 PRODUCTS

2.1 HARDWARE ITEMS

.1 Use one manufacturer's products only for similar items.

2.2 DOOR HARDWARE

.1 Mortise Locksets:

.1 Noted in Hardware Schedule as Function only (use the following leaver or knob, with related function per schedule):

.1 Heavy duty mortise locksets to ANSI A156.13, series 1000, security grade 1.

.2 Functions as follows:

.1 ANSI F01 - Passage Set / Closet Latch.

.2 ANSI F04 - Office Function.

.3 ANSI F05 - Classroom Lock

.4 ANSI F07 - Storeroom or Service Function.

.5 ANSI F13 - Dormitory or Exit Lock.

.6 ANSI F14 - Store Door Lock

.7 ANSI F15 - Hotel Function.

.8 ANSI F18 - Mortise Deadlock.

.9 ANSI F22 - Bath / Bedroom Privacy Lock.

.10 ANSI F75 - Passage or Closet Latch.

.2 All locksets above to be lever or knob function as noted in hardware schedule, and finished in Satin chrome.

.3 Round rose, satin chrome.

.4 ANSI Standard Strikes with ANSI box.

.5 Trim Design:

.1 Lever design: solid handle, round bar contoured in a "C" shape with angle return, similar in design and style as the Sargent "J" Level, Schlage "93" or Corbin "Lustra".

.2 Knob Design: to be round shape similar to Sargent "B" style.

.6 Cylinders and keying: Cylinders from same manufacturer as lockset, 6 pin mortised unit with a minimum of 10 depths, supplied with contractor constructed cylinder, bitted to 1010 sequence and keyed to a common key, registered with manufacturer for use by RCMP only, designated as Sargent "NG" or Schlage "D" or Abloy.

.1 All locks in exhibit and sensitive areas must be keyed and installed by Departmental Representative. (6 locations).

.2 First cut of key must not be greater than 50% of bitting depth available from the key profile.

.2 Electrified Mortise Locksets:

.1 Noted in Hardware Schedule as Function only (use the following leaver or knob, with related Function per Schedule):

.1 Heavy duty electrified mortise lockset c/w deadbolt to ANSI A156.13, Grade 1, UL listed for fire rated doors.

.2 Functions as follows:

.1 ANSI F04 - Office Function.

.2 ANSI F05 - Classroom Lock

.3 ANSI F07 - Storeroom or Service Function.

.4 ANSI F13 - Dormitory or Exit Lock.

.5 ANSI F14 - Store Door Lock

.6 ANSI F15 - Hotel Function.

.7 ANSI F18 - Mortise Deadlock.

24 VDC operations, request to exit or enter functions, independent monitoring of inside and outside of lever rotation, deadbolt monitoring (latch retraction).

.3 Function Requirements:

.1 Lever outside with no power remains in locked condition.

.2 Lever inside simultaneously retracts the latch and deadbolt.

.3 Access granted by use of credential, unless deadbolt is thrown.

.4 When deadbolt is thrown the DX switch is deactivated. A key is required to reactivate the DX switch and enable the credential device.

.5 Can be integrated into access control system.

.6 Auxiliary dead latch.

.4 All locksets to be lever or knob function as noted in Hardware Schedule, and finished in Satin Chrome.

.5 Round rose, Satin Chrome.

.6 ANSI Standard strikes with ANSI box.

.7 Trim Design: same as mortise locksets, 2.2.1 noted above.

.8 Cylinders and keying: same as mortise locksets 2.2.1 noted above.

.9 Acceptable Product: 8271 modified RX DX8271 CW deadbolt 24V x LNL x 26D.

.3 Butts and hinges to ANSI/BHMA A 156.1. 3 Butts per door panel up to 1000mm in width, 4 Butts per door over 1001mm in width:

.1 Listed in Hardware Schedule as A1:

.1 Stainless steel, full mortise, templated, 5 knuckle, 2 permanently lubricated ball bearings, non-removable pin (NRP), 114 x 114 x 3.4mm, finished to ANSI 626.

.1 Acceptable product: Stanley FBB 191, Hager BB1191 or McKinney TA2314.

.2 Listed in Hardware Schedule as A2:

.1 Steel base polished and plated, full mortise, templated, 5 knuckle, 2 permanently lubricated ball bearings, 114 x 102 x 3.4mm, finished to ANSI 626.

.1 Acceptable product: Stanley FBB 179, Hager BB1279 or McKinney TA2714.

.3 Exit Devices:

.1 Listed in Hardware Schedule as Function based on Von Duprin numbering system.

.1 All exit devices to be three point latching system.

.2 Trim Design:

.1 Lever Design: Solid handle, round bar contoured in a "C" shape with angle return, similar in design and style as Corbin "Lustra" or Von Duprin "03".

.4 Door Closers:

.1 Listed in Hardware Schedule as D1:

.1 Door controls (closers): to ANSI/BHMA A156.4, Grade 1, heavy duty, non handed, top jamb mounted, aluminum body with aluminum cover, adjustable through ranges 1 to 6, adjustable backcheck and delayed action, finished to ANSI 689.

.2 Accessory mounting plate, top jamb mounting.

.3 Acceptable product: Sargent 350-O x 351-B, LCN 4040-18G.

.2 Listed in Hardware Schedule as D2:

.1 Door controls (closers): to ANSI/BHMA A156.4, Grade 1, standard duty, non handed, parallel arm, aluminum body with high impact acrylic

cover, adjustable through ranges 1 to 4, adjustable backcheck and delayed action, finished to ANSI 689.

.2 Acceptable product: Sargent 1431-O LCN 1460T.

.5 Auxiliary Trim & Devices:

.1 Listed in Hardware Schedule as F5:

.1 Flush Bolts to ANSI/BHMA A156.16, cast brass or bronze, 150 mm long, wrought brass pin 25 mm throw, spring holds bolt in either open or closed position, dust proof strikes, finish to ANSI 626.

.2 Acceptable product: Hager HA1250, Standard Metal Hardware Manufacturing F65.

.2 Listed in Hardware Schedule as F2:

.1 Door Pull to ANSI/BHMA A156.6, stainless steel cylinder pull, 51 x 400 x 1.6 mm, hole to suit specified cylinder, finished to ANSI 626.

.2 Acceptable product: Hager 121L, Standard Metal Hardware Manufacturing H408.

.3 Listed in Hardware Schedule as F3:

.1 Pushplate to ANSI/BHMA A156.6, 100 x 400 x 1.3 mm thick stainless steel, 15 mm radiused corners, screw attached, finished to ANSI 626.

.2 Acceptable product: Hager 90R, Standard Metal Hardware Manufacturing K14.

.4 Listed in Hardware Schedule as F4:

.1 Kickplate to ANSI/BHMA A156.6, 200 x 1.3 mm thick stainless steel by door width less 50 mm long, 15 mm radiused corners, screw attached, finished to ANSI 626.

.2 Acceptable product: Hager 204SR, Standard Metal Hardware Manufacturing K10R.

.6 Door controls: Stops and overhead holders:

.1 Listed in Hardware Schedule as G1:

.1 Wall stop to ANSI/BHMA A156.8, solid cast brass or bronze, circular shape, rubber insert, concealed mounting, 45 mm diameter, finished to ANSI 626.

.2 Acceptable product: Hager 241F/243F, Standard Metal Hardware Manufacturing S101/S103.

.2 Listed in Hardware Schedule as G2:

.1 Floor stop to ANSI/BHMA A156.8, solid cast brass or bronze, circular shape, convex rubber insert or concave at push button locksets (replaceable), concealed mounting, 60 mm diameter x 25 mm projection, finished to ANSI 626.

.2 Acceptable product: Hager 230W/234W, Standard Metal Hardware Manufacturing S121/S123, Gallery Specialty Hardware 240B/250B or approved equal.

.3 Listed in Hardware Schedule as G3:

.1 Overhead stop release devices to ANSI/BHMA A156.8, heavy duty, non-friction stop type, surface mounted, extruded bronze track 21 x 17.5 mm, extruded bronze arm 19 x 4.8 mm, heavy duty tempered steel spring, non-handed, sized for door leaf width indicated, finished to ANSI 626.

.2 Acceptable product: Sargent 594S, Glynn-Johnson 104S or approved equal.

.7 Thresholds:

.1 Listed in Hardware Schedule as H1:

.1 To ANSI/BHMA A156.21, extruded aluminum threshold, with continuous PVC thermal barrier cast in dovetail recesses permanently bonded, 152 mm wide x 13mm high x full width of door opening, mill finish.

.2 Acceptable product: K.N. Crowder CT-45, Hager 421S or approved equal.

.8 Weatherstrip Set:

.1 Listed in Hardware Schedule as H2:

.1 Head and jamb seal:

.1 Extruded aluminum frame 25 mm width and hollow bulb neoprene insert, clear anodized finish.

.2 Acceptable product: K.N. Crowder W-2, Hager 891S or approved equal.

.2 Door bottom seal (unless H4 below is noted):

.1 Extruded aluminum frame 25 mm width and vinyl sweep, clear anodized finish.

.2 Acceptable product: K.N. Crowder W13S, Hager 750S or approved equal.

.9 Astragal:

.1 Listed in Hardware Schedule as H3:

.1 T shaped, extruded aluminum frame with pile or vinyl insert, overall 44 x 25 x 6mm, clear anodized finish.

.2 Acceptable product: K.N. Crowder W9, Hager 837S or approved equal.

.10 Automatic door bottom seal listed in hardware set as H4:

.1 Extruded aluminum combined with closed cell sponge neoprene. Plunger depresses automatically when door is closed. Seal to be mounted in door

.11 Security Astragal:

.1 Listed in Hardware Schedule as H5:

.1 Acceptable product: #43STST by Zero International.

.12 Automatic door operators:

.1 Listed in Hardware Schedule as I1:

.1 Door swing operator, aluminum operating housing, AC electric motor, connection wiring harness, operator assembly, swing arm, and electronic control.

.2 Operator: Electro-hydraulic, self contained operator, powered by a 1-6 hp motor.

.3 Electronic control:Self contained, solid state integrated circuit controls the operations and switching of the swing power operator.

.4 Connecting hardware: Surface mounted hardware is connected to the door by means of die cast aluminum door arm.

.5 Power open: Automatic door operator is powered open by force transmitted to the hydraulic servo to operate and through adjustable arm linkage to the door.

.6 Spring close: The automatic door operator is spring closed. The spring in non-handed and returns the door to full close.

.7 Finish: Operator housing and arm to match aluminum door/frame colour.

.13 Miscellaneous electrical hardware:

.1 Listed in Hardware Schedule as J1:

.1 Electric strike to ANSI/BHMA E59371, 12V, stainless steel, non-handed, plug connectors, fail safe, entry buzzer.

.2 Acceptable product: Von Duprin 6114.

.2 Listed in Hardware Schedule as J2:

.1 Power supply: Schalge 24V, 2 Amp.

.3 Listed in Hardware Schedule as J3:

.1 Wire transfer loop:

.1 UL listed.

.2 Provide secure and unobstructed means of channeling electrical wiring from door frame into door itself.

.3 Conduit: spring steel helix has internal diameter of approximately 5/16" (8mm).

.4 Housing: stamped steel, approximately 1/16" (1.6mm) thick. Short (105 degree swing) is 11 ½" (292mm) long. 180 degree version is 20 5/32" (512mm) long. Chrome Finish.

.14 Miscellaneous hardware:

.1 Listed in Hardware Schedule as K1:

.1 Padlock, stainless steel.

.2 Acceptable product: Abloy PL 330.

.2 Listed in Hardware Schedule as K2:

.1 Door viewer, 190° one way angle viewer.

.2 Acceptable Product: Ives 698B3 non rated doors and Ives U698B3 for rated doors.

.15 Sliding door hardware:

.1 Listed in Hardware Schedule as L1:

.1 Bi-passing medium duty double doors.

.2 Acceptable product: C-650 as manufactured by K.N. Crowder, Stanley, or an approved alternate.

2.3 FASTENINGS

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

2.4 KEYING

.1 Keying:

.1 All keying shall be completed by Departmental Representative.

.2 Contractor to provide and all construction keys and cylinders to direction of Departmental Representative.

.2 Provide keys in triplicate for every lock in this Contract.

.3 Provide three master keys.

2.5 MISCELLANEOUS HARDWARE

.1 Indexed key control system: to CAN/CGSB-69.21-M90, wall mounted system, type multiple panel, enamel paint finish. Allow for 50% expansion.

.2 Engraved Plastic Plate Signs: 3 mm thick acrylic, two colours, reverse engraved, international symbols for Barrier Free and Washrooms, lettered for room use other locations, Room number.

.1 Acceptable product: PMI, ASI, Hager or approved equal.

.2 Schedule: as follows:

.1 200 x 200 mm signs with Barrier Free symbols on all barrier free washroom doors.

.2 50 x 100 mm door frame numbers (All openings). Numbering to conform to drawings.

.3 300 x 300 mm signs at all stair levels indicating floor level.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

.1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

.2 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.3 Install key control cabinet.

.4 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.5 Removal of construction cores and replacement will be completed by Departmental Representative.

3.3 ADJUSTING

.1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.

.2 Lubricate hardware, operating equipment and other moving parts.

.3 Adjust door hardware to provide tight fit at contact points with frames.

3.4 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.

.3 Remove protective material from hardware items where present.

.4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.5 DEMONSTRATION

.1 Keying System Setup and Cabinet:

.1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.

.2 Place file keys and duplicate keys in key cabinet on their respective hooks.

.3 Lock key cabinet and turn over key to Departmental Representative.

.2 Maintenance Staff Briefing:

.1 Brief maintenance staff regarding:

.1 Proper care, cleaning, and general maintenance of projects complete hardware.

.2 Description, use, handling, and storage of keys.

.3 Use, application and storage of wrenches for door closers locksets and fire exit hardware.

.3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.6 HARDWARE GROUPS

Hardware Set No. 1

- 1 hinge continuous hinge by Aluminum Door Supplier
- 1 Lockset ANSI F13 x WSB x 26D
- 1 Power Door Operator (I1)
- 1 Overhead Door Stop – Finish 26D (G3)
- 1 Electric Door Strike 12V (J1)
- 1 Power Supply 24V, 2AMP (J2)
- 1 Set Weatherstripping – Head & Jamb by Aluminum Door Supplier
- 1 Threshold – Thermally broken by Aluminum Door Supplier

Hardware Set No. 2

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F01 x 26D
- 1 Power Door Operator (I1)
- 1 Wall Stop (G1)
- 1 Electric Strike (J1)
- 1 Power Supply (J2)

Hardware Set No. 3

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Lockset ANSI F15
- 1 Closer (D1)
- 1 Wall Stop (G1)
- 1 Set Weatherstripping – Head & Jamb Seal (H2)

Contractor to drill 25mm x 50mm deep hole at frame and install pull cord for future door contact.

Hardware Set No. 4

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F07
- 1 Door Closer (D2)
- 1 Wall Stop (G1)
- 1 Set Weatherstripping – Head & Jamb Seal (H2)

Hardware Set No. 5

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F15
- 1 Wall Stop (G1)
- 1 Set Weatherstripping – Head & Jamb Seal (H2)
- 1 Automatic Door Bottom Seal (H4)

Hardware Set No. 6

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Lockset ANSI F13
- 1 Door Closure (D2)
- 1 Wall Stop (G1)
- 1 Set Weatherstripping – Head & Jamb Seal (H2)
- 1 Automatic Door Bottom Seal (H4)

Door to have 25mm x 50mm deep hole at frame c/w pull cord for future door contact.

Hardware Set No. 7

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F07
- 1 Closure (D2)
- 1 Overhead Stop (G3)
- 1 Set Weatherstripping – Head & Jamb Seal (H2)

Hardware Set No. 8

- 3 Hinges 114 x 114 x NRP X 26D
- 1 Lockset ANSI F07 (Fixed from Room 102)
- 1 Wall Stop (G1)
- 1 Set Weatherstripping Jamb & Head (H2)
- 1 Automatic Door Bottom Seal (H4)

Hardware Set No. 9

- 3 Hinges 114 x 114 x NRP X 26D
- 1 Lockset ANSI F15 (Fixed from Room 105)
- 1 Closure (D2)
- 1 Wall Stop (G1)
- 1 Set Weatherstripping Jamb & Head (H2)
- 1 Automatic Door Bottom Seal (H4)

Door to have 25mm x 50mm deep hole at frame c/w pull cord for future door contact.

Hardware Set No. 10

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F04
- 1 Wall Stop (G1)
- 1 Set Weatherstripping Jamb, Head & Sill (H2)

Hardware Set No. 11

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Exit Set 9957-EO, F07
- 1 Door Closer (D1)
- 1 Overhead Stop (G3)
- 1 Thermal Broken Aluminum Threshold (H1)
- 1 Set Weatherstripping, Jamb, Head & Sill (H2)

Door to have 25mm x 50 mm deep hole at frame c/w pull cord for future door contact.

Hardware Set No. 12

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F01
- 1 Door Closer (D2)
- 1 Wall Stop (G1)

Hardware Set No. 13

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Lockset ANSI F15 Electrified Mortise
- 1 Door Closer (D1)
- 1 Overhead Stop (G3)
- 1 Power Supply 24V, 2 AMP (J2)
- 1 Wire Transfer Loop (J3)

Door to have 25mm x 50 mm deep hole at frame c/w pull cord for future door contact.

Hardware Set No. 14

- All hardware by door supplier

Hardware Set No. 15

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Lockset ANSI F07
- 1 Overhead Door Closer (D2)
- 1 Set Weatherstripping – Head & Jamb Seal (H2)

Door to have 25mm x 50 mm deep hole at frame c/w pull cord for future door contact.

Hardware Set No. 16

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F15
- 1 Door Closer (D1)
- 1 Floor Stop (G2)
- 1 Security Astragal (H5)
- 1 Set Weatherstripping, Jamb, Head & Sill (H2)
- 1 Thermal Broken Threshold (H1)

Door to have 25mm x 50 mm deep hole at frame c/w pull cord for future door contact.

Hardware Set No. 17

- 6 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F07
- 1 Set Flush Bolts

Hardware Set No. 18

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Lockset ANSI F14 - Knob
- 1 Door Closer (D1)
- 1 Overhead Door Stop (G3)
- 1 Security Astragal (H5)
- 1 Thermal Broken Aluminum Threshold (H1)
- 1 Set Weatherstripping Jamb, Head & Sill (H2)
- 1 Door Viewer (K2)

Doors to have 25mm x 50 mm deep hole at frame c/w pull cord for future door contact.

Hardware Set No. 19

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Lockset ANSI F14
- 1 Door Closer (D1)
- 1 Overhead Door Stop (G3)
- 1 Thermal Broken Aluminum Threshold (H1)
- 1 Set Weatherstripping Jamb, Head & Sill (H2)
- 2 Door Viewers (K2)

Hardware Set No. 20

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F07 - Knob
- 1 Door Closer (D2)
- 1 Wall Stop (G1)
- 1 Set Weatherstripping – Head & Jamb Seal (H2)

Hardware Set No. 21

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F15
- 1 Door Closer (D1)
- 1 Wall Stop (G1)
- 1 Set Weatherstripping Jamb & Head (H2)
- 1 Auto Bottom Seal (H4)

Hardware Set No. 22

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F15
- 1 Set Weatherstripping – Head & Jamb Seal (H2)

Hardware Set No. 23

- 3 Hinges 114 x 114 x NRP x 26D
- 1 Lockset ANSI F07
- 1 Door Closer (D1)
- 1 Overhead Door Stop (G3)
- 1 Thermal Broken Aluminum Threshold (H1)
- 1 Set Weatherstripping Jamb, Head & Sill (H2)

Hardware Set No. 24

- 6 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F07
- 2 Door Closers (D2)
- 1 Wall Stop (G1)
- 1 Floor Stop (G2)
- 1 Flush Bolt
- 1 Astragal (H3)

Hardware Set No. 25

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F01 x 26D
- 1 Wall Stop (G1)

Hardware Set No. 26

- 3 Hinges 114 x 102 x 26D
- 1 Lockset ANSI F22 (Privacy Lock)
- 1 Door Closer (D2)
- 1 Wall Stop (G1)

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section includes the following products:

- .1 Float glass
- .2 Safety glass, including laminated and tempered glass.
- .3 Heat-strengthen glass.
- .4 Reflective glass.
- .5 Polished wire glass.
- .6 Spandrel glass.

.2 Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

- .1 Windows.
- .2 Doors.
- .3 Glazed curtain walls.
- .4 Storefront framing.
- .5 Glazed entrances.
- .6 Sloped glazing.
- .7 Skylights.
- .8 Interior borrowed lites.
- .9 Fire-resistant glazing.

.3 Types of items not described in this Section:

- .1 Glass panels in decorative metal railings.
- .2 Tinted glass.
- .3 One-way mirror glass.
- .4 Patterned glass.
- .5 Decorative glass glazing.
- .6 All-glass entrances and storefronts.
- .7 Structural-sealant-glazed curtain walls.
- .8 Mirrors.
- .9 Fire-resistant glazing.
- .10 Security glazing.

.4 Related Requirements

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 61 00 - Common Product Requirements
- .4 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.5 Section 01 78 00 - Closeout Submittals.

.6 Section 07 82 00 - Joint Sealants.

.7 Section 08 11 13 - Hollow Metal Doors & Frames.

.8 Section 08 14 16 - Flush Wood Doors.

1.2 REFERENCES

.1 ASTM International

.1 ASTM C542-05, Standard Specification for Lock-Strip Gaskets.

.2 ASTM C509-06, Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

.3 ASTM C716-06, Standard Specification for Installing Lock-Strip Gaskets and Infill Glazing Materials

.4 ASTM C864-05, Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

.5 ASTM C1036

.6 ASTM C1048-12, Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass

.7 ASTM C1115-11, Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories

.8 ASTM C1281-14, Standard Specification for Preformed Tape Sealants for Glazing Applications

.9 ASTM C1330-13, Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants

.10 ASTM D790-07e1, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.11 ASTM D1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.

.12 ASTM D1929-96(R2001)e1, Standard Test Method for Determining Ignition Temperature of Plastics.

.13 ASTM D2240-05, Standard Test Method for Rubber Property - Durometer Hardness.

.14 ASTM E84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.

.15 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.16 ASTM E2074-00, Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

.17 ASTM E2010-01, Standard Test Method for Positive Pressure Fire Tests of Window Assemblies.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.2-M98, Flat, Clear Sheet Glass.

.3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
.4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.
.5 CAN/CGSB-12.8-97, Insulating Glass Units.
.6 CAN/CGSB-12.8-97 (Amendment), Insulating Glass Units.
.7 CAN/CGSB-12.9-M91, Spandrel Glass.
.8 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.
.9 CAN/CGSB-12.11-M90, Wired Safety Glass.
.10 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets.

.3 Environmental Choice Program (ECP)

.1 CCD-045-95(R2005), Sealants and Caulking Compounds.

.4 American National Standards Institute (ANSI):

.1 ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings

.5 Consumer Product Safety Commission (CPSC)

.6 Glass Association of North American (GANA)

.1 GANA Glazing Manual - 2008.
.2 GANA Laminated Glazing Reference Manual - 2009.

.7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.8 National Fire Protection Association (NFPA):

.1 NFPA 80: Fire Doors and Windows.

.9 Standard Council of Canada:

.1 CAN/ULC-S101-14: Standard Methods Of Fire Endurance Tests Of Building Construction And Materials
.2 ULC Standard CAN4-S104: Fire Tests of Door Assemblies.
.3 ULC Standard CAN4-S106: Fire Tests of Window Assemblies.
.4 CAN/ULC-S101-14M: Standard Methods of Fire Endurance Tests.

1.3 DEFINITIONS

.1 Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

.2 Glass Thicknesses: Indicated by thickness designations in millimetres according to ASTM C 1036.

.3 Interspace: Space between lites of an insulating-glass unit.

1.4 PERFORMANCE REQUIREMENTS

.1 General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

.2 Delegated Design: For glass panels having a dimension in any one direction 1500 mm or greater design glass, including comprehensive engineering analysis according to CAN/CGSB-12.20 by a professional engineer, using the following design criteria:

.1 Design Wind Loads: Calculated as per the National Building Code of Canada (2015) for project location, type of building and adjacent site conditions, but in no case less than 1.4 KPa and in no case less than loadings containing in *Cladding Wind Load Estimates*, if so attached with this project Manual.

.2 Design Snow Loads: As per the National Building Code of Canada (2015) for project location, type of building and adjacent site conditions.

.3 Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

.4 Thickness of Heat-Absorbing Glass: Provide the same thickness for each tint colour indicated throughout Project.

.5 Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.

.6 Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 25 mm, whichever is less.

.7 Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

.8 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

.1 Temperature Change: 67 deg C, ambient; 100 deg C, material surfaces.

1.5 ACTION SUBMITTALS

.1 Product Data: For each glass product and glazing material indicated.

.2 Glass Samples: For each type of glass product other than clear monolithic vision glass]; 300 mm square.

.1 Coated glass.

.2 Wired glass.

.3 Laminated glass with coloured interlayer.

.4 Insulating glass.

.3 Glazing Accessory Samples: For gaskets and sealants, in 300-mm lengths. Install sealant Samples between two strips of material representative in colour of the adjoining framing system.

.4 Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

.1 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, coated glass, and insulating glass.

.1 For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

.2 Warranties: Sample of warranties.

1.7 QUALITY ASSURANCE

.1 Source Limitations for Glass: Obtain glass coated float glass, laminated glass, and insulating glass from single source from single manufacturer for each glass type.

.2 Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

.3 Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

.1 GANA Publications: GANA's *Laminated Glazing Reference Manual* and GANA's *Glazing Manual.*

.2 AAMA Publications: AAMA GDSG-1, *Glass Design for Sloped Glazing,* and AAMA TIR-A7, *Sloped Glazing Guidelines.*

.3 IGMA Publication for Sloped Glazing: IGMA TB-3001, *Guidelines for Sloped Glazing.*

.4 IGMA Publication for Insulating Glass: SIGMA TM-3000, *North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.*

.4 Insulating Glass Certification Program: Permanently marked either on spacers or at least one insulating unit component with appropriate certification label of inspecting and testing agency indicated below:

1. Insulating Glass Manufacturers Alliance (IGMA) or Insulating Glass Manufacturers Association of Canada (IGMAC)

.5 Provide safety glass permanently marked with the company name or logo and CAN/CGSB-12.1-M if the product meets categories 1 and 2, or mark as CAN/CGSB 12.1-M-1 if the product meets the requirements of Category 1 only.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

.2 Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

.3 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.4 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.5 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect glazing and frames from nicks, scratches, and blemishes.

.3 Protect prefinished aluminum surfaces with wrapping.

.4 Replace defective or damaged materials with new.

.6 Develop Waste Reduction Workplan related to Work of this Section.

.7 Packaging Waste Management: remove for reuse and return of crates, as specified in in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.9 PROJECT CONDITIONS

.1 Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

.1 Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 4.4 deg C.

1.10 WARRANTY

.1 Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

.1 Warranty Period: 10 years from date of Substantial Completion.

.2 Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

.1 Warranty Period: Five years from date of Substantial Completion.

.3 Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

.1 Warranty Period: 10 years from date of Substantial Completion.

.4 Manufacturer's Special Warranty for Opacifer Coatings on Spandrel Glass: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

.1 Warranty Period: 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

.1 Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

.1 Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

.2 Strength: Where float glass is indicated, provide annealed float glass, heat-treated float glass, or fully tempered float glass as needed to comply with *Performance Requirements* Article. Where heat-strengthened glass is indicated, provide heat-treated float glass or fully tempered float glass as needed to comply with *Performance Requirements* Article. Where tempered glass is indicated, provide fully tempered float glass.

2.2 GLASS PRODUCTS

.1 General

.1 Thickness: Unless otherwise indicated, provide 6 mm.

.2 Tint: Provide clear glass.

.3 Provide safety glazing labelling for units fully tempered or laminated.

.2 Float Glass: CAN/CGSB-12.3, Quality, Glazing.

.3 Heat-Treated Float Glass: CAN/CGSB 12.9-M, Type 2, Heat-Strengthened Glass, Class A-Float Glass.

.4 Safety Glass: CAN/CGSB 12.1-M, and one of the following:

.1 Laminate float glass.

.2 Fully tempered float glass

.3 Laminated fully tempered float glass.

.5 Fully Tempered Glass: CAN/CGSB 12.1-M, Type 2, Tempered Glass, Class B-Float Glass.

.6 Wired Glass: CAN/CGSB 12.11-M90.

.7 Transparent (One-Way) Mirror: CAN/CGSB-12.6.

.8 Reflective-Coated Vision Glass: CAN/CGSB-12.10, coated by pyrolytic process or vacuum deposition (sputter-coating) process, and complying with other requirements specified.

.1 Heat-strengthened, except laminated and tempered for sloped glazing.

.2 Coating Colour: Unless otherwise indicated, provide silver colour.

.9 Spandrel Glass: CAN/CGSB-12.9-M, Type 1-Tempered Glass or Type 2-Heat Strengthened Glass, Class A-Float Glass.

.1 Coating: Ceramic or silicone coating.

.1 Coating Colour: Unless otherwise indicated, then selected by Departmental Representative from manufacturer's full range.

.2 Opaque Coating Location:

.1 Monolithic glass units: Second surface.

.2 Insulated glass units: Fourth surface.

.3 Fallout Resistance: Passes fallout-resistance test in ASTM C 1048 for an assembly of glass and adhered reinforcing material.

.4 Reflective Spandrel Glass: Factory apply manufacturer's standard opacifier of the following material, with resulting products complying with Specification No. 89-1-6 in GANA's Tempering Division's *Engineering Standards Manual*:

.1 Manufacturer's standard opacifier material.

.5 Use Type 1 Tempered Glass when installed in doors, sidelights, and glass lites within 900 mm of finished floor.

2.3 TEMPERED GLASS PRODUCTS FOR USE IN GLASS GUARD ASSEMBLIES

.1 Tempered Glass: Tempered float glass to CAN/CGSB-12.1-M, Type 2, Tempered Glass, Class B-Float Glass

.1 Glass Colour: Clear; unless otherwise noted on drawings.

.2 Thickness for Structural Glass Balusters: As required by structural loads, but not less than 12.0 mm.

2.4 LAMINATED GLASS PRODUCTS

.1 Laminated Glass: CAN/CGSB 12.1-M, Type 1. Use materials that have a proven record of no tendency to bubble, discolour, or lose physical and mechanical properties after fabrication and installation.

.1 Glass:

.1 Glass Type: float glass, unless otherwise noted, or otherwise required to meet performance criteria.

.2 Glass thickness: As required to meet the performance criteria but in no case less than 6 mm.

.2 Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written recommendations.

.3 Interlayer:

.1 Interlayer Thickness: Provide thickness as required to comply with performance requirements but in no case less than 1.52 mm for sloped glazing and 0.76 mm for all other glazing.

.2 Interlayer Colour: Clear, unless otherwise indicated.

.4 Coatings: Unless otherwise noted, no coatings are required.

.2 Provide safety glazing labelling.

2.5 INSULATING GLASS PRODUCTS

.1 Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to CAN/CGSB-12.8, and complying with other requirements specified.

.1 Sealing System: Dual seal, with manufacturer's standard primary and secondary.

.2 Spacer: Manufacturer's standard high-performance spacer material and construction.

.3 Desiccant: Molecular sieve or silica gel, or blend of both.

.4 Overall Unit Thickness: 25 mm.

.5 Thickness of Each Glass Lite: as required to meet the performance criteria but in no case less than 6.0 mm.

.6 Interspace Content: Unless otherwise indicated, provide Argon gas.

.7 Low-E Coating: LoE^2 240 coating; or equivalent.

.8 Grey tint 6mm exterior pane.

.9 Glass Type:

.1 Doors, sidelights, and glass lites between heated and unheated paces and within 900 mm of finished floor: Safety glass.

.2 Spandrel Panels: Spandrel glass.

.3 Curtain wall: Heat strengthened, unless otherwise required to meet performance requirements.

.4 All other locations: provide float glass, unless a stronger glass is required to meet the performance criteria.

2.6 GLAZING GASKETS

.1 Dense Compression Gaskets: Moulded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

.1 Neoprene complying with ASTM C 864.

.2 EPDM complying with ASTM C 864.

.3 Silicone complying with ASTM C 1115.

.4 Thermoplastic polyolefin rubber complying with ASTM C 1115.

.2 Soft Compression Gaskets: Extruded or moulded, closed-cell, integral-skinned neoprene, EPDM, silicone, or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

.1 Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

.3 Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with moulded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.7 GLAZING SEALANTS

.1 General:

.1 Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

.2 Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

.3 Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

.4 Colours of Exposed Glazing Sealants: As selected by Departmental Representative from manufacturer's full range.

.2 Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

2.8 GLAZING TAPES

.1 Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and non-migrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

.1 AAMA 804.3 tape, where indicated.

.2 AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

.3 AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

.2 Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

.1 AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.

.2 AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

.1 General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

.2 Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

.3 Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

.4 Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

.5 Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

.6 Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

.1 Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

.2 Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

.3 Grind smooth and polish exposed glass edges and corners.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

.1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

.2 Presence and functioning of weep systems.

.3 Minimum required face and edge clearances.

.4 Effective sealing between joints of glass-framing members.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

.2 Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

.1 Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

.2 Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

.3 Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

.4 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

.5 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

.6 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

.7 Provide spacers for glass lites where length plus width is larger than 1270 mm.

.1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

.2 Provide 3-mm minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

.8 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

.9 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

.10 Set glass lites with proper orientation so that coatings face exterior or interior as specified.

.11 Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

.12 Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

.1 Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

.2 Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

.3 Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

.4 Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

.5 Do not remove release paper from tape until right before each glazing unit is installed.

.6 Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 GASKET GLAZING (DRY)

.1 Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

.2 Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints mitre cut and bonded together at corners.

.3 Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

.4 Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gas-

kets. Compress gaskets to produce a weather tight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

.5 Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

.1 Use sealant glazing method only if all other glazing methods are inappropriate.

.2 Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

.3 Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

.4 Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

.1 Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.8 CLEANING AND PROTECTION

.1 Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove non-permanent labels and clean surfaces.

.2 Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

.3 Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

.4 Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

.5 Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

.6 Clean worksite daily.

3.9 GLAZING SCHEDULE

.1 Provide glass units fabricated from clear, uncoated float glass, unless noted otherwise.

.1 Provide glass units installed in doors and frames located within 900 mm of the finished floor fabricated using safety glass, unless noted otherwise.

.2 Provide glass units installed in doors and frames located in fire separations fabricated from polished wired glass, unless noted otherwise.

.3 Provide heat-strength or fully tempered glass where required to meet performance requirements.

.2 Provide insulated glass units between heated and unheated spaces, and where noted otherwise.

.1 Provide monolithic glass units in all other locations, unless noted otherwise.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Field installation of security film over selected glazing.

.2 Types of items you will not find described in this Section:

.1 Decorative films for glass.
.2 Safety films for glass.
.3 Solar control films for glass.
.4 Laminated glass, with decorative interlayers.
.5 Decorative glass for interior applications
.1 Acid etched.
.2 Sandblasted.
.3 Patterned.
.4 Silk-screened.
.5 Laminated.
.6 Glass with finished edges.

1.2 SUBMITTALS

.1 Product Data: Manufacturer's data sheets on each product to be used, including:

.1 Preparation instructions and recommendations.
.2 Storage and handling requirements and recommendations.
.3 Installation methods.

.2 Verification Samples: For each finish product specified, two samples representing actual product, colour, and patterns.

.1 Security film mounted onto 150 x 150 x 6 mm piece of clear glass.

.3 Maintenance Data: For each type of decorative film overlay to include in maintenance manuals.

1.3 QUALITY ASSURANCE

.1 Manufacturer: All primary products specified in this section will be supplied by a single manufacturer.

.2 Installer: All products listed in this section are to be installed by a single installer.

.3 Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

.1 Finish areas designated by Departmental Representative.

.2 Do not proceed with remaining work until workmanship, colour, and sheen are approved by Departmental Representative.

.3 Refinish mock-up area as required to produce acceptable work.

1.4 WARRANTY

.1 Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace security film on glass that fails in materials or workmanship within warranty period.

.1 Failures include, but are not limited to, the following:

.1 Blistering, bubbling or delaminating from glass.

.2 Inability to maintain appearance without discolouration.

.3 Remove, replace and reapply defective materials.

.2 In event of product failure under warranty terms, remove and re-apply film without glass replacement at no cost to Government of Canada.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Store products in manufacturer's unopened packaging until ready for installation.

.2 Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.6 PROJECT CONDITIONS

.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Security Film: optically clear, 2 ply laminate film, abrasion resistant coating and release liner.

.1 Color: Transparent

.2 Number of laminate layers: 2

.3 Laminate thickness with adhesive: 0.23 mm

.4 Tensile strength: 5000 kg/cm

.5 Break strength: 39.5 kg/cm

.6 UV radiation rejection: 99%

PART 3 EXECUTION

3.1 PREPARATION

.1 Clean glass before beginning installation using neutral cleaning solution.

.2 Ensure no deleterious material adheres to glass by balding surface of glass using industrial razors.

.3 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.

.4 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause, film to delaminate, or vision transparency or distortion problems. Report findings to Departmental Representative.

.5 Before beginning Work, place absorbent on horizontal surface below material to absorb moisture accumulation generated by film application.

3.2 INSTALLATION

.1 Field installation of security film to glass windows:

- .1 Install film in the same manner as tested.
- .2 Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.
- .3 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.
- .4 Examine glass under natural daylight and identify cracks, blisters, bubbles, discolouration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems. Report findings to Departmental Representative before starting Work.
- .5 Install security film to glass windows ensuring no blisters, bubbles, scratches or distortions.

.2 Cut film edges straight and square.

.3 Do not install film behind window stops.

.4 Cut edges in accordance with manufacturer's written instructions.

.5 Apply and attach film to glass in accordance with manufacturer's written instructions.

.6 Splicing:

- .1 Splice film only when glass is greater in width than film.
- .2 Splice film only after receipt of written approval from Departmental Representative.
- .3 Use overlapped factory edges only.
- .4 Ensure maximum overlap of 3 mm.

.7 Use only water and film slip solution on glass to facilitate positioning of film.

.8 Ensure removal of excess water from between film and glass.

.9 Remove left over material form work area and return work area to original condition.

3.3 INSTALLER'S INSPECTION

.1 Visual Inspection: in accordance with IWFA - Visual Quality Standard for Applied Window Film.

.2 Return to work place after 30 days but no longer than 40 days for final cleaning and inspection of installed film.

.3 Remove and replace film that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 2.0 m minimum after 30 day period.

3.4 FINAL CLEANING

.1 Wash interior and exterior of each glass panel and film using cleaning solution recommended by film manufacturer.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Fixed, extruded-aluminum, horizontal, storm resistant louvers located in the building's envelope.

.1 Exposed and fully-recessed vertical mullions, where required due to louver size.

.2 Uninsulated blank-off panels.

.2 Types of items not described in this Section:

.1 Fixed, formed-metal louvers.

.2 Adjustable, extruded-aluminum and formed-metal louvers.

.3 Louvers installed in doors.

.4 Mechanical louvers.

.3 Related Work:

.1 Mechanical ductwork.

.2 Section 07 92 00 - Joint Sealants.

1.2 DEFINITIONS

.1 Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

.2 Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

.3 Storm-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.3 PERFORMANCE REQUIREMENTS

.1 Delegated Design: Design louvers, including comprehensive engineering analysis by a professional engineer, using structural performance requirements and design criteria indicated.

.2 Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

.1 Design Wind Loads: Calculated as per the National Building Code of Canada (2015) for project location, type of building and adjacent site conditions, but in

no case less than 1.4 KPa and in no case less than loadings containing in *Cladding Wind Load Estimates*, if so attached with this project Manual.

.3 Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.4 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.1 For louvers specified to bear AMCA seal, include printed catalogue pages showing specified models with appropriate AMCA Certified Ratings Seals.

.2 Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

.1 Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.

.2 Show mullion profiles and locations.

.3 Samples for Verification: For each type of metal finish required.

.4 Delegated-Design Submittal: For louvers larger than 1.44 square metres in area, provide submittals indicating compliance with the structural criteria, including analysis data, signed and sealed by the professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

.1 Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a testing agency or by manufacturer and witnessed by a testing agency, for each type of louver and showing compliance with performance requirements specified.

1.6 QUALITY ASSURANCE

.1 Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

1.7 PREINSTALLATION MEETINGS

.1 Preinstallation Conference: Conduct conference at Project site.

.1 Review, discuss, and coordinate the interrelationship of vents with other exterior wall components and ductwork. Include provisions for anchorage, flashing, sealing perimeters, and protecting finishes.

.2 Review and discuss the sequence of work required to construct a watertight and weather tight exterior building envelope.

.3 Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.8 COORDINATION

.1 Coordinate installation of louvers located in the building's envelope to ensure an air-tight, water-tight seal with the building's air/vapour barrier and with attached ductwork.

1.9 PROJECT CONDITIONS

.1 Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Aluminum Extrusions: ASTM B 221M, Alloy 6063-T5, T-52, or T6.

.2 Aluminum Sheet: ASTM B 209M, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

.3 Fasteners: Use types and sizes to suit unit installation conditions.

.1 For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.

.2 For color-finished louvers, use fasteners with heads that match color of louvers.

.4 Post installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

.5 Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

.1 Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

.2 Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

.1 Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern unless horizontal mullions are indicated.

.3 Maintain equal louver blade spacing to produce uniform appearance.

.4 Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

.1 Frame Type: Channel unless otherwise indicated.

.1 Provide exterior flange only if detailed on drawings.

.5 Include supports, anchorages, and accessories required for complete assembly.

.6 Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 1830 mm o.c., whichever is less.

.1 Provide exposed vertical mullions, unless otherwise noted.

.2 Provide fully recessed vertical mullions where specifically noted. Provide mitred outside corners where required.

.1 Fully Recessed Mullions: Provide mullions fully recessed behind louver blades. Where length of louver exceeds fabrication and handling limitations, fabricate with close-fitting blade splices designed to permit expansion and contraction.

.3 Exterior Corners: Prefabricated corner units with mitred blades with concealed close-fitting splices and with fully recessed mullions at corners.

.7 Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

.1 Horizontal Storm-Resistant Louver:

.1 Louver Depth: 125 mm.

.2 Frame and Blade Nominal Thickness: Not less than 2.03 mm.

.3 Louver Performance Ratings:

.1 Free Area: Not less than 0.65 sq. m for 1220 mm wide by 1220 mm high louver.

.2 Air Performance: Not more than 25-Pa static pressure drop at 3.6-m/s free-area exhaust velocity.

.3 Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 75 mm per hour and a wind speed of 13 m/s at a core-area intake velocity of 3.0 m/s.

.4 AMCA Seal: Mark units with AMCA Certified Ratings Seal.

.5 Finish Type: If not otherwise indicated then provide baked-enamel or powder coated finish.

2.4 LOUVER SCREENS

.1 General: Provide screen at each exterior louver.

.1 Screen Location for Fixed Louvers: Interior face.

.2 Screening Type: Bird screening.

.2 Louver Screen Frames: Fabricate to louver sizes indicated.

.1 Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.

.2 Finish: Mill finish.

.3 Louver Screening for Aluminum Louvers: one of the following:

.1 Bird Screening: Aluminum, 13 mm square mesh, 1.60 mm wire.

.2 Bird Screening: Flattened, expanded aluminum, 19 by 1.27 mm thick.

2.5 BLANK-OFF PANELS

.1 Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.

.1 Aluminum sheet for aluminum louvers, not less than 1.27 mm nominal thickness.

.2 Panel Finish: Same finish applied to louvers.

.3 Attach blank-off panels using manufacturer's standard.

2.6 RATINGS

.1 Provide fire rated type louvers when louvers are located in fire rated door assemblies.

2.7 FINISHES, GENERAL

.1 Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

.2 Colour: In not otherwise indicated, then selected by Departmental Representative from manufacturer's full range of colours.

2.8 ALUMINUM FINISHES

.1 Finish louvers after assembly.

.2 Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

.3 Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

.4 Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 0.04 mm. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

.5 High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

.1 Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

.2 Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather tight connection.

.3 Form closely fitted joints with exposed connections accurately located and secured.

.4 Provide perimeter reveals and openings of uniform width for sealants and joint fillers.

.5 Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

.6 Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

.7 Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weather tight louver joints are required. Comply with Division 07 Section *Joint Sealants* for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

.1 Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

.2 Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

.3 Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Departmental Representative, remove damaged units and replace with new units.

.1 Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

.4 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Non-load-bearing steel framing systems for interior gypsum board assemblies.

.2 Suspension systems for interior gypsum ceilings, soffits, and grid systems.

.3 Mesh security liner panels.

.4 Sheet steel security liner panel.

.2 Types of items not described in this Section

.1 Exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

.2 Blanket insulation for acoustical, thermal, or fire-resistant purposes.

1.2 RELATED WORK

.1 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Section 07 92 00 - Joint Sealants.

.3 Section 09 29 00 - Gypsum Board

1.3 REFERENCES

.1 ASTM International

.1 ASTM A641/A641M-14, Standard Specification for Zinc–Coated (Galvanized) Carbon Steel Wire

.2 ASTM A 653/A 653M -15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.3 ASTM A 792/A 792M- 15, Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

.4 ASTM C645-14, Standard Specification for Nonstructural Steel Framing Members.

.5 ASTM C754-15, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.6 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

.7 ASTM E413-10, Classification for Rating Sound Insulation

.8 ASTM E488/E488M-15, Standard Test Methods for Strength of Anchors in Concrete Elements

.9 ASTM E1190-11, Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members

.2 Environmental Choice Program (ECP)

.1 CCD-047-98(R2005), Architectural Surface Coatings.

.2 CCD-048-95(R2006), Surface Coatings - Recycled Water-Borne.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.1 MPI #26, Primer, Galvanized Metal, Cementitious.

.5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.4 ACTION SUBMITTALS

.1 Product Data: For each type of product.

1.5 INFORMATION SUBMITTALS

.1 Evaluation Reports: For dimpled steel studs and runners and firestop tracks.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect metal framing from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse by manufacturer of crates, as specified in Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 DESCRIPTION

.1 Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction

identical to those tested in assembly indicated according to CAN/ULC-S101-14 by an independent testing agency.

.2 STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

.3 Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 FRAMING SYSTEMS

.1 Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

.2 Framing Members, General: Comply with ASTM C 754 for conditions indicated.

.1 Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.

.2 Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, Z120, hot-dip galvanized, unless otherwise indicated.

.3 Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners.

.1 Steel Studs and Runners:

.1 Minimum Base-Metal Thickness: 0.5 mm.

.2 Depth: As indicated on Drawings.

.2 Dimpled Steel Studs and Runners:

.1 Minimum Base-Metal Thickness: 0.5 mm.

.2 Depth: As indicated on Drawings.

.4 Slip-Type Head Joints: Where indicated, provide one of the following:

.1 Single Long-Leg Runner System: ASTM C 645 top runner with 51 mm deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 305 mm of the top of studs to provide lateral bracing.

.2 Double-Runner System: ASTM C 645 top runners, inside runner with 51 mm deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.

.3 Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

.5 Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

.6 Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

.1 Minimum Base-Metal Thickness: 0.79 mm.

.7 Cold-Rolled Channel Bridging: Steel, 1.34 mm minimum base-metal thickness, with minimum 13 mm wide flanges.

.1 Depth: 38 mm.

.2 Clip Angle: Not less than 38 by 38 mm, 1.72 mm thick, galvanized steel.

.8 Hat-Shaped, Rigid Furring Channels: ASTM C 645.

.1 Minimum Base-Metal Thickness: 0.5 mm.

.2 Depth: 22.2 mm.

.9 Resilient Furring Channels: 13 mm deep, steel sheet members designed to reduce sound transmission.

.1 Configuration: Asymmetrical.

.10 Cold-Rolled Furring Channels: 1.34 mm uncoated-steel thickness, with minimum 13 mm wide flanges.

.1 Depth: 19 mm.

.2 Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.8 mm.

.3 Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 1.59 mm diameter wire, or double strand of 1.21 mm diameter wire.

.11 Z-Shaped Furring: With slotted or nonslotted web, face flange of 31.8 mm, wall attachment flange of 22 mm, minimum uncoated-metal thickness of 0.5 mm, and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

.1 Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 1.59 mm diameter wire, or double strand of 1.21 mm diameter wire.

.2 Hanger Attachments to Concrete:

.1 Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

.1 Type: Cast-in-place anchor, designed for attachment to concrete forms, post installed, chemical anchor or post installed, expansion anchor.

.2 Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

.3 Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 4.12 mm in diameter.

.4 Flat Hangers: Steel sheet, 25 by 5 mm by length indicated.

.5 Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 1.34 mm and minimum 13 mm wide flanges.

.1 Depth: 64 mm.

.6 Furring Channels (Furring Members):

.1 Cold-Rolled Channels: 1.34 mm uncoated-steel thickness, with minimum 13 mm wide flanges, 19 mm deep.

.2 Steel Studs and Runners: ASTM C 645.

.1 Minimum Base-Metal Thickness: 0.5 mm.

.2 Depth: As indicated on Drawings.

.3 Dimpled Steel Studs and Runners: ASTM C 645.

.1 Minimum Base-Metal Thickness: 0.5 mm.

.2 Depth: As indicated on Drawings.

.4 Hat-Shaped, Rigid Furring Channels: ASTM C 645, 22 mm deep.

.1 Minimum Base-Metal Thickness: 0.5 mm.

.5 Resilient Furring Channels: 13 mm deep members designed to reduce sound transmission.

.1 Configuration: Asymmetrical.

2.4 METAL MESH SECURITY LINER PANELS

.1 Liner Panel: Metal Mesh of 3.05 mm minimum bare metal thickness, commercial quality as follows:

.1 Carbon Steel to ASTM A-1011

.2 Mesh diamond width: 23.4mm x 53.8mm long bond to bond with 13 diamonds per 304.8mm of width

.3 Mesh size opening: width 14.3mm x 42.88mm 1ong allowing 63% open area

.4 Mesh strand width: 4.17mm

.5 Mesh strand thickness: 3.05mm

.6 Weight: 8.35 kg/m²

.7 Acceptable product to be incorporated into the Work is as follows:

.1 AMICO Security Mesh ASM .75-9F Maximum Security

2.5 SHEET METAL SECURITY LINEAR PANEL

.1 Liner Panel: sheet metal of 1.52 mm minimum bare metal thickness, commercial quality consisting of one of the following:

.1 Zinc coated sheet steel to ASTM A 653/A 653M, with Z275 designation zinc coating;

.2 Aluminum-zinc alloy coated sheet steel to ASTM A 792/A 792M, grade 33 or 37 with AZ150 coating, regular spangle surface, not chemically treated for paint finish.

2.6 AUXILIARY MATERIALS

.1 General: Provide auxiliary materials that comply with referenced installation standards.

.1 Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

.2 Isolation Strip at Exterior Walls: Provide the following:

.1 Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 3.2 mm thick, in width to suit steel stud size.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Coordination with Spray Applied Fireproofing Materials:

.1 Before sprayed fireproofing materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 610 mm o.c.

.2 After sprayed fireproofing materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

.1 Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

.1 Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

.2 Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

.3 Install bracing at terminations in assemblies.

.4 Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

.1 Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

.2 Install studs so flanges within framing system point in same direction.

.1 Space studs as follows:

.1 Single-Layer Application: 406 mm o.c. unless otherwise indicated.

.2 Multilayer Application: 406 mm o.c. unless otherwise indicated.

.3 Tile Backing Panels: 406 mm o.c. unless otherwise indicated.

.3 Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

.1 Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

.2 Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

.1 Install two studs at each jamb unless otherwise indicated.

.2 Install cripple studs at head adjacent to each jamb stud, with a minimum 13 mm clearance from jamb stud to allow for installation of control joint in finished assembly.

.3 Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

.3 Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

.4 Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

.1 Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

.5 Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

.6 Curved Partitions:

.1 Bend track to uniform curve and locate straight lengths so they are tangent to arcs.

.2 Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 150 mm o.c.

.4 Direct Furring:

.1 Screw to wood framing.

.2 Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 610 mm o.c.

.5 Z-Furring Members:

.1 Erect insulation specified in other Sections vertically and hold in place with Z-furring members spaced 610 mm o.c.

.2 Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 610 mm o.c.

.3 At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 305 mm from corner and cut insulation to fit.

.6 Installation Tolerance: Install each framing member so fastening surfaces vary not more than 3 mm from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

.1 Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

.2 Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

.3 Suspend hangers from building structure as follows:

.1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

.1 Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

.2 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

.1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

.3 Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

.4 Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

.5 Do not attach hangers to steel roof deck.

.6 Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

.7 Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

.8 Do not connect or suspend steel framing from ducts, pipes, or conduit.

.4 Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

.5 Installation Tolerances: Install suspension systems that are level to within 3 mm in 3.6 m measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.6 INSTALLING METAL MESH SECURITY LINER PANELS

.1 Install metal mesh security liner panels in locations indicated.

.2 Mount metal mesh liner panels on the outside of the room's framing.

.3 Support all edges by anti-spread bracing, studs or corners. Align the sheet edges at every vertical and horizontal seam on the centre line of the steel stud or anti-spread bracing and secure all sheets with welds or rivets.

.1 Welds: 1.5mm fillet weld along strand of mesh liner, 15mm long at 200mm o.c. or 8mm plug weld at 200 mm o.c.

.2 Rivets: 4.8 mm steel rivets and fender washers (38mm OD, 4.8 mm ID) at 200 mm o.c.

3.7 SHEET METAL SECURITY LINER PANEL

.1 Install sheet metal security liner panels in locations indicated.

.2 Install sheet metal liner panels on the interior of the room's framing 1200 mm around openings and as indicated on drawings.

.3 Support all edges by anti-spread bracing, studs or corners. Align the sheet edges at every vertical and horizontal seam on the centre line of the steel stud or anti-spread bracing and secure all sheets with welds or rivets.

.1 Welds: 1.5mm fillet weld, 15mm long at 200mm o.c. or 8mm plug weld at 200 mm o.c.

.2 Rivets: 4.8 mm steel rivets and fender washers (38mm OD, 4.8 mm ID) at 200 mm o.c.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Interior Gypsum Board

.1 Gypsum wallboard, Regular, Type X.

.2 Light-weight Gypsum Ceiling Board Panels.

.3 Moisture- and mould-resistant gypsum board.

.2 Tile Backing Panels.

.1 Glass-mat, water-resistant backing board.

.2 Cementitious backer units.

.3 Trim accessories, including trims at window mullion interface.

.4 Joint treatment materials and spackling.

.5 Access doors in non-rated ceiling with lids made of gypsum board.

.2 Related Work:

.1 Section 01 33 00 - Submittal Procedures

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 07 84 13 - Penetration Firestopping.

.4 Section 07 84 43 - Joint Firestopping.

.5 Section 09 91 23 - Interior Painting.

.6 Section 09 22 16 - Non-Structural Metal Framing for non-structural framing and suspension systems that support gypsum board panels.

1.2 TYPES OF ITEMS NOT DESCRIBED IN THIS SECTION:

.1 Blanket insulation.

.2 Metal access doors and frames.

.3 Non-structural framing and suspension systems that support gypsum board panels.

.4 Gypsum panels used in exterior applications.

.5 Gypsum sheathing.

.6 Metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.

.7 Textured finish.

.8 Aluminum trims.

.9 Wood and plywood blocking.

1.3 REFERENCES

.1 Aluminum Association (AA)

.1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 ASTM International

.1 ASTM C475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.2 ASTM C514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.

.3 ASTM C557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.

.4 ASTM C840-08, Standard Specification for Application and Finishing of Gypsum Board.

.5 ASTM C954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

.6 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.7 ASTM C1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.8 ASTM C1280-99, Standard Specification for Application of Gypsum Sheathing.

.9 ASTM C1177/C1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.10 ASTM C1178/C1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.

.11 ASTM C1396/C1396M-09a, Standard Specification for Gypsum Wallboard.

.3 Association of the Wall and Ceilings Industries International (AWCI)

.1 AWCI Levels of Gypsum Board Finish-97.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.5 Green Seal Environmental Standards (GS)

.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2007, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.7 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S102-07, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

1.4 ACTION SUBMITTALS

.1 Product Data: For each type of product.

.2 Samples: Submit samples for the following products:

.1 Trim Accessories: Full-size Sample in 300 mm long length for each trim accessory indicated or required.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

.1 Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

.2 Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

.3 Do not install panels that are wet, those that are moisture damaged, and those that are mould damaged.

.1 Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

.2 Indications that panels are mould damaged include, but are not limited to, fuzzy or splotchy surface contamination and discolouration.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store gypsum board materials level in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.

.3 Protect from weather, elements and damage from construction operations.

.4 Handle gypsum boards to prevent damage to edges, ends or surfaces.

.5 Protect prefinished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

.6 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse by manufacturer of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

.1 Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to CAN/ULC-S101 by an independent testing agency.

.2 STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

.1 Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 15 percent.

.2 Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

.3 Long Edges: Tapered.

2.3 INTERIOR GYPSUM BOARD

.1 Gypsum Board, Regular: ASTM C 1396/C 1396M.

.2 Gypsum Board, Type X: ASTM C 1396/C 1396M.

.3 Light-weight Gypsum Ceiling Panels: ASTM C 1396/C 1396M

.4 Moisture- and Mould-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mould-resistant core and paper surfaces.

.1 Mould Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS

.1 Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

.1 Mould Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

.2 Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

.1 Mould Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

.1 Interior Trim: ASTM C 1047.

.1 Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.

.2 Shapes:

.1 Cornerbead.

.2 Bullnose bead.

.3 LC-Bead: J-shaped; exposed long flange receives joint compound.

.4 L-Bead: L-shaped; exposed long flange receives joint compound.

.5 U-Bead: J-shaped; exposed short flange does not receive joint compound.

.6 Expansion (control) joint.

.7 Curved-Edge Cornerbead: With notched or flexible flanges.

.2 Trim for Non-Rated Ceiling Access Hatches with lids made of Gypsum Board:

.1 PVC T-shapedAccess Door Beads with 16mm flange for access door to rest on and longer exposed long flange for receiving joint compound.

.3 Trim at Wall Interface with Window Mullions

.1 Frame End Cap with snap on PVC battens, clear anodized aluminum, size to suit.

.1 Provide continuous black neoprene gasket between end cap and window mullion.

2.6 JOINT TREATMENT MATERIALS

.1 General: Comply with ASTM C 475/C 475M.

.2 Joint Tape:

.1 Interior Gypsum Board: Paper.

.2 Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.

.3 Tile Backing Panels: As recommended by panel manufacturer.

.3 Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

.1 Prefilling: At open joints, rounded or bevelled panel edges, and damaged surface areas, use setting-type taping compound.

.2 Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

.1 Use setting-type compound for installing paper-faced metal trim accessories.

.3 Fill Coat: For second coat, use drying-type, all-purpose compound.

.4 Finish Coat: For third coat, use drying-type, all-purpose compound.

.5 Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

.4 Joint Compound for Tile Backing Panels:

.1 Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

.2 Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

.1 General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

.2 Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

.3 Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

.1 Use screws complying with ASTM C 954 for fastening panels to steel members from 0.84 to 2.84 mm thick.

.2 For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

.4 Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

.2 Examine panels before installation. Reject panels that are wet, moisture damaged, and mould damaged.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

.1 Comply with ASTM C 840.

.2 Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

.3 Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1.5 mm of open space between panels. Do not force into place.

.4 Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

.5 Form control and expansion joints with space between edges of adjoining gypsum panels.

.6 Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

.1 Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 0.7 sq. m in area.

.2 Fit gypsum panels around ducts, pipes, and conduits.

.3 Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 6.4 to 9.5 mm wide joints to install sealant.

.7 Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 6.4 to 12.7 mm wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

.8 Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

.9 Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

.10 STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 APPLYING INTERIOR GYPSUM BOARD

.1 Single-Layer Application:

.1 On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.

.2 On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

.1 Stagger abutting end joints not less than one framing member in alternate courses of panels.

.2 At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

.3 On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

.4 Fastening Methods: Apply gypsum panels to supports with steel drill screws.

.2 Multilayer Application:

.1 On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing

member, 400 mm minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

.2 On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

.3 On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

.4 Fastening Methods: Fasten base layers and face layers separately to supports with screws.

.3 Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

.4 Curved Surfaces:

.1 Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 300 mm long straight sections at ends of curves and tangent to them.

.2 For double-layer construction, fasten base layer to studs with screws 400 mm o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 300 mm o.c.

3.4 APPLYING TILE BACKING PANELS

.1 Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile, unless otherwise noted on Drawings. Install with 6.4 mm gap where panels abut other construction or penetrations.

.1 Install Type X panels where required for fire-resistance-rated assembly.

.2 Cementitious Backer Units: ANSI A108.11.

.3 Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

.1 General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

.2 Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Departmental Representative for visual effect.

.3 Interior Trim: Install in the following locations:

.1 Cornerbead: Use at outside corners unless otherwise indicated.

.2 Bullnose Bead: Use where indicated.

.3 LC-Bead: Use at exposed panel edges.

.4 L-Bead: Use where indicated.

.5 U-Bead: Use where indicated.

.6 Curved-Edge Cornerbead: Use at curved openings.

.4 Install wall end cap where gypsum board partition intersects with window mullion.

3.6 CEILING ACCESS HATCHES

.1 Install ceiling access hatches in non-rated gypsum board ceilings as required to access mechanical or electrical devices.

.2 Construct access hatches as per manufacturer's instructions for concealed hatches.

.3 Construct access hatches parallel and perpendicular to adjacent wall surfaces and in alignment with each other whenever possible.

.4 Construct access hatches 450 x 450 mm in size or larger as required for proper access. Limit variation in hatch sizes.

3.7 FINISHING GYPSUM BOARD

.1 General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

.2 Prefill open joints, rounded or bevelled edges, and damaged surface areas.

.3 Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

.4 Gypsum Board Finish Levels: Finish panels to according to ASTM C 840:

.5 Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

.6 Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 PROTECTION

.1 Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

.2 Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

.3 Remove and replace panels that are wet, moisture damaged, and mould damaged.

.1 Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

.2 Indications that panels are mould damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

3.9 SCHEDULES

.1 Gypsum Board: Utilize the following gypsum board panels for the following applications::

.1 Regular Type: Typical, unless noted otherwise.

.2 Type X: Where required for fire-resistance-rated assembly.

.3 Moisture- and Mould-Resistant Type, Regular and Type X as required, as follows:

.1 Interior face of exterior walls.

.2 Interior of locker rooms, washrooms and shower rooms.

.3 Interior of janitorial closet and storage rooms not otherwise tiled.

.4 In other locations specifically indicated on drawings.

.2 Tile Backing Panels: Utilize the following tile backing panels in the following applications:

.1 Glass-mat, water-resistant backing board: Typical, unless noted otherwise, Regular and Type X as required.

.3 Gypsum Board Finish Levels: Provide the following finish levels in the following locations.

.1 Level 1: Ceiling plenum areas, concealed areas, and where noted.

.2 Level 2: Panels that are substrate for tile.

.3 Level 3: Panels that are substrate for epoxy wall coatings.

.4 Level 4: At panel surfaces exposed to view when completed, unless noted otherwise.

.1 Primer and its application to surfaces are specified in Section 09 91 23 - *Interior Painting*.

.5 Level 5: At panel surfaces scheduled for a semi-gloss or high-gloss paint finish but not within designated M&E rooms; and in other locations noted on Drawings.

.1 Primer and its application to surfaces are specified in other Section 09 91 23 - *Interior Painting*.

.2 If drawings do not note the required paint gloss level then assume, for pricing purposes, that a Level 5 finish will not be required.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Ceramic tile for interior installation.
.2 Waterproof membrane.
.3 Crack isolation membrane.
.4 Metal edge strips.

.2 Types of items you will not find described in this Section:

.1 Metal stair nosings as opposed to tiles intended for use as stair nosing.
.2 Ceramic tile for exterior installation.
.3 Ceramic tile installations intended to be kept submerged continuously under water.
.4 Glass-mat, water-resistant backer board.
.5 Stone tiling.

1.2 RELATED WORK:

.1 Section 01 33 00 - Submittal Procedures

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 09 29 00 - Gypsum Board

1.3 DEFINITIONS

.1 General

.1 Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

.2 ANSI A108 Series

.1 ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in *American National Standard Specifications for Installation of Ceramic Tile*.

1.4 PERFORMANCE REQUIREMENTS

.1 Static Coefficient of Friction

.1 For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

.1 Level Surfaces: Minimum 0.5 dry.

.2 Step Treads: Minimum 0.6 dry.

.3 Ramp Surfaces: Minimum 0.6 dry.

.2 Where specific tiles are specified, confirm products are compliant with Static Coefficient of Friction prior to purchasing. By failing to do so and failing to notifying the Departmental Representative in writing, the Contractor agrees to replace installed tiles with acceptable compliant tiles for no change in Contract Price.

1.5 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Shop Drawings: Submit when requested.

.1 Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

.3 Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving colour selection.

.4 Samples for Verification:

.1 Full-size units of each type and composition of tile and for each colour and finish required. For ceramic mosaic tile in colour blend patterns, provide full sheets of each colour blend.

.2 Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each colour and finish required. Make samples at least 300 mm square, but not fewer than 4 tiles. Use grout of type and in colour or colours approved for completed Work.

.3 Full-size units of each type of trim and accessory for each colour and finish required.

.4 Metal edge strips in 150 mm lengths.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, colour, pattern, and size indicated.

.2 Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and colour indicated.

1.7 QUALITY ASSURANCE

.1 Source Limitations for Tile

.1 Obtain tile of each type and colour or finish from one source or producer.

.1 Obtain tile of each type and colour or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

.2 Source Limitations for Setting and Grouting Materials

.1 Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

.3 Source Limitations for Other Products

.1 Obtain each of the following products specified in this Section from a single manufacturer for each product:

.1 Waterproof membrane.

.2 Crack isolation membrane.

.3 Joint sealants.

.4 Metal edge strips.

.4 Mock-ups

.1 Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Build mock-up of each type of floor tile installation.

.2 Build mock-up of each type of wall tile installation.

.3 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

.5 Preinstallation Conference

.1 Conduct conference at Project site.

.2 Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labelling tile packages.

.2 Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

.3 Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

.4 Store liquid materials in unopened containers and protected from freezing.

.5 Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.9 PROJECT CONDITIONS

.1 Environmental Limitations

.1 Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.10 EXTRA MATERIALS

.1 Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, colour, pattern, and size indicated.

.2 Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and colour indicated.

PART 2 PRODUCTS

2.1 PRODUCTS, GENERAL

.1 ANSI Ceramic Tile Standard

.1 Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

.2 Provide tile complying with Standard grade requirements unless otherwise indicated.

.2 ANSI Standards for Tile Installation Materials

.1 Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TTMAC installation methods specified in tile installation schedules, and other requirements specified.

.3 Factory Blending

.1 For tile exhibiting colour variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colours as those taken from other packages and match approved Samples.

.4 Mounting

.1 For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

.2 Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

.5 Factory-Applied Temporary Protective Coating

.1 Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

.1 CT-1:

.1 Type and Colour: Through body porcelain floor tile, matte finish, Light Grey leathered appearance; Final colour selection to be chosen by Departmental Representative from manufacturer's standard range for through body porcelain floor tiles with matte finish.

.2 Size: 9x300x600mm

.3 Installation: Stacked Installation, Vertical orientation for Wall Application

.4 Grout: 3mm grout lines, Silver colour to be chosen by Departmental Representative from manufacturer's standard range.

.1 Where horizontal and vertical planes meet align grout lines.

.5 Trim: Provide on all exposed to view edges and outside corners.

.1 Style: Brushed Chrome Anodized Aluminum ACGB finishing and edge protecting trim with integrated joint spacer and anchoring leg with perforations.

.2 CT-2:

.1 Type and Colour: Back painted glass wall tile, Glossy finish, Black colour with metallic hues; Final colour selection to be chosen by Departmental Representative from manufacturer's standard range for back painted glass wall tiles.

.2 Size: 8x50x300mm

.3 Installation: Stacked horizontal orientation for Wall Application

.4 Grout: 1.5mm grout lines, Black colour to be chosen by Departmental Representative from manufacturer's standard range.

.5 Trim: Provide on all exposed to view edges and outside corners.

.1 Style: Brushed Chrome Anodized Aluminum ACGB finishing and edge protecting trim with integrated joint spacer and anchoring leg with perforations.

.2 Trim Units

.1 Utilize matching tile trim pieces, if manufactured, as is appropriate for the particular tile installation, including but not limited to:

.1 Base, including inside and outside corners.

.2 Bullnose trim.

.3 Stair nosing.

.4 Stair treads with serrated edging.

2.3 WATERPROOF MEMBRANE

.1 General

.1 Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

.2 Polyethylene Sheet

.1 Polyethylene faced on both sides with fleece webbing; 0.203 mm nominal thickness.

2.4 CRACK ISOLATION MEMBRANE

.1 General

.1 Manufacturer's standard product, selected from the following, which complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

.2 Polyethylene Sheet

.1 Polyethylene faced on both sides with fleece webbing; 0.203 mm nominal thickness.

.3 Corrugated Polyethylene

.1 Corrugated polyethylene with dovetail-shaped corrugations and with anchoring webbing on the underside; 4 mm nominal thickness.

2.5 SETTING MATERIALS

.1 Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

.1 For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

.2 EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar (Thin Set): ANSI A118.11.

2.6 GROUT MATERIALS

.1 Polymer-Modified Tile Grout: ANSI A118.7.

.2 Water-Cleanable Epoxy Grout: ANSI A118.3.

.1 Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

.3 Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

2.7 ELASTOMERIC SEALANTS

.1 General

.1 Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 07 92 00 - *Joint Sealants*.

.1 Use sealants that have a VOC content of 250 g/L or less.

.2 Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

.2 Colours

.1 Provide colours of exposed sealants to match colours of grout in tile adjoining sealed joints unless otherwise indicated.

.3 One-Part, Mildew-Resistant Silicone Sealant

.1 ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

.4 Multipart, Pourable Urethane Sealant for Use T

.1 ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

2.8 MISCELLANEOUS MATERIALS

.1 Trowelable Underlayments and Patching Compounds

.1 Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

.2 Metal Edge Strips

.1 Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring and wall applications; nickel silver exposed-edge material unless otherwise noted.

.3 Temporary Protective Coating

.1 Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

.1 Petroleum paraffin wax, fully refined and odourless, containing at least 0.5 percent oil with a melting point of 49 to 60 deg C per ASTM D 87.

.2 Retain subparagraph above for either factory or field application; retain subparagraph below if acceptable for field application in lieu of wax.

.3 Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

.4 Tile Cleaner

.1 A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

.5 Grout Sealer

.1 Manufacturer's standard silicone product for sealing grout joints and that does not change colour or appearance of grout.

.1 Transition Strip

.1 Provide 6mm wide zinc metal bar type transition strip between different floor finishes.

.2 Ensure transition strip is flush with top of tile.

2.9 MIXING MORTARS AND GROUT

.1 Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

.2 Add materials, water, and additives in accurate proportions.

.3 Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

.1 Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

.2 Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

.1 Verify that surfaces that received a steel trowel finish have been mechanically scarified.

.2 Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

.3 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

.4 Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Departmental Representative.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable levelling and patching compound specifically recommended by tile-setting material manufacturer.

.2 Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1:50 toward drains.

.3 Blending

.1 For tile exhibiting colour variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colours as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

.4 Field-Applied Temporary Protective Coating

.1 If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

.1 Comply with TTMAC 's *Handbook for Ceramic Tile Installation* for TTMAC installation methods. Comply with parts of the ANSI A108 Series *Specifications for Installation of Ceramic Tile* that are referenced in TTMAC installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

.1 For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

.1 Tile floors in wet areas.

.2 Tile floors composed of tiles 200 by 200 mm or larger.

.3 Tile floors composed of rib-backed tiles.

.2 Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

.3 Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

.4 Jointing Pattern

.1 Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

.1 For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

.2 Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

.3 Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

.5 Joint Widths

.1 Unless otherwise indicated, install tile with the following joint widths:

.1 Ceramic Mosaic Tile: 1.6 mm.

.2 Quarry Tile: 6.35 mm.

.3 Paver Tile: 6.35 mm.

.4 Glazed Wall Tile: 1.6 mm.

.5 Decorative Thin Wall Tile: 1.6 mm.

.6 Expansion Joints

.1 Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

.1 Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

.2 Prepare joints and apply sealants to comply with requirements in Section 07 92 00 - *Joint Sealants*.

.7 Metal Edge Strips

.1 Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

.2 Install where exposed edge of tile terminates anywhere other than at an inside corner where no matching bull-nose tile profile exists, or in the case of an outside corner, no matching outside corner tile exists.

.8 Grout Sealer

.1 Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

.1 Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

.2 Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

.1 Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

.2 Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.6 CLEANING AND PROTECTING

.1 Cleaning

.1 On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

.1 Remove latex-portland cement grout residue from tile as soon as possible.

.2 Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

.3 Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

.2 Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

.3 Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

.4 Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR TILE INSTALLATION SCHEDULE

.1 General

.1 Surfaces
  .1 Floors.
  .2 Walls.
.2 Substrates
  .1 Concrete.
  .2 Masonry.
  .3 Exterior grade plywood.
  .4 Gypsum board.
  .5 Cementitious backer units.
  .6 Coated glass-mat, water-resistant gypsum backer board.
  .7 Cement fibre underlay.
.3 Tile Type: See drawings.
.4 Installation Type: Thin-set.
  .1 Use crack isolation membrane as required and for tiles 400 mm or greater in any one direction.
  .2 Use waterproofing membrane only where indicated.
.5 Mortar
  .1 Plywood substrates: EGP latex-portland cement mortar.
  .2 All other substrates: latex portland cement mortar.
.6 Grout Type:
  .1 Use epoxy grout in public washrooms, commercial kitchens, and in other locations specifically indicated.
  .2 Use Polymer modified in all other locations.
    .1 Grout lines 3.2 mm or wider: sanded grout.
    .2 All other: unsanded grout.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 09 84 13 - Acoustic Wall Panels.

.2 Section 23 37 13 - Grilles, Registers and Diffusers.

.3 Section 26 50 00 - Lighting.

1.2 REFERENCES

.1 ASTM International (ASTM).

.1 ASTM C635/C635M-13a, Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustic Tile and Lay-in Panel Ceilings.

.2 ASTM E84-14, Standard Test Method for Surface Burning Characteristics of Building Materials.

.3 ASTM E413-10, Classification for Rating Sound Insulation.

.4 ASTM E1264-08e1, Standard Classification for Acoustical Ceiling Products.

.2 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S102-10, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 DESIGN CRITERIA

.1 Suspension system shall support the ceiling assembly shown on drawings or specified herein, with maximum deflection of 1/360th of span.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for ceiling panels and ceiling suspension system and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Submit duplicate 100 mm x 100 mm samples of standard colours. Samples to be actual pieces of coloured panels.

.2 If requested, submit one representative model of each type of suspension system for approval before installation.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Handle materials to prevent damage to edges or surfaces. Protect metal accessories and trim from being bent or damaged.

.3 Store and protect from nicks, scratches, and blemishes.

.4 Replace defective/damaged materials with new.

1.6 JOB CONDITIONS

.1 Start work in areas after glazing is complete, concrete is dry, where ambient temperature is above 16°C, and when mechanical and electrical work installed above the ceiling is tested and approved.

1.7 MAINTENANCE MATERIALS

.1 Submit maintenance materials in accordance with Section 01 33 00 – Submittal Procedures.

.2 Deliver acoustical units amounting to 2% of gross ceiling area for each pattern and type required for this project.

.3 Materials to be same production run as installed material. Clearly identify each type of acoustic unit, including colour and texture.

.4 Store extra materials where directed by Departmental Representative.

PART 2 PRODUCTS

2.1 PANELS

.1 Panels: to ASTM E1264, lay-in type, mineral fibre construction.

.1 Acoustic ceiling panel - **ACT1**:

.1 ASTM E1264 Classification: Type IV, Form 2, Pattern E.

.2 Construction: cellulose fibre.

.3 Pattern: lightly textured.

.4 Flame spread rating: 25 or less in accordance with CAN/ULC-S102.

.5 Smoke developed: 50 or less in accordance with CAN/ULC-S102.

.6 Noise reduction coefficient (NRC): 0.70.

.7 Ceiling Attenuation Class (CAC) rating: 35 in accordance with ASTM E1264

.8 Light reflectance range: 0.89.

.9 Edge type: square.

.10 Colour: white.

.11 Size: 610 mm x 1220 mm x 19 mm thick.

.12 Shape: flat.

.13 Surface coverings: low VOC paint.

.14 Recycled content: 76%.

.15 Antimicrobial treated to protect against growth of mold, mildew and bacteria.

.16 Suspension system: panel to lay in 23.8 mm exposed grid.

.2 Acoustic ceiling panel - **ACT2**:

.1 ASTM E1264 Classification: Type X, Pattern CGI.

.2 Construction: cellulose fibre.

.3 Pattern: smooth texture, perforated.

.4 Flame spread rating: 25 or less in accordance with CAN/ULC-S102.

.5 Smoke developed: 50 or less in accordance with CAN/ULC-S102.

.6 Noise reduction coefficient (NRC): 0.55.

.7 Ceiling Attenuation Class (CAC) rating: 35 in accordance with ASTM E1264

.8 Light reflectance range: 0.79.

.9 Edge type: square.

.10 Colour: white.

.11 Size: 610 mm x 1220 mm x 16 mm thick.

.12 Shape: flat.

.13 Surface coverings: vinyl face.

.14 Recycled content: 51%.

.15 Antimicrobial treated to protect against growth of mold, mildew and bacteria.

.16 Suspension system: panel to lay in 23.8 mm exposed grid.

.2 Acoustical insulation: glass fibre, roll insulation; acoustically rated.

2.2 SUSPENSION SYSTEM

.1 Suspension system: to ASTM C635/C635M; 23.8 mm exposed grid system, heavy duty main tee, intermediate cross tee; fabricated from hot-dipped galvanized steel.

.1 Minimum recycled content: 64%.

.2 Where suspended edges of acoustic tile ceiling are visible provide 100mm, 90 degree trim piece.

.3 Finish: baked polyester or powder coated; flat white to match acoustic panels.

.4 Accessories: provide suspension system complete with following accessories.

.1 Wall moulding: shadow moulding; overall size 50 mm wide x 30 mm high with 19 mm wide x 7 mm high reveal.

.2 Hanger wire: 2.6 mm diameter, galvanized soft annealed steel wire.

.3 Other accessories as required for complete system.

PART 3 EXECUTION

3.1 SUSPENSION SYSTEM INSTALLATION

.1 Erect ceiling suspension system after items such as anchors, blocking, sound and fire barriers, electrical and mechanical work above ceiling have been reviewed by Departmental Representative.

.2 Lay out system according to reflected ceiling plan.

.3 Ensure suspension system is coordinated with location of related components.

.4 Install wall mouldings to provide correct ceiling height. Finished ceiling system to be level within 1:1200. Use shadow type wall mouldings unless noted otherwise.

.5 Support suspension system main tees at 1220 mm o.c. maximum with hanger wire from building structural system. Complete assembly shall support superimposed loads, such as lighting fixtures, diffusers and grilles.

.6 Support light fixtures and diffusers with supplemental hangers as follows:

.1 Standard 610 mm x 1220 mm fluorescent light fixtures and mechanical and electrical fixtures weighing more than 11.4 kg: within 150 mm of each corner of light fixture.

.2 Smaller fixtures: no supplemental hangers required.

.7 Interlock cross member to main tee to provide rigid assembly.

.8 Install suspension assembly in accordance with manufacturer's instructions.

.9 Frame at openings for light fixtures and air diffusers.

3.2 PANEL INSTALLATION

.1 Install panels where shown on drawings under conditions outlined in current bulletin of the Canadian Acoustical and Insulating Materials Association.

.2 Neatly cut and fit around items such as sprinkler heads, lighting fixtures, access panels and mechanical equipment.

.3 Lay acoustic insulation over ceilings indicated.

3.3 ADJUSTING

.1 Adjust sags or twists which may develop in the suspension system. Remove damaged or faulty parts of the system and install new.

.2 Remove soiled or damaged panels and install new.

3.4 CLEANUP

.1 Clean visible metal parts of suspension system. Touch up scratches, abrasions, voids and other defects in painted surfaces.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Resilient Base

.1 Typical

.2 Contoured resilient base.

.2 Resilient moulding accessories.

.2 Types of items not described in this Section:

.1 Resilient stair accessories

.3 Related Requirements

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

.1 ASTM International

.1 ASTM F1303-04(2014), Standard Specification for Sheet Vinyl Floor Covering with Backing.

.2 ASTM F1861(2012), Standard Specification for Resilient Wall Base

.2 South Coast Air Quality Management District (SCAQMD)

.1 SCAQMD Rule 1113-13, Architectural Coatings.

.2 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.

1.3 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Product Data: For each type of product indicated.

.3 Samples for Verification: For each type of product indicated, in manufacturer's standar size Samples but not less than 300 mm long, of each resilient product colour, texture, and pattern required.

1.4 MAINTENANCE MATERIAL SUBMITTALS

.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Furnish not less than 3 linear m for every 150 linear m or fraction thereof, of each type, colour, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

.1 Mock-ups: Provide resilient products with mock-ups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C or more than 32 deg C.

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect specified materials from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.3 Develop Construction Waste Management Plan related to Work of this Section.

.4 Packaging Waste Management: remove for reuse by manufacturer of pallets, as specified in Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.7 PROJECT CONDITIONS

.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C or more than 35 deg C, in spaces to receive resilient products during the following time periods:

.1 48 hours before installation.

.2 During installation.

.3 48 hours after installation.

.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C or more than 35 deg C.

.3 Install resilient products after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 RESILIENT BASE - TYPICAL

.1 Resilient Base Standard: to ASTM F 1861.

.1 Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).

.2 Manufacturing Method: Group I (solid, homogeneous) or Group II (layered).

.3 Style:

.1 Cove (base with toe): unless otherwise indicated.

.2 Straight (flat or toeless), at carpet flooring locations.

.4 Minimum Thickness

.1 3.2 mm.

.5 Height

.1 102 mm, unless otherwise indicated.

.6 Lengths

.1 Coils in manufacturer's standard length.

.7 Outside Corners

.1 Job formed or preformed.

.8 Inside Corners

.1 Job formed or preformed.

.9 Colours and Patterns

.1 Charcoal colour selected by Departmental Representative from full range of manufacturer's colours and patterns.

2.2 CONTOURED RESILIENT BASE

.1 Refer to drawings to determine if contoured resilient base is required and if so, the required locations.

.2 Contoured resilient base to replicated moulded wood base profiles, to ASTM F-1861, Type TP, Group 1 (solid) Standard.

.3 Colours and Profiles

.1 If not otherwise indicated, then selected by Departmental Representative from full range of industry colours and profiles.

2.3 RESILIENT MOULDING ACCESSORY

.1 Description

.1 Cap for cove carpet
.2 Cap for cove resilient floor covering
.3 Carpet edge for glue-down applications
.4 Nosing for carpet
.5 Nosing for resilient floor covering
.6 Reducer strip for resilient floor covering
.7 Joiner for tile and carpet
.8 Transition strips.

.2 Material

.1 Rubber.

.3 Profile and Dimensions

.1 As required, absolute minimal height.

.4 Colours and Patterns

.1 If not otherwise indicated, then selected by Departmental Representative from full range of industry colours and patterns.

2.4 INSTALLATION MATERIALS

.1 Trowelable Levelling and Patching Compounds

.1 Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

.2 Adhesives

.1 Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

.2 Use adhesives that comply with the following limits for VOC content:

.1 Cove Base Adhesives: Not more than 50 g/L.

.2 Rubber Floor Adhesives: Not more than 60 g/L.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

.2 Fill cracks, holes, and depressions in substrates with trowelable levelling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

.3 Do not install resilient products until they are same temperature as the space where they are to be installed.

.1 Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

.4 Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

.1 Comply with manufacturer's written instructions for installing resilient base.

.2 Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

.3 Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

.4 Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

.5 Do not stretch resilient base during installation.

.6 On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

.7 Preformed Corners: Install preformed corners before installing straight pieces.

.8 Job-Formed Corners:

.1 Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discolouration (whitening) at bends.

.2 Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

.1 Comply with manufacturer's written instructions for installing resilient accessories.

.2 Resilient Moulding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

.1 Comply with manufacturer's written instructions for cleaning and protection of resilient products.

.2 Perform the following operations immediately after completing resilient product installation:

.1 Remove adhesive and other blemishes from exposed surfaces.

.2 Sweep and vacuum surfaces thoroughly.

.3 Damp-mop surfaces to remove marks and soil.

.3 Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

.4 Cover resilient products until Substantial Completion.

.5 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Linoleum and Rubber sheet floor coverings.

.2 Related Work:

.1 Section 09 65 13 - Resilient Base and Accessories for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

.3 Types of items you will not find described in this Section:

.1 Vinyl sheet floor coverings.
.2 Rubber sheet floor covering.
.3 Resilient floor tile.
.4 Resilient floor coverings designed to control electrostatic discharge.
.5 Resilient floor coverings for use in athletic-activity or support areas.

1.2 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Samples for Verification: In manufacturer's standard size, but not less than 150-by-230 mm sections of each different colour and pattern of floor covering required.

.1 For heat-welding bead, manufacturer's standard-size Samples, but not less than 230 mm long, of each colour required.

.3 Seam Samples: For seamless-installation technique indicated and for each floor covering product, colour, and pattern required; with seam running lengthwise and in center of 150-by-230 mm Sample applied to a rigid backing and prepared by Installer for this Project.

1.3 CLOSEOUT SUBMITTALS

.1 Maintenance Data: For each type of floor covering to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Floor Covering: Furnish quantity not less than 3 linear m for every 150 linear m or fraction thereof, in roll form and in full roll width for each colour, pattern, and type of floor covering installed.

1.5 QUALITY ASSURANCE

.1 Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Build mock-ups for floor coverings including resilient base and accessories.

.1 Size: Minimum 9.3 sq. m for each type, colour and pattern in locations directed by Departmental Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C or more than 32 deg C. Store rolls upright.

1.7 PROJECT CONDITIONS

.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C or more than 29 deg C, in spaces to receive floor coverings during the following time periods:

.1 48 hours before installation.

.2 During installation.

.3 48 hours after installation.

.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C or more than 35 deg C.

.3 Close spaces to traffic during floor covering installation.

.4 Close spaces to traffic for 48 hours after floor covering installation.

.5 Install floor coverings after other finishing operations, including painting, have been completed.

1.8 EXTRA MATERIALS

.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.2 Floor Covering

.1 Furnish quantity not less than 3 linear m for every 150 linear m or fraction thereof, in roll form and in full roll width for each colour, pattern, and type of floor covering installed.

PART 2 PRODUCTS

2.1 LINOLEUM SHEET FLOORING

.1 Homogeneous linoleum sheet to ASTM F 2034, Type 1; calendared onto natural jute backing.

.1 Properties

.1 Thickness: 2.5 mm

.2 Width of Sheet: 2m

.3 Backing: Jute

.4 Pattern and color to extend throughout total thickness of material.

.5 Provide complete with high performance finish.

.2 Performance

.1 Slip Resistance to ASTM D 2047: Meets or exceeds the industry recommendation of >0.5 for flat surfaces.

.2 Static Load Limit to ASTM F 970-00: minimum 5860 KPa

.3 Fire Testing ASTM E 648/NFPA 253: Class 1

.4 Smoke Testing ASTM E 662/NFPA 258: 450 or less

.3 Seaming Method: welded seams.

.2 RSF1: Marbleized Dark Blue chosen by Departmental Representative from manufacturer's Standard range.

.3 RSF2: Marbleized Medium Grey chosen by Departmental Representative from manufacturer's Standard range.

2.2 RUBBER SHEET FLOORING

.1 Sheet rubber: to ASTM F1859; vulcanized dual durometer construction, with a base of synthetic rubbers, stabilizing agents and pigmentation.

.1 Properties:

.1 Thicknesses: 3mm.

.2 Wear Layer thickness:>1mm

.3 Width: 1900 mm.

.4 Weight: 4.8 kg/m2.

.5 Construction: dual layer construction with top (wear) layer having Shore A hardness greater than bottom layer.

.6 Surface texture: Smooth.

.7 Finish: Factory applied low-gloss finish, cured by ultraviolet (UV) processing.

.2 Performance:

.1 Modulus at 10% Elongation (ASTM D412): 350 psi.

.2 Coefficient of Friction (ASTM D2047): 0.80.

.3 Hardness, Shore A (ASTM D2240): 90 ± 5.

.4 Abrasion Resistance (H18 wheel, 1000g, 1000 cycles) (ASTM D3389): <0.15g loss

.5 Critical Radiant Flux (ASTM E648): 0.45 W/cm2, Class 1.

.2 RSF3: Marbleized Light Grey chosen by Departmental Representative from manufacturer's Standard range.

2.3 INSTALLATION MATERIALS

.1 Trowelable Levelling and Patching Compounds

.1 Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

.2 Adhesives

.1 Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.

.2 Use adhesives that have a VOC content of not more than 60 g/L.

.3 Seamless-Installation Accessories

.1 Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.

.1 Colour: Match floor covering.

.4 Integral-Flash-Cove-Base Accessories

.1 Cove Strip: 25 mm radius provided or approved by manufacturer.

.2 Cap Strip: Square stainless steel metal, satin finish.

.3 Corners: Metal inside and outside corners and end stops provided or approved by manufacturer.

.5 Floor Polish

.1 Provide protective liquid floor polish products only if recommended by manufacturer and as per their recommendations.

.6 Transition Strip

.1 Provide 6mm wide zinc metal bar type transition strip between different floor finishes.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor coverings.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.

.2 Concrete Substrates: Prepare according to ASTM F 710.

.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

.2 Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

.3 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.4 Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.3 Fill cracks, holes, and depressions in substrates with trowelable levelling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

.4 Do not install floor coverings until they are same temperature as space where they are to be installed.

.1 Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

.5 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.3 FLOOR COVERING INSTALLATION

.1 Comply with manufacturer's written instructions for installing floor coverings.

.2 Unroll floor coverings and allow them to stabilize before cutting and fitting.

.3 Lay out floor coverings as follows

.1 Maintain uniformity of floor covering direction.

.2 Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 152 mm away from parallel joints in floor covering substrates.

.3 Match edges of floor coverings for colour shading at seams.

.4 Avoid cross seams.

.4 Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.

.5 Extend floor coverings into toe spaces, door reveals, closets, and similar openings.

.6 Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.

.7 Install floor coverings on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of colour and pattern between pieces of floor coverings installed on covers and adjoining floor covering. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.

.8 Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

.9 Seamless Installation

.1 Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.

.10 Integral-Flash-Cove Base

.1 Where resilient sheet flooring is specified as base material, provide integral-flash cove base.

.2 Cove floor coverings up vertical surfaces 152 mm, unless noted otherwise. Support floor coverings at horizontal and vertical junction by cove strip. Butt at top against cap strip.

.3 Install metal corners at inside and outside corners.

3.4 CLEANING AND PROTECTION

.1 Comply with manufacturer's written instructions for cleaning and protection of floor coverings.

.2 Perform the following operations immediately after completing floor covering installation:

.1 Remove adhesive and other blemishes from floor covering surfaces.

.2 Sweep and vacuum floor coverings thoroughly.

.3 Damp-mop floor coverings to remove marks and soil.

.3 Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

.4 Floor Polish: Remove soil, visible adhesive and surface blemishes from floor covering before applying liquid floor polish.

.1 Apply three coat(s) unless specifically not recommended by flooring manufacturer.

.5 Cover floor coverings until Substantial Completion.

.6 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Rubber floor tile.

.2 Related Work:

.1 Section 09 65 13 - Resilient Base and Accessories for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

.3 Types of items not described in this Section:

.1 Resilient terrazzo floor tile.
.2 Resilient sheet floor coverings.
.3 Linoleum floor coverings.
.4 Resilient floor coverings designed to control electrostatic discharge.
.5 Resilient floor coverings for use in athletic-activity or support areas.

1.2 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Samples for Verification: Full-size units of each colour and pattern of floor tile required.

.1 For heat-welding bead, manufacturer's standard-size Samples, but not less than 230 mm long, of each colour required.

.3 Seam Samples: For seamless-installation technique indicated and for each flooring product, colour, and pattern required; with seam running lengthwise and in center of 150-by-230 mm Sample applied to a rigid backing and prepared by Installer for this Project.

1.3 CLOSEOUT SUBMITTALS

.1 Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.4 MATERIALS MAINTENANCE SUBMITTALS

.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, colour, and pattern of floor tile installed.

1.5 QUALITY ASSURANCE

.1 Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Build mock-ups for floor tile including resilient base and accessories.

.1 Size: Minimum 9.3 sq. m for each type, colour, and pattern in locations directed by Departmental Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 10 deg C or more than 32 deg C. Store floor tiles on flat surfaces.

1.7 PROJECT CONDITIONS

.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C or more than 35 deg C, in spaces to receive floor tile during the following time periods:

.1 48 hours before installation.

.2 During installation.

.3 48 hours after installation.

.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C or more than 35 deg C.

.3 Close spaces to traffic during floor tile installation.

.4 Close spaces to traffic for 48 hours after floor tile installation.

.5 Install floor tile after other finishing operations, including painting, have been completed.

1.8 EXTRA MATERIALS

.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, colour, and pattern of floor tile installed.

PART 2 PRODUCTS

2.1 RUBBER FLOOR TILE

.1 Rubber Floor Tiles manufactured from a homogeneous composition of synthetic rubber, additives, and colorants to meet the performance requirements of ASTM F 1344, Class 1-A and 1-B Standard Specification for Rubber Floor Tile

.1 Performance

.1 Abrasion Resistance ASTM D 3389: < 1.0 gm weight loss

.2 Hardness ASTM D 2240: Not less than 85 Shore A

.3 Slip Resistance ASTM D 2047: Meets or Exceeds a static coefficient of friction of 0.8

.4 Color Heat Stability ASTM F 1514: < 8.0 ΔE

.5 Acoustical ASTM E 492 - Impact Insulation Class: 40 IIC for 0.125" (3.17 mm) thickness tiles

.6 Static Load Limit ASTM F 970: Passes at 250 psi

.7 Fire Resistance ASTM E 648 - Critical Radiant Flux: Class 1

.8 Smoke Development ASTM E 662: < 450

.2 Rubber Floor Tile:

.1 RTF1:

.1 Type: Class I-A, homogeneous rubber tile, solid colour.

.2 Wearing Surface: smooth.

.3 Thickness: 3.2 mm, unless noted otherwise.

.4 Size: 610 by 610 mm unless noted otherwise.

.5 Pattern: Bamboo texture

.6 Colour: Charcoal colour chosen by Departmental Representative from manufacturer's standard range.

.3 Tactile Warning Tile: to meet CSA B651-12

.1 Tactile Warning Tiles in contrasting colour from stair treads and landing floor finish to indicate edge of stair tread for the blind or visually impaired.

.2 RTF2:

.1 Pattern: Domed

.2 Colour: Silver Grey colour to be chosen by Departmental Representative from manufacturer's standard range.

.3 Thickness: 4.0 mm dome height with 3.2 mm base thickness; 7.2 mm overall thickness.

.4 Size: 610 by 610 mm unless noted otherwise.

2.2 INSTALLATION MATERIALS

.1 Trowelable Levelling and Patching Compounds

.1 Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

.2 Adhesives

.1 Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.

.2 Use adhesives that comply with the following limits for VOC content:

.1 VCT and Asphalt Tile Adhesives: Not more than 50 g/L.

.2 Rubber Floor Adhesives: Not more than 60 g/L.

.3 Floor Polish

.1 Provide protective liquid floor polish products as recommended by manufacturer.

.1 Transition Strip

.1 Provide 6mm wide zinc metal bar type transition strip between different floor finishes.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

.2 Concrete Substrates: Prepare according to ASTM F 710.

.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

.2 Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

.3 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.4 Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.3 Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

.4 Fill cracks, holes, and depressions in substrates with trowelable levelling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

.5 Do not install floor tiles until they are same temperature as space where they are to be installed.

.1 Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

.6 Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 FLOOR TILE INSTALLATION

.1 Comply with manufacturer's written instructions for installing floor tile.

.2 Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

.1 Lay tiles square with room axis unless noted otherwise.

.3 Match floor tiles for colour and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

.1 Lay tiles with grain running in one direction, unless noted otherwise.

.4 Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

.5 Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

.6 Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

.7 Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of colour and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

.8 Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

.1 Comply with manufacturer's written instructions for cleaning and protection of floor tile.

.2 Perform the following operations immediately after completing floor tile installation:

.1 Remove adhesive and other blemishes from exposed surfaces.

.2 Sweep and vacuum surfaces thoroughly.

.3 Damp-mop surfaces to remove marks and soil.

.3 Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

.4 Floor Polish: Remove soil, visible adhesive and surface blemishes from floor tile surfaces before applying liquid floor polish.

.1 Apply three coat(s), unless specifically not recommended by flooring manufacturer.

.5 Cover floor tile until Substantial Completion.

.6 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D2240, Standard Test Method for Rubber Property - Durometer Hardness.

.2 ASTM E648, Standard Test Method for Critical Radiant Flux of Floor-covering Systems Using a Radiant Heat Energy Source.

.3 ASTM F1869, Standard test Method for Measuring Moisture Vapour Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.3 SUBMITTALS

.1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300mm long base.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for sports flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 EXTRA MATERIALS

.1 Provide extra material of sports flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide 5 m² of sports flooring material required for project for maintenance use.

.3 Extra materials to be in one piece and from same production run as installed materials.

.4 Clearly identify each roll of sheet flooring and each container of adhesive.

.5 Deliver to Departmental Representative upon completion of the work of this section.

.6 Store where directed by Departmental Representative.

1.6 ENVIRONMENT REQUIREMENTS

.1 Maintain air temperature and structural base temperature at flooring installation area of 18º C to 30º C for 48 hours before, during and 48 hours after installation, and at a relative humidity not greater than 60%.

1.7 QUALITY ASSURANCE

.1 Provide Certificate of Quality Compliance from sports flooring manufacturer.

.2 Provide Certificate of Quality Compliance from sports flooring installer upon satisfactory completion of installation.

1.8 WARRANTY

.1 Flooring materials shall be warranted by the manufacturer against defects in materials and workmanship for a period of ten (10) years following the date of substantial completion.

.2 Contractor shall provide a one (1) year warranty from the date of Substantial Completion against defects in workmanship.

PART 2 PRODUCTS

2.1 SPORTS FLOORING

.1 Prefabricated 2- layer system resilient rubber sport flooring with a wear layer of highly durable vulcanized rubber and a base of natural and synthetic rubber.

.1 Sports flooring shall meet the following minimum physical properties:
.2 Hardness Shore A (ASTM D2240), 75/60
.3 Ball Rebound (DIN V 18032-2 April 2001)), 95%
.4 Shock Absorption (DIN V 18032-2 April 2001)), 35%
.5 Critical Radiant Flux (ASTM E648), 0.45 W/cm^2, Class I
.6 Total Thickness: 6mm
.7 Top Layer (Wearlayer): 2.0 mm

.2 **RSPF1:** Dark Blue colour as chosen by Departmental Representative from manufacturer's standard range of colours.

.3 Adhesive: as recommended by flooring manufacturer.

.4 Floor Filler: white premix latex requiring only water to produce cementitious paste.

PART 3 EXECUTION

3.1 PREPARATION

.1 Concrete floor slab must be smooth and level and be within tolerance of $\pm$ 3 mm in 3 m radius. Remove ridges and bumps. Fill low spots, cracks, joints, holes and other defects with an approved filler. Remove any other contaminants such as grease, paint, dust, solvents or rust.

.2 Moisture vapour emission content of the concrete floor slab shall not exceed 3 lbs/1000 ft^2 (1.46 kg/100 m^2) per 24 hrs when using the Calcium Chloride test method as per ASTM F1869-98. The flooring supplier to confirm moisture vapour emission content prior to sports flooring installation in new construction, and any corrective measures are the responsibility of the contractor. In the case of existing facilities where the sports flooring is being replaced, the flooring supplier is to provide a flooring system suitable for the existing moisture vapour emission content as determined by the flooring supplier during the tender period.

.3 Ensure floor is thoroughly clean before proceeding with the installation.

.4 Install suitable moisture retardant membrane as per manufacturers requirements.

3.2 INSTALLATION (SHEET FLOORING)

.1 Strike a chalk line on the subfloor bisecting it longitudinally. Unroll the rolls and lay them out lengthways on either side of this line, perfectly parallel one to the other until the entire floor is covered.

.2 Lay all flooring, making all necessary adjustments, cuts or tolerance corrections before applying adhesive. Allow flooring to relax for 24 hours before gluing.

.3 Starting at center axis fold each roll back upon itself. Apply recommended adhesive with serrated trowel onto completely dry surface. Continue applying adhesive under each roll, working outwards to the walls. Do not attach to walls.

.4 Wait 12 to 24 hours before proceeding with seam grooving and welding.

.5 Clean entire surface to rid of dust or other foreign matter before seam grooving and welding.

.6 Groove (rout) seams only through depth of wear layer according to manufacturer's instructions, where manufacturer requires seams to be welded.

.7 Mechanically or manually heat weld seams in conformance with manufacturer's instructions.

.8 Once weld rod and material has cooled, trim excess weld rod by using a cable slide then finish with a spatula knife.

.9 Hold seams in place with suitable weights for a minimum of 12 hours.

3.3 FINISHING

.1 At door entrance and accesses, install 50 mm min. width threshold/transition strip at material edge. Fasten threshold/transition strip to allow freedom of movement of sports flooring. Threshold/transition strip to be extruded aluminum.

3.4 CLEANING

.1 Remove excess adhesive from floor, base and wall surfaces without damage.

.2 Clean, seal and wash floor and base surface to flooring manufacturer's instructions.

.3 Clean work area daily.

3.5 PROTECTION

.1 Protect new floors from time of final set of adhesive to final inspection.

.2 Prohibit traffic on floor for 48 hours after installation.

3.6 VENTILATION

.1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air recalculate through a district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

3.7 COMMSSIONING

.1 Train user staff in the care, cleaning and sealing of sports flooring.

.2 Acceptance of maintenance material turned over to Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Static-dissipative flooring of the following types:

.1 Vinyl floor tile.

.2 Types of items not described in this Section:

.1 Static-dissipative flooring of the following types:

.1 Rubber floor tile.

.2 Vinyl sheet floor covering.

.3 Rubber sheet floor covering.

.2 Conductive flooring.

.3 Related Work:

.1 Section 09 65 13 - *Resilient Base and Accessories* for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.2 PERFORMANCE REQUIREMENTS

.1 Static-Dissipative Properties: Provide floor coverings with static-control properties indicated as determined by testing identical products per test method indicated by an independent testing and inspecting agency.

.1 Electrical Resistance: Test per ASTM F 150 with 100-V applied voltage.

.1 Average greater than 1 megohm and less than or equal to 1000 megohms when test specimens are tested surface to ground.

.2 Static Generation: Less than 300 V when tested per AATCC-134 at 20 percent relative humidity with conductive footwear.

.3 Static Decay: 5000 to 0 V in less than 0.25 seconds when tested per FED-STD-101C/4046.1.

.2 FloorScore Compliance: Static-control resilient flooring shall comply with requirements of FloorScore Standard.

1.3 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Sustainability Submittals:

.1 Product Data for adhesives and chemical-bonding compound, documentation including printed statement of VOC content.

.2 Product Data for static-control resilient flooring, documentation from an independent testing agency indicating compliance with the FloorScore Standard.

.3 Shop Drawings: For each type of floor covering.

.1 Submit grounding diagram showing location of grounding strips and connections.

.4 Samples for Verification: For each type of floor covering indicated and of size indicated below:

.1 Floor Tile: Full-size units.

1.4 INFORMATIONAL SUBMITTALS

.1 Product Test Reports: Based on evaluation of comprehensive tests performed by a testing agency, for floor coverings.

1.5 CLOSEOUT SUBMITTALS

.1 Maintenance Data: For each type of floor covering to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, colour, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

.1 Preinstallation Conference: Conduct conference at Project site.

.1 Review methods and procedures related to static-control resilient floor coverings including, but not limited to, the following:

.1 Examination and preparation of substrates to receive floor covering.

.2 Installation.

.3 Field quality-control testing.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer but not less than 10 deg C or more than 32 deg C.

.1 Floor Tile: Store on flat surfaces.

1.9 PROJECT CONDITIONS

.1 Maintain ambient temperatures within range recommended by manufacturer, but not less than 21 deg C or more than 29 deg C, in spaces to receive floor coverings during the following time periods:

.1 48 hours before installation.

.2 During installation.

.3 48 hours after installation.

.2 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13 deg C or more than 35 deg C.

.3 Close spaces to traffic during floor covering installation.

.4 Close spaces to traffic for 48 hours after floor covering installation.

.5 Install floor coverings after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 STATIC-DISSIPATIVE RESILIENT FLOOR COVERINGS

.1 Permanently Static-Dissipative, Homogeneous Vinyl Floor Tile to ASTM F 1700.

.1 Class I (monolithic), Type A (smooth surface).

.2 Size: 2mm x 615mm x615mm

.3 Electrical Resistance: 1 x 10^6 - 10^8 ohms surface to ground

.4 Slip Resistance to ASTM D 2047: Meets or exceeds the industry recommendation of >0.5 for flat surfaces.

.5 Static Load Limit to ASTM F 970-00: minimum 10,000 KPa

.6 Fire Testing ASTM E 648/NFPA: Class 1

.7 Smoke Testing ASTM E 662/NFPA 258: 450 or less

.8 **ASF1**:

.1 Type and Colour: Medium Grey with carbon black veins and copper strips between tiles to provide permanently static dissipative flooring.

.2 Installation: as per manufacturer's instructions.

2.2 INSTALLATION MATERIALS

.1 Trowelable Levelling and Patching Compounds: Latex-modified, portland cement or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

.2 Static-Control Adhesive: Provided or approved by manufacturer; type that maintains electrical continuity of floor covering system to ground connection.

.3 Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR, Subpart D (EPA Method 24):

.1 VCT and Asphalt Tile Adhesives: Not more than 50 g/L.

.4 Grounding Strips: Provided or approved by manufacturer; type and size that maintains electrical continuity of floor covering system to ground connection.

.5 Maintenance Floor Tiles: Special floor tiles inscribed *Conductive floor. Do not wax.*

.6 Floor Polish: Provide protective, static-control liquid floor polish products as recommended by floor covering manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion or static-control characteristics of floor coverings.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings and electrical continuity of floor covering systems.

.2 Concrete Substrates: Prepare according to ASTM F 710.

.1 Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

.2 Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

.3 Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.4 Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

.3 Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

.4 Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

.5 Do not install floor coverings until they are same temperature as space where they are to be installed.

.1 Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

.6 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.3 INSTALLATION, GENERAL

.1 Install static-control resilient floor covering according to manufacturer's written instructions.

.2 Embed grounding strips in static-control adhesive. Extend grounding strips beyond perimeter of static-control resilient floor covering surfaces to ground connections.

.3 Scribe, cut, and fit floor coverings to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

.4 Extend floor coverings into toe spaces, door reveals, closets, and similar openings. Extend floor covering to center of door openings.

.5 Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

.6 Install floor coverings on covers for telephone and electrical ducts, and similar items in installation areas. Maintain overall continuity of colour and pattern with pieces of floor coverings installed on covers. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.

.7 Adhere floor coverings to substrates using a full spread of static-control adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 FLOOR TILE INSTALLATION

.1 Comply with manufacturer's written instructions for installing floor tile.

.2 Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half floor tile at perimeter.

.1 Lay floor tiles square with room axis unless otherwise indicated.

.3 Match floor tiles for colour and pattern by selecting floor tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.

.1 Lay static-dissipative, vinyl composition floor tiles with grain direction alternating in adjacent floor tiles (basket-weave pattern) unless otherwise indicated.

.4 In each space where conductive, solid vinyl floor tile is installed, install maintenance floor tile identifying conductive floor tile in location approved by Departmental Representative.

3.5 FIELD QUALITY CONTROL

.1 Testing: Engage a testing agency to test electrical resistance of static-control resilient floor covering systems for compliance with requirements.

.1 Arrange for testing after installation static-control adhesives have fully cured and floor covering systems have stabilized to ambient conditions and after ground connections are completed.

.2 Arrange for testing of floor coverings before and after performing floor polish procedures.

.2 Static-control resilient floor coverings will be considered defective if they do not pass tests and inspections.

.3 Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

.1 Comply with manufacturer's written instructions for cleaning and protection of floor coverings.

.2 Perform the following operations immediately after completing floor covering installation:

.1 Remove static-control adhesive and other blemishes from exposed surfaces.

.2 Sweep and vacuum surfaces thoroughly.

.3 Damp-mop surfaces to remove marks and soil.

.3 Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

.1 If recommended in writing by manufacturer, apply protective static-control floor polish formulated to maintain or enhance floor covering's electrical properties to floor covering surfaces that are free from soil, static-control adhesive, and surface blemishes.

.1 Verify that both floor polish and its application method are approved by manufacturer and that floor polish will not leave an insulating film that reduces floor coverings' effectiveness for static control.

.4 Cover floor coverings until Substantial Completion.

.5 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 This Section includes resinous flooring systems with epoxy body coat(s).

1.2 SUBMITTALS

.1 Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each epoxy flooring material required.

.2 Submit, for verification purposes, 300 mm x 300 mm square sample of each type of epoxy flooring required, applied to a rigid backing, in colour and finish indicated.

.3 Maintenance Data: For resinous flooring to include in maintenance manuals.

1.3 QUALITY ASSURANCE

.1 Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

.2 Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Apply full-thickness mockups on square floor area selected by Departmental Representative.

.2 Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

.3 Manufacturer's Inspections and Certifications:

.1 Manufacturer's technical representative must be on site for the preparation of the substrate and to verify the acceptability of that substrate for the new seamless epoxy aggregate flooring system and, to certify that the product ingredients and mix proportions for each section of flooring comply with the manufacturer's Product data sheet.

.2 The manufacturer's technical representative shall turn over to the Departmental Representative a written affidavit prepared by him/her stating that (1) the flooring products are designed and adequate for the intended use, (2) the surface preparation has been inspected and accepted for the installation of the flooring system and (3) the seamless epoxy flooring materials are as specified, mixed and applied in accordance with the manufacturer's instructions and product data sheets. The inspection process is required for each individual section of flooring.

1.4 WARRANTY

.1 Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace flooring that fail(s) in materials or workmanship within warranty period.

.1 Failures include, but are not limited to, the following:

.1 Delamination from the substrate.

.2 Cracking except at locations where the substrate may crack.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials to job site factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

.2 Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

.3 Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

.2 Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

PART 2 PRODUCTS

2.1 RESINOUS FLOORING

.1 Available Products: Subject to compliance with requirements, products that may be incorporated into the Work are limited to the following and are to be installed as per the manufacturer's recommendations:

.1 **EPXF1**: Epoxy Coating

.1 Sikagard Duroplast 100 N as marketed by SikaDuochem

.2 **EPXF2**: Epoxy Coating

.1 Stonhard, Inc.; Stonhard Stonshield SLT

.2 Provide Coved Base - 150mm (6") high coved base to provide integral seal at the joint between floor and wall.

.3 Colour: To be chosen by Departmental Representative from manufacturer's standard range.

2.2 ACCESSORY MATERIALS

.1 Use primers as recommended by manufacturers for substrate.

.2 Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

.3 Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.

PART 3 EXECUTION

3.1 PREPARATION

.1 General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

.2 Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

.1 Roughen concrete substrates as follows:

.1 Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

.2 Remove any existing urethane coatings and other incompatible materials not readily removed by shot-blasting by grinding application to expose concrete

.3 Utilize only equipment with integral vacuum pick-up capacity

.2 Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.

.3 Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

.4 Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.

3.2 APPLICATION

.1 General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

.1 Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.

.2 Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.

.3 At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.

.1 Apply joint sealant to comply with manufacturer's written recommendations.

.2 Apply primer over prepared substrate at manufacturer's recommended spreading rate.

.3 Apply reinforcing membrane to substrate cracks.

.4 Apply trowelled or screeded body coat(s) in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.

.5 Apply grout coat, of type recommended by resinous flooring manufacturer to fill voids in surface of final body coat and to produce wearing surface indicated.

.6 Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 FIELD QUALITY CONTROL

.1 Core Sampling: At the direction of Departmental Representative and at locations designated by Departmental Representative, take 1 core sample per 92.9 sq. m of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring and correct deficiencies.

.2 Material Sampling: Departmental Representative may at any time and any number of times during resinous flooring application require material samples for testing for compliance with requirements.

.1 Departmental Representative will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.

.2 Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.

.3 If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.4 CLEANING AND PROTECTING

.1 Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

.2 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Modular carpet tile.

.2 Types of items not described in this Section:

.1 Selective structure demolition and the removal of existing floor coverings.

.2 Sheet carpeting.

.3 Related Work:

.1 Section 09 65 13 - Resilient Base and Accessories for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.2 ACTION SUBMITTALS

.1 Product Data: For each type of product.

.1 Include manufacturer's written data on physical characteristics, durability, and fade resistance.

.2 Include installation recommendations for each type of substrate.

.2 Shop Drawings: Show the following:

.1 Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.

.2 Carpet tile type, color, and dye lot.

.3 Type of subfloor.

.4 Type of installation.

.5 Pattern of installation.

.6 Pattern type, location, and direction.

.7 Pile direction.

.8 Type, color, and location of insets and borders.

.9 Type, color, and location of edge, transition, and other accessory strips.

.10 Transition details to other flooring materials.

.3 Samples: For each of the following products and for each colour and texture required. Label each Sample with manufacturer's name, material description, colour, pattern, and designation indicated on Drawings and in schedules.

.1 Carpet Tile: Full-size Sample.

.2 Exposed Edge, Transition, and other Accessory Stripping: 300 mm long Samples.

.4 Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

.1 Product Test Reports: For carpet tile, for tests performed by a testing agency.

.2 Sample Warranty

1.4 CLOSEOUT SUBMITTALS

.1 Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

.1 Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

.2 Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 8.3 sq. m.

.2 Warranty: warranty specified in this Section.

1.6 QUALITY ASSURANCE

.1 Mock-ups: Before installing carpet tile, build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Approved mock-ups may become part of the completed Work if undamaged at time of Substantial Completion.

.2 Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Comply with CRI 104, Section 5, *Storage and Handling*.

1.8 PROJECT CONDITIONS

.1 Comply with CRI 104, Section 7.2, *Site Conditions; Temperature and Humidity* and Section 7.12, *Ventilation*.

.2 Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

.3 Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

.4 Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.9 WARRANTY

.1 Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within warranty period.

.1 Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.

.2 Failures include, but are not limited to, more than 10 percent loss of face fibre, edge ravelling, snags, runs, loss of tuft bind strength, dimensional stability, excess static discharge, and delamination.

1.10 EXTRA MATERIALS

.1 Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 8.3 sq. m.

PART 2 PRODUCTS

2.1 CARPET TILE

.1 Carpet: to CAN/CGSB-4.129 and as follows.

.2 Properties:

.1 Pipe Fibre: to CAN/CGSB-4.129.

.1 100% Nylon

.2 Dye Method: Solution Dyed

.3 Carpet Tile Dimensions: 250mmx1000mm

.4 Primary Backing/Backcoating: Manufacturer's standard composite materials.

.5 Applied Soil-Resistance Treatment: Manufacturer's standard material.

.6 Antimicrobial Treatment: Manufacturer's standard material.

.3 Performance:

.1 Certified for flammability to Health Canada regulations under "Hazardous Products (Carpet) Regulations", Part II of the Schedule.

.2 Maximum flame spread rating 300, maximum smoke developed classification 500.

.3 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute's IAQ requirements.

.4 Dimensional Stability: AACHEN Din 54318 <10%

.5 Traffic Classification: Severe

.6 Lightfastness: AATCC 16 - E) ≥ 4.0 @ 60 AFU's

.7 Static**:** AATCC - 134 < 3.0 KV

.8 Emissions: Provide carpet tile that complies with testing and product requirements of CRI's *Green Label Plus* program.

.4 **TCPT1**:

.1 Type: Tufted Textured Loop

.2 Colour: Departmental Representative to choose from manufacturer's range of skinny plank tiles with a combination of natural colours and more colourful yarns.

.3 Size: 250mmx1000mm

.4 Pile height: 3.8 mm.

.5 Pile thickness: 2.4 mm

.6 Pile Density: 252,920 g/m^3

.7 Stitches: 34.3 ends/100mm

.8 Tufted Yarn weight: minimum 610 g/m^2 unless otherwise indicated.

.9 Installation: Ashlar Method, to run plan west east.

.5 **TCPT2**:

.1 Type: Patterned Level Loop

.2 Colour: Departmental Representative to choose from manufacturer's range of skinny plank tiles resembling maple wood grain.

.3 Size: 250mmx1000mm

.4 Pile height: 1.5 mm

.5 Pile thickness: 0.4 mm

.6 Pile Density: 1,334,872 g/m^3

.7 Stitches: 37.01 ends/100mm

.8 Tufted Yarn weight: minimum 509 g/m^2 unless otherwise indicated.

.9 Installation: Ashlar Method, to run plan north south.

2.2 INSTALLATION ACCESSORIES

.1 Trowellable Levelling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

.2 Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

.1 VOC Limits: provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

.3 Transition Strip: Provide 6mm wide zinc metal bar type transition strip between different floor finishes.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, colour, pattern, and potential defects.

.2 Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

.1 Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.

.2 Subfloor finishes comply with requirements specified in Division 03 Section *Cast-in-Place Concrete* for slabs receiving carpet tile.

.3 Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

.3 For wood subfloors, verify the following:

.1 Underlayment over subfloor complies with requirements specified in Section 06 10 53 – *Miscellaneous Rough Carpentry*.

.2 Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

.4 For metal subfloors, verify the following:

.1 Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.

.5 For painted subfloors, verify the following:

.1 Perform bond test recommended in writing by adhesive manufacturer.

.6 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 General: Comply with CRI 104, Section 6.2, *Site Conditions; Floor Preparation*, and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

.2 Use trowellable levelling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level

cracks, holes and depressions 3 mm wide or wider and protrusions more than 0.8 mm unless more stringent requirements are required by manufacturer's written instructions.

.3 Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

.4 Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminium surfaces, to remove metal oxides, immediately before applying adhesive.

.5 Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

.1 General: Comply with CRI 104, Section 14, *Carpet Modules*, and with carpet tile manufacturer's written installation instructions.

.2 Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive, unless noted otherwise.

.3 Maintain dye lot integrity. Do not mix dye lots in same area.

.4 Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

.5 Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

.6 Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use non-permanent, nonstaining marking device.

.7 Install pattern parallel to walls and borders.

.8 Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

.1 Perform the following operations immediately after installing carpet tile:

.1 Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.

.2 Remove yarns that protrude from carpet tile surface.

.3 Vacuum carpet tile using commercial machine with face-beater element.

.2 Protect installed carpet tile to comply with CRI 104, Section 16, *Protection of Indoor Installations*.

.3 Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

.4 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:

.1 Acoustical testing of rooms shown on drawings as having either a STC or NIC criteria

1.3 DEFINITIONS AND ABBREVIATIONS

.1 STC – Sound Transmission Class; a ranking of the acoustical isolation across a component part, such as a partition, a floor, or a door. STC testing is conducted in laboratories.

.2 NIC – Noise Isolation Coefficient; a ranking of the acoustical isolation between two spaces taking into account all the imperfections that might exist between the two spaces. NIC testing is conducted on site.

1.4 PERFORMANCE REQUIREMENTS

.1 General Performance: The Noise Isolation Coefficient between those spaces indicated on the drawings as having a STC or NIC rating and all adjoining spaces shall be equal or better than the STC or NIC number shown on the drawing for that space.

1.5 TESTING STANDARD

.1 ASTM E336-97 Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.

1.6 QUALIFICATIONS OF TESTING ORGANIZATION

.1 Engage an independent testing organization acceptable to the Departmental Representative to undertake the field testing. Testing organization must adhere to national and international quality standards.

1.7 SUBMITTALS

.1 Test Reports: Provide signed test report for each space tested indicating test procedures used, test results, statement if the space meets the acoustical criteria indicated, and if criteria is not met, provide probably cause of failure cost effective recommendations for remedial work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

.1 Determine the Noise Isolation Coefficient between those spaces indicated on the drawings as having an STC or NIC rating and all adjoining spaces by undertaking acoustical testing to the standards indicated.

.2 Undertake field testing as soon as practically possible. Avoid delays that could result in redo of finish work if remedial construction work is needed.

.3 Provide 48 hours prior notice to Departmental Representative of each test performed.

.4 Provide preliminary test report to Departmental Representative within 48 hours of performing test indicating if criteria has been met. If criteria has not been met immediately stop all work in spaces tested and spaces immediately adjoining for next 96 hours and immediately provide notice to Departmental Representative that work is stopped due to test failure. Provide probably causes for failure and cost-effective recommendations for remedial work.

.5 Provide complete test reports within seven days of performing tests.

.6 Where cause of failure can be attributed in part to the Work of this Contract, correct the Work and retest at no cost to the Government of Canada.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Acoustical wall panels.

.2 Types of items not described in this Section:

.1 Spline and back-mounted acoustical wall panels

.2 Acoustical ceiling panels supported by exposed suspension system and tested for noise reduction.

.3 Acoustical ceiling tiles supported by concealed suspension system and tested for noise reduction.

.4 Adhesively applied textile wall coverings.

.5 Site-upholstered systems for ceilings and walls.

.6 Fabric-wrapped wall and ceiling panels that are not required to be tested for acoustical performance.

1.2 DEFINITIONS

.1 NRC: Noise reduction coefficient.

1.3 SUBMITTALS

.1 Product Data: For each type of panel edge, core material, and mounting indicated.

.2 Shop Drawings: For acoustical wall panels. Include mounting devices and details. Include elevations showing panel sizes and direction of fabric weave and pattern matching. Indicate panel edge and core materials.

.3 Maintenance Data: For acoustical wall panels to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal recommendations.

1.4 QUALITY ASSURANCE

.1 Source Limitations: Obtain acoustical wall panels through one source from a single manufacturer.

.2 Fire-Test-Response Characteristics: Provide acoustical wall panels with the following surface-burning characteristics as determined by testing identical products per CAN/ULC-S102:

.1 Flame-Spread Index: 25 or less.

.2 Smoke-Developed Index: 450 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Comply with acoustical wall panel manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

.2 Deliver materials and panels in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations: Do not install acoustical wall panels until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 PRODUCTS

2.1 CORE MATERIALS

.1 Glass-Fibre Board: ASTM C 612; density as specified, unfaced, dimensionally stable, moulded rigid board.

2.2 BACK-MOUNTED, ACOUSTICAL WALL PANELS WITH GLASS-FIBRE BOARD CORE

.1 Panel Description: Acoustical panels consisting of fiberglass core clad in a fabric face and attached with concealed security fasteners.

.2 Nominal Core Density: not less than 96 kg/cu. m.

.3 Facing Material: Fabric, selected from manufacturer's standard range by Departmental Representative.

.4 Edge finish: Square profile; chemically hardened using resin

.5 Nominal Core Thickness and Overall System NRC: 25 mm and not less than NRC 0.80.

.6 Panel Width: As indicated on Drawings.

.7 Panel Height: Fabricated height as indicated on Drawings; mounting height as determined in the field by the Departmental Representative.

.8 Provide cutouts as required.

.9 Mounting: face mounted, with concealed rail or clip system for wall mounting.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

.2 Comply with acoustical wall panel manufacturer's written instructions for installation of panels using type of concealed mounting accessories indicated or, if not indicated, as recommended by manufacturer. Anchor panels securely to supporting substrate.

.3 Installation Tolerances: As follows:

.1 Variation from Level and Plumb: Plus or minus 1.6 mm.

.4 All room services (receptacles, switches, and etc) to have cover plates flush with face of panel.

3.2 PROTECTION

.1 Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, to ensure that acoustical wall panels are without damage or deterioration at time of Substantial Completion.

.2 Replace acoustical wall panels that cannot be cleaned and repaired, in a manner approved by Departmental Representative, before time of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Surface preparation and the application of paint systems on the following exterior substrates:

.1 Steel.

.2 Galvanized metal.

.3 Aluminum (not anodized or otherwise coated).

.4 Unfinished wood, including wood treated with tinted wood preservative.

.5 Shop-primed items.

.6 Pipe supports, valves, valve operator and appurtenances except:

.1 Aluminum jacket

.2 PVC piping or jacket

.3 Stainless steel

.2 Types of items not described in this Section:

.1 Shop priming of metal substrates with primers specified in this Section.

.2 Shop priming carpentry with primers specified in this Section.

.3 Factory priming and finishing specified in other Sections.

.4 Special-use coatings.

.5 Surface preparation and the application of paint systems on interior substrates.

.6 Surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.

.3 Scope of Work of this Contract

.1 While drawings and schedules identify locations for some finishes, the scope of work entails painting all of the following exterior surfaces:

.1 All surfaces explicitly noted.

.2 All unfinished exterior surfaces that are either exposed-to-view or semi-exposed-to-view, unless otherwise noted.

.2 Specifically, do not paint:

.1 Grating.

.2 Concrete, brick, stone, or masonry, unless specifically indicated.

.3 Roofing membranes.

.4 Stainless steel.

.5 Aluminum handrail and aluminum stair and ladder components unless specifically indicated.

.6 Anodized aluminum and factory-painted aluminum.

.7 Glass.

.8 Asphalt.

.9 Exterior wood pressure treated with wood preservative, unless explicitly noted on drawings.

1.2 DEFINITIONS

.1 Concealed Surface: A surface that cannot be seen because the view from any angle is obstructed by an immovable object.

.2 Exposed and semi-exposed surface: Any surface that is not a concealed surface.

.3 Finish: a final surface treatment intended to enhance the appearance of a substrate or protect it from the adverse effects of its environmental, or both, and includes but is not limited to paint, stains, and coatings.

.1 Primer finish is not considered a finish.

.2 Gloss Levels:

.3 Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

.4 Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

.5 Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

.6 Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

.7 Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

.8 Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

.1 Product Data: For each type of product. Include preparation requirements and application instructions.

.2 Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

.1 Submit Samples on rigid backing, 200 mm square.

.2 Step coats on Samples to show each coat required for system.

.3 Label each coat of each Sample.

.4 Label each Sample for location and application area.

.3 Product List: For each product indicated, include the following:

.1 Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

.2 Printout of current *MPI Approved Products List* for each product category specified in Part 2, with the proposed product highlighted.

.3 VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

.1 Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Paint: 5 percent, but not less than 3.8 L of each material and color applied.

1.5 QUALITY ASSURANCE

.1 MPI Standards:

.1 Products: Complying with MPI standards indicated and listed in *MPI Approved Products List*.

.2 Preparation and Workmanship: Comply with requirements in *MPI Architectural Painting Specification Manual* for products and paint systems indicated.

.2 Mock-ups: Apply benchmark samples of each paint system indicated and each colour and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Departmental Representative will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

.1 Vertical and Horizontal Surfaces: Provide samples of at least 9 sq. m.

.2 Other Items: Departmental Representative will designate items or areas required.

.2 Final approval of colour selections will be based on benchmark samples.

.1 If preliminary colour selections are not approved, apply additional benchmark samples of additional colours selected by Departmental Representative at no added cost to Government of Canada.

.3 Compatibility:

.1 Ensure type of paint used is compatible with the substrate being painted.

.2 If manufacturer of substrate being painted recommends use of selected paint products, limit use to these products only.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C.

.1 Maintain containers in clean condition, free of foreign materials and residue.

.2 Remove rags and waste from storage areas daily.

1.7 PROJECT CONDITIONS

.1 Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 10 and 35 deg C.

.2 Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 3 deg C above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 PAINT, GENERAL

.1 Material Compatibility:

.1 Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

.2 For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

.2 Colours: In not noted otherwise, then selected by Departmental Representative from full range of colours.

.3 Gloss Levels: As determined by Departmental Representative.

2.2 BLOCK FILLERS

.1 Interior/Exterior Latex Block Filler: MPI #4.

2.3 PRIMERS/SEALERS

.1 Alkali-Resistant Primer: MPI #3.

.2 Bonding Primer (Water Based): MPI #17.

.3 Bonding Primer (Solvent Based): MPI #69.

.4 Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint system indicated.

2.4 METAL PRIMERS

.1 Alkyd Anticorrosive Metal Primer: MPI #79.

.2 Quick-Drying Alkyd Metal Primer: MPI #76.

.3 Cementitious Galvanized-Metal Primer: MPI #26.

.4 Waterborne Galvanized-Metal Primer: MPI #134.

.5 Quick-Drying Primer for Aluminum: MPI #95.

2.5 WOOD PRIMERS

.1 Exterior Latex Wood Primer: MPI #6.

.2 Exterior Alkyd Wood Primer: MPI #5.

.3 Exterior Oil Wood Primer: MPI #7.

2.6 EXTERIOR LATEX PAINTS

.1 Exterior Latex (Flat): MPI #10 (Gloss Level 1).

.2 Exterior Latex (Semi gloss): MPI #11 (Gloss Level 5).

.3 Exterior Latex (Gloss): MPI #119 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).

2.7 EXTERIOR ALKYD PAINTS

.1 Exterior Alkyd Enamel (Flat): MPI #8 (Gloss Level 1).

.2 Exterior Alkyd Enamel (Semi gloss): MPI #94 (Gloss Level 5).

.3 Exterior Alkyd Enamel (Gloss): MPI #9 (Gloss Level 6).

2.8 QUICK-DRYING ENAMELS

.1 Quick-Drying Enamel (Semi gloss): MPI #81 (Gloss Level 5).

.2 Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).

2.9 TEXTURED AND HIGH-BUILD COATINGS

.1 Latex Stucco and Masonry Textured Coating: MPI #42.

.2 High-Build Latex (Exterior): MPI #40.

2.10 ALUMINUM PAINT

.1 Aluminum Paint: MPI #1.

2.11 FLOOR COATINGS

.1 Interior/Exterior Clear Concrete Floor Sealer (Water Based): MPI #99.

.2 Interior/Exterior Clear Concrete Floor Sealer (Solvent Based): MPI #104.

.3 Interior/Exterior Latex Floor and Porch Paint (Low Gloss): MPI #60 (maximum Gloss Level 3).

.4 Exterior/Interior Alkyd Floor Enamel (Gloss): MPI #27 (Gloss Level 6).

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

.2 Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

.1 Concrete: 12 percent.

.2 Masonry (Clay and CMU): 12 percent.

.3 Wood: 15 percent.

.3 Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

.4 Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

.1 Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

.1 Comply with manufacturer's written instructions and recommendations in *MPI Architectural Painting Specification Manual* applicable to substrates and paint systems indicated.

.2 Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

.1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

.2 Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

.3 Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

.1 Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

.4 Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

.5 Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

.6 Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

.7 Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

.8 Aluminum Substrates: Remove surface oxidation.

.9 Wood Substrates:

.1 Scrape and clean knots, and apply coat of knot sealer before applying primer.

.2 Sand surfaces that will be exposed to view, and dust off.

.3 Prime edges, ends, faces, undersides, and backsides of wood.

.4 After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

.1 Apply paints according to manufacturer's written instructions.

.1 Use applicators and techniques suited for paint and substrate indicated.

.2 Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

.2 Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match colour of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

.3 If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, colour, and appearance.

.4 Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and colour breaks.

3.4 CLEANING AND PROTECTION

.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

.2 After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

.3 Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Departmental Representative, and leave in an undamaged condition.

.4 At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE (ALSO REFERRED ON DRAWINGS AS PTX)

.1 Propose paint system for any surfaces not listed. Propose paint system consisting of a minimum of a prime coat, intermediate coat, and topcoat.

.2 Concrete Substrates, Nontraffic Surfaces:

.1 Latex System: MPI EXT 3.1A.

.1 Prime Coat: Exterior latex matching topcoat.

.2 Intermediate Coat: Exterior latex matching topcoat.

.3 Concrete Substrates, Traffic Surfaces:

.1 Alkyd Floor Enamel System: MPI EXT 3.2D.

.1 Prime Coat: Exterior/interior alkyd floor enamel (gloss).

.2 Intermediate Coat: Exterior/interior alkyd floor enamel.

.3 Topcoat: Exterior/interior alkyd floor enamel.

.4 CMU Substrates:

.1 Latex System: MPI EXT 4.2A.

.1 Prime Coat: Interior/exterior latex block filler.

.2 Intermediate Coat: Exterior latex matching topcoat.

.3 Topcoat: Exterior latex.

.5 Steel Substrates:

.1 Alkyd System: MPI EXT 5.1D.

.1 Prime Coat: Alkyd anticorrosive metal primer.

.2 Intermediate Coat: Exterior alkyd enamel matching topcoat.

.3 Topcoat: Exterior alkyd enamel.

.6 Galvanized-Metal Substrates:

.1 Latex Over Water-Based Primer System: MPI EXT 5.3H.

.1 Prime Coat: Waterborne galvanized-metal primer.

.2 Intermediate Coat: Exterior latex matching topcoat.

.3 Topcoat: Exterior latex.

.7 Aluminum Substrates:

.1 Latex System: MPI EXT 5.4H.

.1 Prime Coat: Quick-drying primer for aluminum.

.2 Intermediate Coat: Exterior latex matching topcoat.

.3 Topcoat: Exterior latex.

.8 Dressed Lumber Substrates: Including e Architectural woodwork and doors. (Confirm with Departmental Representative prior to application.)

.1 Latex System: MPI EXT 6.3L.

.1 Prime Coat: Exterior latex wood primer.

.2 Intermediate Coat: Exterior latex matching topcoat.

.3 Topcoat: Exterior latex.

.9 Wood Panel Substrates: Including plywood siding, fascia, and soffits. (Confirm with Departmental Representative prior to application.)

.1 Latex System: MPI EXT 6.4K.

.1 Prime Coat: Exterior latex wood primer.

.2 Intermediate Coat: Exterior latex matching topcoat.

.3 Topcoat: Exterior latex.

.10 Dimension Lumber Substrates, Nontraffic Surfaces: Including board siding, fencing, and undersides of decking. (Confirm with Departmental Representative prior to application.)

.1 Latex System: MPI EXT 6.2M.

.1 Prime Coat: Exterior latex wood primer.

.2 Intermediate Coat: Exterior latex matching topcoat.

.3 Topcoat: Exterior latex.

.11 Dimension Lumber Substrates, Traffic Surfaces: Including lumber, and decking stairs. (Confirm with Departmental Representative prior to application.)

.1 Latex System: MPI EXT 6.5E.

.1 Prime Coat: Exterior latex wood primer.

.2 Intermediate Coat: Interior/exterior latex floor and porch.

.3 Topcoat: Interior/exterior latex floor and porch.

.1 With additive to increase skid resistance of painted surface.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Surface preparation and the application of paint systems on the following interior substrates:

.1 Concrete.
.2 Clay masonry.
.3 Concrete masonry units (CMU).
.4 Steel.
.5 Galvanized metal.
.6 Aluminum (not anodized or otherwise coated).
.7 Wood.
.8 Gypsum board.

.2 Types of items not described in this Section:

.1 Wood stains and transparent finishes.
.2 Shop priming of metal substrates with primers specified in this Section.
.3 Shop priming carpentry with primers specified in this Section.
.4 Factory finishing of steel doors and frames and of wood doors; where specified.
.5 Gypsum board spackling.
.6 Special-use coatings, including epoxy coatings.
.7 Intumescent painting.
.8 Surface preparation and the application of paint systems on exterior substrates.
.9 Surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

.3 Related Requirements:

.1 Section 01 33 00 - Submittal Procedures.
.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.3 Section 01 78 00 - Closeout Submittals.

.4 Scope of Work of this Contract

.1 While drawings and schedules identify locations for some finishes, the scope of work entails painting all the following interior surfaces:

.1 All surfaces explicitly noted to be painted.
.2 All surfaces scheduled to be covered with wall coverings.
.3 All unfinished surfaces that are either exposed-to-view or semi-exposed-to-view and not otherwise scheduled to receive another type of finish, excluding finished hardwood; unless otherwise noted.

.2 Specifically, do not paint any of the following surfaces:

.1 Grating.
.2 Concrete floors, unless specifically indicated.
.3 Stainless steel.
.4 Aluminum handrail and aluminum stair and ladder components.
.5 PVC, rubber, copper, bronze or brass surfaces.

1.2 REFERENCES

.1 ASTM International

.1 ASTM D523 (2014), Standard Test Method for Specular Gloss

.1 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33

.2 Environmental Protection Agency (EPA)

.1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 Master Painters Institute (MPI)

.1 MPI Architectural Painting Specifications Manual, 2004.

.5 National Fire Code of Canada – latest edition

.6 Society for Protective Coatings (SSPC)

.1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

.7 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34 .

.8 Underwriters Laboratories of Canada (ULC)

1.3 DEFINITIONS

.1 Concealed Surface: A surface that cannot be seen because the view from any angle is obstructed by an immovable object.

.2 Exposed and semi-exposed surface: Any surface that is not a concealed surface.

.3 Finish: a final surface treatment intended to enhance the appearance of a substrate or protect it from the adverse effects of its environmental, or both, and includes but is not limited to paint, stains, coatings, laminates, tiles, fabrics and carpets.

.1 Primer finish is not considered a finish.

.4 Unfinished Surface: A surface having no Finish.

.5 Gloss Levels:

.1 Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

.2 Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

.3 Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

.4 Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

.5 Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

.6 Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

.7 Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

.1 Product Data: For each type of product. Include preparation requirements and application instructions.

.2 Samples for Verification: For each type of paint system and in each colour and gloss of topcoat.

.1 Submit Samples on rigid backing, 200 mm square.

.2 Step coats on Samples to show each coat required for system.

.3 Label each coat of each Sample.

.4 Label each Sample for location and application area.

.3 Product List: For each product indicated, include the following:

.1 Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

.2 Printout of current *MPI Approved Products List* for each product category specified in Part 2, with the proposed product highlighted.

.3 VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Paint: 5 percent, but not less than 3.8 L of each material and colour applied.

1.6 QUALITY ASSURANCE

.1 MPI Standards:

.1 Products: Complying with MPI standards indicated and listed in *MPI Approved Products List*.

.2 Preparation and Workmanship: Comply with requirements in *MPI Architectural Painting Specification Manual* for products and paint systems indicated.

.2 Mock-ups: While paint colours may be specifically indicated in the documents, still proceed with mock-ups. Apply benchmark samples of each paint system indicated and each colour and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Departmental Representative will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

.1 Wall and Ceiling Surfaces: Provide samples of at least 9 sq. m.

.2 Other Items: Departmental Representative will designate items or areas required.

.2 Apply benchmark samples after permanent lighting and other environmental services have been activated.

.3 Final approval of colour selections will be based on benchmark samples.

.1 If preliminary colour selections are not approved, apply additional benchmark samples of additional colours selected by Departmental Representative at no added cost to Government of Canada.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 7 deg C.

.1 Maintain containers in clean condition, free of foreign materials and residue.

.2 Remove rags and waste from storage areas daily.

.2 Fire Safety Requirements:

.1 Provide Type ABC fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal polystyrene packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).

.4 Separate for recycling and place in designated containers Steel waste in accordance with Waste Management Plan (WMP).

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with CEPA, regulations.

.7 Ensure emptied containers are sealed and stored safely.

.8 Unused coating materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.

.9 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.10 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.11 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.12 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.13 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.8 PROJECT CONDITIONS

.1 Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 10 and 35 deg C.

.2 Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 3 deg C above the dew point; or to damp or wet surfaces.

PART 2 PRODUCTS

2.1 PAINT, GENERAL

.1 Material Compatibility:

.1 Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

.2 For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

.2 VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colourants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

.1 Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.

.2 Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.

.3 Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.

.4 Floor Coatings: VOC not more than 100 g/L.

.5 Shellacs, Clear: VOC not more than 730 g/L.

.6 Shellacs, Pigmented: VOC not more than 550 g/L.

.7 Flat Topcoat Paints: VOC content of not more than 50 g/L.

.8 Nonflat Topcoat Paints: VOC content of not more than 150 g/L.

.9 Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.

.10 Floor Coatings: VOC not more than 100 g/L.

.11 Shellacs, Clear: VOC not more than 730 g/L.

.12 Shellacs, Pigmented: VOC not more than 550 g/L.

.13 Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.

.14 Dry-Fog Coatings: VOC content of not more than 400 g/L.

.15 Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.

.16 Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

.3 Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

.1 Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

.2 Restricted Components: Paints and coatings shall not contain any of the following:

.1 Acrolein.

.2 Acrylonitrile.

.3 Antimony.

.4 Benzene.

.5 Butyl benzyl phthalate.

.6 Cadmium.

.7 Di (2-ethylhexyl) phthalate.

.8 Di-n-butyl phthalate.

.9 Di-n-octyl phthalate.

.10 1,2-dichlorobenzene.
.11 Diethyl phthalate.
.12 Dimethyl phthalate.
.13 Ethylbenzene.
.14 Formaldehyde.
.15 Hexavalent chromium.
.16 Isophorone.
.17 Lead.
.18 Mercury.
.19 Methyl ethyl ketone.
.20 Methyl isobutyl ketone.
.21 Methylene chloride.
.22 Naphthalene.
.23 Toluene (methylbenzene).
.24 1,1,1-trichloroethane.
.25 Vinyl chloride.

.4 Colours:

.1 PT1 Interior Paint
.1 White paint colour to be chosen by Departmental Representative from manufacturer's standard range.

.2 PT2 Interior Paint
.1 Dark blue paint colour to be chosen by Departmental Representative from manufacturer's standard range.

.3 PT3 Interior Paint
.1 Light grey paint colour to be chosen by Departmental Representative from manufacturer's standard range.

.4 PT4 Interior Paint
.1 Doors and door numbers in cells to be Eco Spec WB Interior Latex, Semi-gloss finish F376 by Benjamin Moore. Allow for two colours, with paint for door numbers contrasting with paint for doors. Colours to be chosen by Departmental Representative.

.5 PT5 Interior Paint
.1 Dark warm grey paint colour to be chosen by Departmental Representative from manufacturer's standard range.

.6 PT6 Interior Paint
.1 18% grey

.7 M&E equipment: Assume no colour coding required unless otherwise indicated in mechanical and electrical specification sections.

.5 Gloss Levels: As determined by Departmental Representative on a surface by surface basis.

2.2 BLOCK FILLERS

.1 Interior/Exterior Latex Block Filler: MPI #4.

.1 VOC Content: E Range of E3.

2.3 PRIMERS/SEALERS

.1 Interior Latex Primer/Sealer: MPI #50.

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 3.

.2 Interior Alkyd Primer/Sealer: MPI #45.

.1 VOC Content: E Range of E2.

.3 Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.4 METAL PRIMERS

.1 Alkyd Anticorrosive Metal Primer: MPI #79.

.1 VOC Content: E Range of E2.

.2 Quick-Drying Alkyd Metal Primer: MPI #76.

.1 VOC Content: E Range of E3.

.3 Rust-Inhibitive Primer (Water Based): MPI #107.

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 3.

.4 Cementitious Galvanized-Metal Primer: MPI #26.

.1 VOC Content: E Range of E1.

.5 Waterborne Galvanized-Metal Primer: MPI #134.

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 3.

.6 Vinyl Wash Primer: MPI #80.

.1 VOC Content: E Range of E3.

.7 Quick-Drying Primer for Aluminum: MPI #95.

.1 VOC Content: E Range of E3.

2.5 WOOD PRIMERS

.1 Interior Latex-Based Wood Primer: MPI #39.

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 3.

2.6 LATEX PAINTS

.1 Interior Latex (Flat): MPI #53 (Gloss Level 1).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 2.5.

.2 Interior Latex (Low Sheen): MPI #44 (Gloss Level 2).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.3 Interior Latex (Eggshell): MPI #52 (Gloss Level 3).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.4 Interior Latex (Satin): MPI #43 (Gloss Level 4).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.5.

.5 Interior Latex (Semigloss): MPI #54 (Gloss Level 5).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.

.6 Interior Latex (Gloss): MPI #114 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.

.7 Institutional Low-Odour/VOC Latex (Flat): MPI #143 (Gloss Level 1).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 5.5.

.8 Institutional Low-Odour/VOC Latex (Low Sheen): MPI #144 (Gloss Level 2).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.5.

.9 Institutional Low-Odour/VOC Latex (Eggshell): MPI #145 (Gloss Level 3).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 4.5.

.10 Institutional Low-Odour/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 5.5.

.11 High-Performance Architectural Latex (Low Sheen): MPI #138 (Gloss Level 2).

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 6.

.12 High-Performance Architectural Latex (Eggshell): MPI #139 (Gloss Level 3).

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 6.

.13 High-Performance Architectural Latex (Satin): MPI #140 (Gloss Level 4).

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 6.5.

.14 High-Performance Architectural Latex (Semigloss): MPI #141 (Gloss Level 5).

.1 VOC Content: E Range of E3.

.2 Environmental Performance Rating: EPR 7.

.15 Exterior Latex (Flat): MPI #10 (Gloss Level 1).

.1 VOC Content: E Range of E3.

.16 Exterior Latex (Semigloss): MPI #11 (Gloss Level 5).

.1 VOC Content: E Range of E3.

.17 Exterior Latex (Gloss): MPI #119 (Gloss Level 6, except minimum gloss of 65 units at 60 deg).

.1 VOC Content: E Range of E3.

2.7 ALKYD PAINTS

.1 Interior Alkyd (Flat): MPI #49 (Gloss Level 1).

.1 VOC Content: E Range of E3.

.2 Interior Alkyd (Eggshell): MPI #51 (Gloss Level 3).

.1 VOC Content: E Range of E2.

.3 Interior Alkyd (Semigloss): MPI #47 (Gloss Level 5).

.1 VOC Content: E Range of E2.

.2 Environmental Performance Rating: EPR 3.

.4 Interior Alkyd (Gloss): MPI #48 (Gloss Level 6).

.1 VOC Content: E Range of E2.

2.8 QUICK-DRYING ENAMELS

.1 Quick-Drying Enamel (Semigloss): MPI #81 (Gloss Level 5).

.1 VOC Content: E Range of E3.

.2 Quick-Drying Enamel (High Gloss): MPI #96 (Gloss Level 7).

.1 VOC Content: E Range of E3.

2.9 TEXTURED COATING

.1 Latex Stucco and Masonry Textured Coating: MPI #42.

.1 VOC Content: E Range of E3.

2.10 DRY FOG/FALL COATINGS

.1 Latex Dry Fog/Fall: MPI #118.

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.2 Waterborne Dry Fall: MPI #133.

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.3 Interior Alkyd Dry Fog/Fall: MPI #55.

.1 VOC Content: E Range of E3.

2.11 ALUMINUM PAINT

.1 Aluminum Paint: MPI #1.

.1 VOC Content: E Range of E3.

2.12 FLOOR COATINGS

.1 Interior Concrete Floor Stain: MPI #58.

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 2.

.2 Interior/Exterior Clear Concrete Floor Sealer (Water Based): MPI #99.

.1 VOC Content: E Range of E3.

.3 Interior/Exterior Clear Concrete Floor Sealer (Solvent Based): MPI #104.

.1 VOC Content: E Range of E2.

.4 Interior/Exterior Latex Floor and Porch Paint (Low Gloss): MPI #60 (maximum Gloss Level 3).

.1 VOC Content: E Range of E3.
.2 Environmental Performance Rating: EPR 3.

.5 Exterior/Interior Alkyd Floor Enamel (Gloss): MPI #27 (Gloss Level 6).

.1 VOC Content: E Range of E2.
.2 Additives: Manufacturer's standard additive to increase skid resistance of painted surface.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

.2 Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

.1 Concrete: 12 percent.

.2 Masonry (CMU): 12 percent.

.3 Wood: 15 percent.

.4 Gypsum Board: 12 percent.

.3 Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

.4 Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

.1 Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

.1 Comply with manufacturer's written instructions and recommendations in MPI Architectural Painting Specification Manual applicable to substrates indicated.

.2 Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

.1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

.2 Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

.3 Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

.1 Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

.4 Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

.5 Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

.6 Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

.1 SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

.7 Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

.8 Aluminum Substrates: Remove surface oxidation.

.9 Wood Substrates:

.1 Scrape and clean knots, and apply coat of knot sealer before applying primer.

.2 Sand surfaces that will be exposed to view, and dust off.

.3 Prime edges, ends, faces, undersides, and backsides of wood.

.4 After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

.10 Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

.1 Apply paints according to manufacturer's written instructions.

.1 Use applicators and techniques suited for paint and substrate indicated.

.2 Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

.3 Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

.2 Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match colour of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

.3 If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, colour, and appearance.

.4 Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and colour breaks.

.5 Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

.1 Mechanical Work:

.1 Uninsulated metal piping.

.2 Uninsulated plastic piping.

.3 Pipe hangers and supports.

.4 Tanks that do not have factory-applied final finishes.

.5 Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.

.6 Mechanical equipment that is indicated to have a factory-primed finish for field painting.

.2 Electrical Work:

.1 Galvanized and steel conduits.

.2 Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 CLEANING AND PROTECTION

.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

.2 After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

.3 Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Departmental Representative, and leave in an undamaged condition.

.4 At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

.1 Propose paint system for any surfaces not listed. Propose paint system consisting of a minimum of a prime coat, intermediate coat, and topcoat.

.2 Concrete Substrates, Nontraffic Surfaces:

.1 High-Performance Architectural Latex System: MPI INT 3.1C.

.1 Prime Coat: Interior latex primer/sealer.

.2 Intermediate Coat: High-performance Architectural latex matching topcoat.

.3 Topcoat: High-performance Architectural latex.

.3 Concrete Substrates, Traffic Surfaces:

.1 Alkyd Floor Enamel System: MPI INT 3.2B.

.1 Prime Coat: Exterior/interior alkyd floor enamel.

.2 Intermediate Coat: Exterior/interior alkyd floor enamel.

.3 Topcoat: Exterior/interior alkyd floor enamel.

.4 CMU Substrates:

.1 High-Performance Architectural Latex System: MPI INT 4.2D.

.1 Prime Coat: Interior/exterior latex block filler.

.2 Intermediate Coat: High-performance Architectural latex matching top-coat.

.3 Topcoat: High-performance Architectural latex .

.5 Steel Pipes filled with liquids, including but not limited to sprinkler pipes:

.1 Alkyd System: MPI INT 5.1E.

.1 Prime Coat: Alkyd anticorrosive metal primer.

.2 Intermediate Coat: Interior alkyd matching topcoat.

.3 Topcoat: Interior alkyd

.6 Galvanized Metal Pipes filled with liquids, including but not limited to sprinkler pipes:

.1 Alkyd System: MPI INT 5.3C.

.1 Prime Coat: Cementitious galvanized-metal primer.

.2 Intermediate Coat: Interior alkyd matching topcoat.

.3 Topcoat: Interior alkyd

.7 Steel Substrates:

.1 High-Performance Architectural Latex System: MPI INT 5.1R.

.1 Prime Coat: Alkyd anticorrosive metal primer.

.2 Intermediate Coat: High-performance Architectural latex matching top-coat.

.3 Topcoat: High-performance Architectural latex.

.8 Galvanized-Metal Substrates:

.1 High-Performance Architectural Latex System: MPI INT 5.3M.

.1 Prime Coat: Waterborne galvanized-metal primer.

.2 Intermediate Coat: High-performance Architectural latex matching top-coat.

.3 Topcoat: High-performance Architectural latex .

.9 Aluminum (Not Anodized or Otherwise Coated) Substrates:

.1 High-Performance Architectural Latex System: MPI INT 5.4F.

.1 Prime Coat: Quick-drying primer for aluminum.

.2 Intermediate Coat: High-performance Architectural latex matching top-coat.

.3 Topcoat: High-performance Architectural latex.

.10 Dressed Lumber Substrates: Including Architectural woodwork and doors.

.1 High-Performance Architectural Latex System: MPI INT 6.3A.

.1 Prime Coat: Interior latex-based wood primer.

.2 Intermediate Coat: High-performance Architectural latex matching top-coat.

.3 Topcoat: High-performance Architectural latex.

.11 Wood Panel Substrates: Including painted plywood, medium-density fiberboard, and hardboard.

.1 High-Performance Architectural Latex System: MPI INT 6.4S.

.1 Prime Coat: Interior latex-based wood primer.

.2 Intermediate Coat: High-performance Architectural latex matching topcoat.

.3 Topcoat: High-performance Architectural latex.

.12 Dimension Lumber Substrates, Nontraffic Surfaces: Including exposed joists and exposed beams.

.1 High-Performance Architectural Latex System: MPI INT 6.2B.

.1 Prime Coat: Interior alkyd primer/sealer.

.2 Intermediate Coat: High-performance Architectural latex matching topcoat.

.3 Topcoat: High-performance Architectural latex.

.13 Wood Substrates, Traffic Surfaces:

.1 Latex Floor Paint System: MPI INT 6.5G.

.1 Prime Coat: Interior alkyd primer/sealer.

.2 Intermediate Coat: Interior/exterior latex floor and porch paint.

.3 Topcoat: Interior/exterior latex floor and porch paint.

.14 Gypsum Board Substrates:

.1 High-Performance Architectural Latex System: MPI INT 9.2B.

.1 Prime Coat: Interior latex primer/sealer.

.2 Intermediate Coat: High-performance Architectural latex matching topcoat.

.3 Topcoat: High-performance Architectural latex.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Surface preparation and application of high-built epoxy wall coating systems on concrete or CMU walls and ceilings.

1.2 RELATED DOCUMENTS

.1 Section 07 92 00 - Joint Sealants

1.3 REFERENCES

.1 CAN/ULC-S102, Test for Surface Burning Characteristics of Building Materials and Assemblies.

.2 ASTM D522-93a (2001), Test Methods for Mandrel Bend Test of Attached Organic Coatings

.3 ASTM D1308-02e1, Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes

.4 ASTM D1360-98 (2004), Test method for Fire Retardancy of Paints (cabinet method)

.5 ASTM D2486-00, Test methods for Scrub Resistance of Wall Paints

.6 ASTM E96-05, Test Methods for Water Vapour Transmission of Materials

.7 CGSB 1-GP-71, Methods of Testing Paints and Pigments – Blushing Resistance of Lacquer Finishes

1.4 SUBMITTALS

.1 Product Data: For each type of product indicated.

.2 Samples for Verification: For each type of coating system and in each colour and gloss of finish coat indicated.

.1 Submit Samples on rigid backing, 300 mm square.

.2 Label each coat of each Sample.

.3 Label each Sample for location and application area.

1.5 QUALITY ASSURANCE

.1 Master Painters Institute (MPI) Standards:

.1 Preparation and Workmanship: Comply with requirements in *MPI Architectural Painting Specification Manual* for products and coating systems indicated.

.2 Make available copies of the material literature, clearly indicating conditions of acceptance for surfaces and methods of application on site before, during and after application of product, until such time as work is accepted by Departmental Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials undamaged, in original containers, with manufacturer's labels and seals intact.

.2 Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 12 deg C.

.1 Maintain containers in clean condition, free of foreign materials and residue.

.2 Remove rags and waste from storage areas daily.

1.7 PROJECT CONDITIONS

.1 Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 10 and 35 deg C, 24 hours before, during and 24 hours after application or until cured.

.2 Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 3 deg C above the dew point; or to damp or wet surfaces.

1.8 EXTRA MATERIALS

.1 Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

.1 Quantity: Furnish an additional 5 percent, but not less than 3.8 L of each material and colour applied.

PART 2 PRODUCTS

2.1 EPOXY WALL COATING

.1 Available Products: Subject to compliance with requirements, products that may be incorporated into the Work are limited to the following and are to be installed as per the manufacturer's recommendations:

.1 **EPXW1**: Epoxy Coating

.1 Sikagard Duroplast 150 as marketed by Sika.

.2 Colour: RAL7046 Telegray 2.

2.2 ACCESSORY MATERIALS

.1 Use primers as recommended by manufacturers for substrate.

.2 Patching and Fill Material: Resinous product of or approved by resinous wall coating manufacturer and recommended by manufacturer for application indicated.

.3 Joint Sealant: Type recommended or produced by resinous wall coating manufacturer for type of service and joint condition indicated.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

.1 Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

.1 Concrete: 12 percent.

.2 CMU: 12 percent.

.2 Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

.3 Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

.4 Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

.1 Comply with manufacturer's written instructions and recommendations in *MPI Architectural Painting Specification Manual* applicable to substrates indicated.

.2 Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

.1 After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

.3 Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.

.1 Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

3.3 APPLICATION

.1 Apply epoxy coating according to manufacturer's written instructions.

.1 Use applicators and techniques suited for coating and substrate indicated.

.2 Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.

.3 Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

.2 Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and colour breaks.

3.4 FIELD QUALITY CONTROL

.1 Departmental Representative reserves the right to invoke the following procedure at any time and as often as Departmental Representative deems necessary during the period when coatings are being applied:

.1 Departmental Representative will engage the services of a testing agency to sample coating material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.

.2 Testing agency will perform tests for compliance with specified requirements.

.3 Departmental Representative may direct Contractor to stop applying coatings if test results show materials being used do not comply with specified requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

3.5 CLEANING AND PROTECTION

.1 At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

.2 After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

.3 Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Departmental Representative, and leave in an undamaged condition.

.4 At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE OF WORK

.1 The work of this section includes the supply and installation of all signage called for on drawings and herein specified.

1.2 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.

.2 Clearly indicate size and description of components, base materials, and attachment devices.

1.3 GUARANTEE

.1 Provide a written guarantee that components will be warranted against material and design and workmanship defects for a period of one (1) year after Departmental Representative's Certificate of Substantial Completion or they shall be replaced or repaired at no cost to the Department Representative.

PART 2 PRODUCTS

2.1 NUMBER PLATES 'A' – LAMICOID TYPE (BUILDING OPERATIONS ROOM NUMBER)

.1 Provide one 25 mm x 50 mm Lamicoid sign. Letters/numbers to be 19 mm high capitals, Helvetica Medium style. Colour shall be white character engraved into black background.

.2 Attach signs with double-sided foam tape and silicone adhesive.

.3 One sign of this type is to be applied to the head frame at every interior door unless otherwise indicated (see Sign list for painted Room numbers on door frame). Mount above the latch side of the door.

.4 Generally room identification letter/numbers for this sign type shall be as per architectural floor plans.

.5 All drawings and samples to be submitted for Department Representative approval.

2.2 ACRYLIC SIGN TYPE 'B' - 6 MM (ALL INTERIOR SIGNS EXCEPT LAMICOID)

.1 Room number shall be recess mounted into a recess created in the sign face. Acrylic solvent is to be used to melt and permanently bond raised text onto the sign face. All raised text, characters, etc. are to have a beveled edge on the raised portion. Indicated

acrylic raised pictograms, numbers and letters to be 0.8 mm raised form the surface. Colour: White. Vinyl lettering is not acceptable.

.2 Sans Serif Helvetica Medium Style or approved alternative. Not raised letters and numbers shall be reverse screen printed to back side of sign panel, colour white unless otherwise indicated. Raised letters or pictograms shall be glued to sign face with non-removable adhesive.

.3 PVC back panel colour: Black.

.4 Use black double tape only for sandwich panel assembly and to past the sign on glass where necessary. Where signs are mounted on sidelights or windows, a matching vinyl opaque backing plate of equal size and finish shall be mounted on the inside face of the glass behind the sign.

.5 Background to be screen printed to back side of sign panel with colour silver metallic.

.6 Sign work for the disabled (handicapped washrooms) shall be to material standards above and to the standards required by the Building Requirements for Persons with Disabilities, Section 3.8 of the Building Code.

.7 Signs to all washrooms shall have International Symbols for Men and Women plus room name.

.8 Washrooms with handicapped facilities shall also have the International Symbol for Accessibility.

.9 Schedule - (Note room numbers are for reference to the numbers shown on project construction drawing floor plans; actual numbers will be 3 digits in sequence with number established by Department Representative.) Allow for a 3 digit number or letter/number combination on every sign to be confirmed by Department Representative prior to manufacturing.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install to achieve vandal resistance and a visually pleasing effect.

.2 Install Type 'B' signs in accordance with the requirements of Section 3.8.3.1 in the National Building Code, centred 1350 mm above finish floor, and at a distance of 150 mm from the strike jamb of the door.

.3 Confirm sign locations with Department Representative before installation.

END OF SECTION

10 14 19 - INTERIOR SIGNAGE SCHEDULE

NUMBER FROM FLOOR PLAN	SIGNAGE NUMBER REQUIRED	TYPE	SPECIFIED LOCATION (If not specified, to be coordinated on site with client representative)	SIGNAGE TEXT (SPECIFIC FOR SIGN) REQUIRED
101	101	DR # ONLY		
102	102	DR # ONLY		
103	103	Type 2		SIGNAGE NAME PROVIDED BY CLIENT
103B	103B	DR # ONLY		
104	104	Type 3		Refer to Pictogram
105	105	Type 2		SIGNAGE NAME PROVIDED BY CLIENT
106	106	DR # ONLY		
107	107	DR # ONLY		
108	108	DR # ONLY		
110	110	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
111	111	Type 4		SIGNAGE NAME PROVIDED BY CLIENT
112	112	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
113	113	N/A		
114A	114A	N/A		
114B	114B	N/A		
115	115	Type 3		Refer to Pictogram
116	116	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
117	117	Type 3		Refer to Pictogram
118	118	Type 3		Refer to Pictogram
119	119	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
120		N/A	On door and on cell wall	Painted #1. Refer to description on sheet A202b
121		N/A	On door and on cell wall	Painted #2. Refer to description on sheet A202b
122	122	Style Type 1, Vinyl (no Lamacoid)		SIGNAGE NAME PROVIDED BY CLIENT
123	123	DR # ONLY		
124	124	Type 1	Door 124A only	SIGNAGE NAME PROVIDED BY CLIENT
125	125	N/A		
126	126	Style Type 1, Vinyl (no Lamacoid)		SIGNAGE NAME PROVIDED BY CLIENT
127	127	Style Type 1, Vinyl (no Lamacoid)		SIGNAGE NAME PROVIDED BY CLIENT
128	128	Style Type 1, Vinyl (no Lamacoid)		SIGNAGE NAME PROVIDED BY CLIENT
129	129	Style Type 1, Vinyl (no Lamacoid)		SIGNAGE NAME PROVIDED BY CLIENT
130	130	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
131	131	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
131B	131B	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
132	132	DR # ONLY		
133	133	DR # ONLY		
134	134	N/A		
135	135	Type 1		SIGNAGE NAME PROVIDED BY CLIENT
301	301	N/A		
302	302	N/A		
303	303	N/A		

GENERAL NOTES:

1. THE SPECIFIC SIGNAGE TEXT INFORMATION WILL BE PROVIDED BY THE CLIENT POST TENDER AWARD. ALLOW UP TO 40 CHARACTERS FOR SIGNAGE TEXT.

2. REFER TO SPECIFICATION FOR TYPE 1, 2, 3 AND 4.

3. ALL DOOR NUMBERS AS LISTED RECEIVE A NUMER PLATE AS DESCRIBED IN SPECIFICATION, UNLESS OTHERWISE NOTED. THIS IS IN ADDITION TO SIGNAGE TYPE IF SCHEDULED.

4. TEXT NOTED (N/A) DOES NOT REQUIRE DOOR NUMBERS/SIGNAGE.

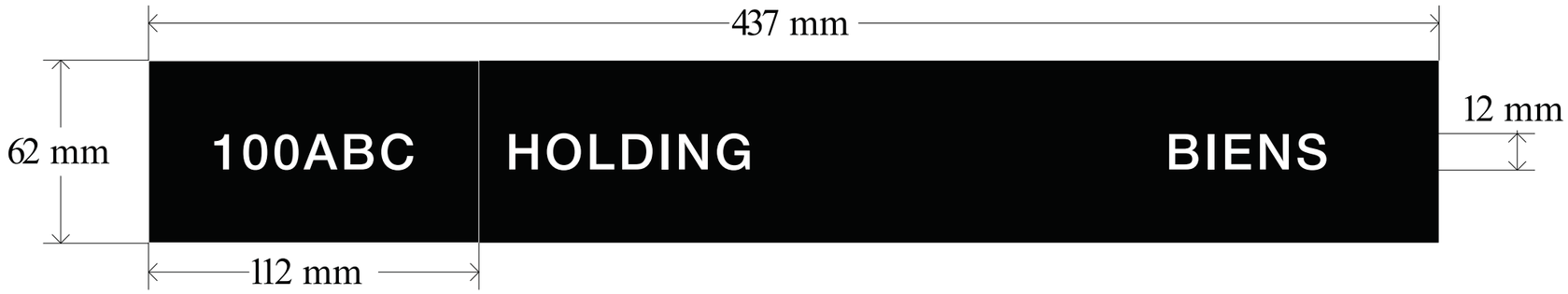
5. TYPE 'DR # ONLY' DENOTES DOOR NUMBER AS SPECIFIED ONLY, NO ADDITIONAL SIGNAGE TYPE REQUIRED FOR THESE DOORS/ROOMS.

6. SIGNAGE LOCATIONS ARE TO BE COORDINATED ON SITE WITH CLIENT REPRESENTATIVE, UNLESS NOTED ON THIS SCHEDULE.

7. APPLIED VINYL SIGNAGE FOR ROOMS SCHEDULED SHALL MATCH THE FORMAT OF TYPE 1. CHARACTER FINISH/COLOUR AND SIZE SHALL MATCH AS SPECIFIED FOR TYPE 1.

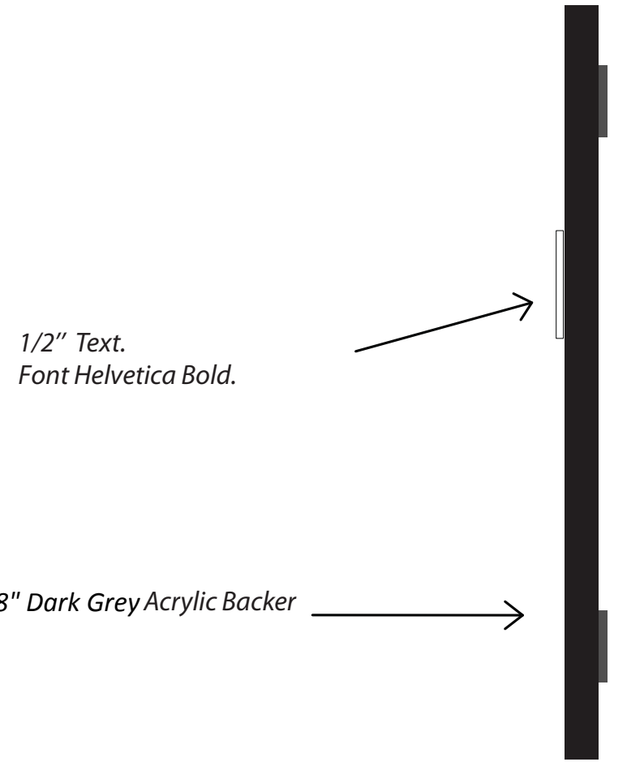
TYPE 1

ASK.1-a



Side View Room ID's

Single sided Room Identification



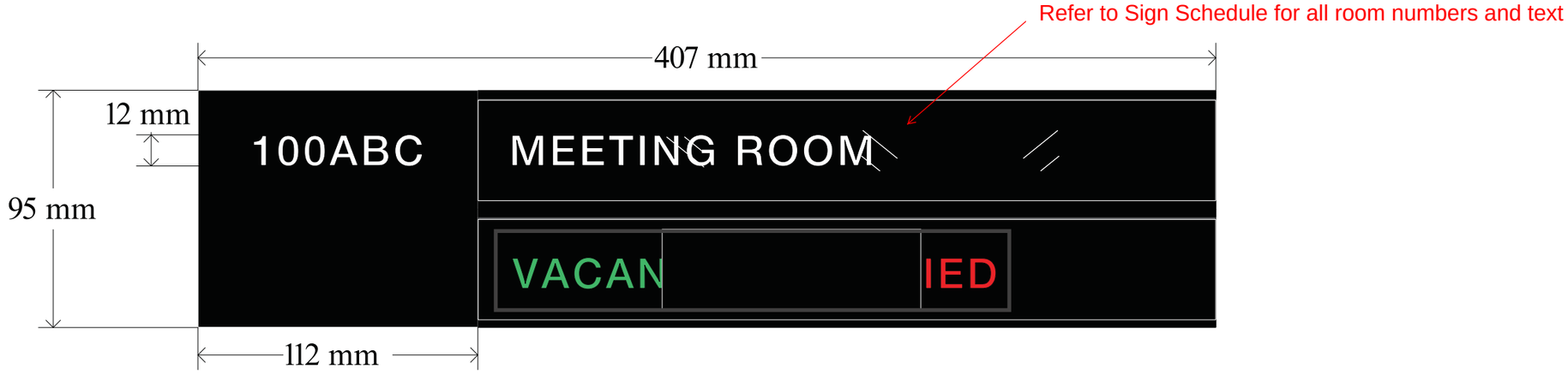
Color Index

Dark Grey

White

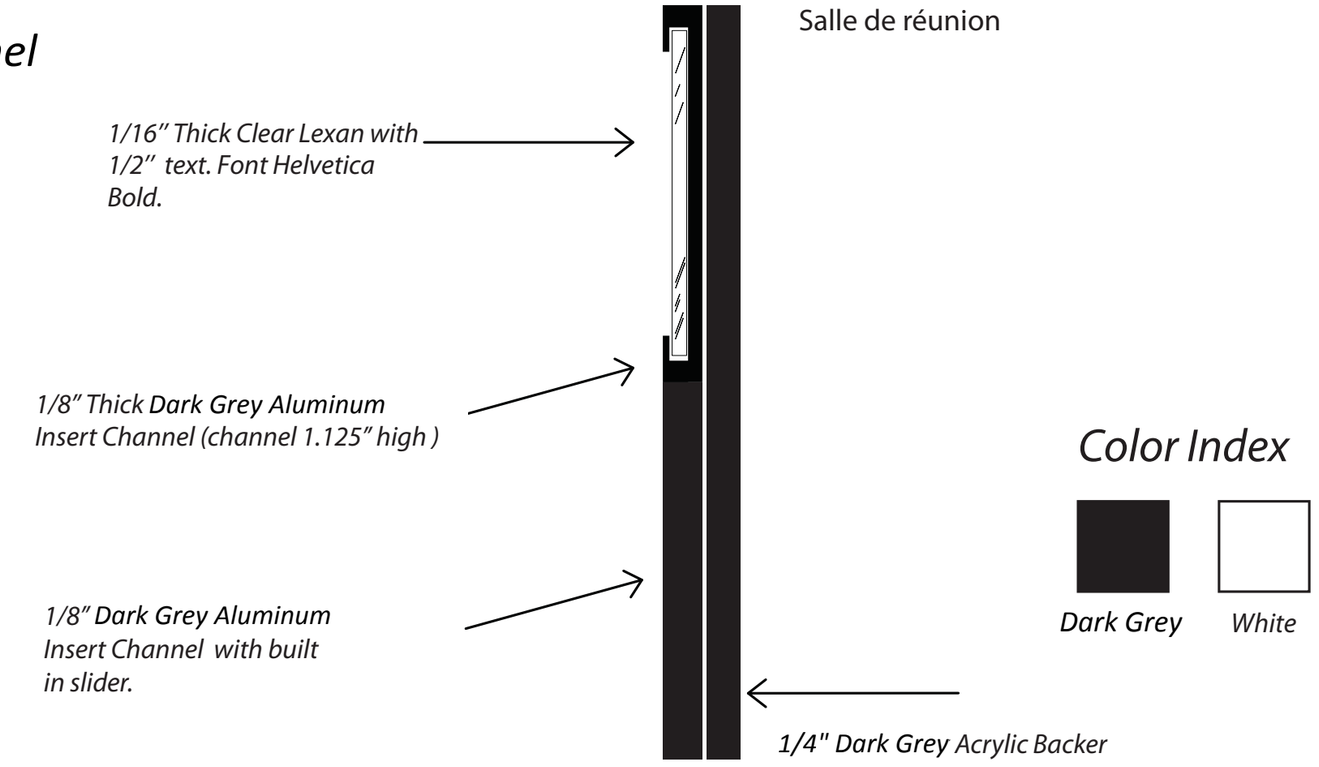
TYPE 2

ASK.1-b



Side View Room ID's

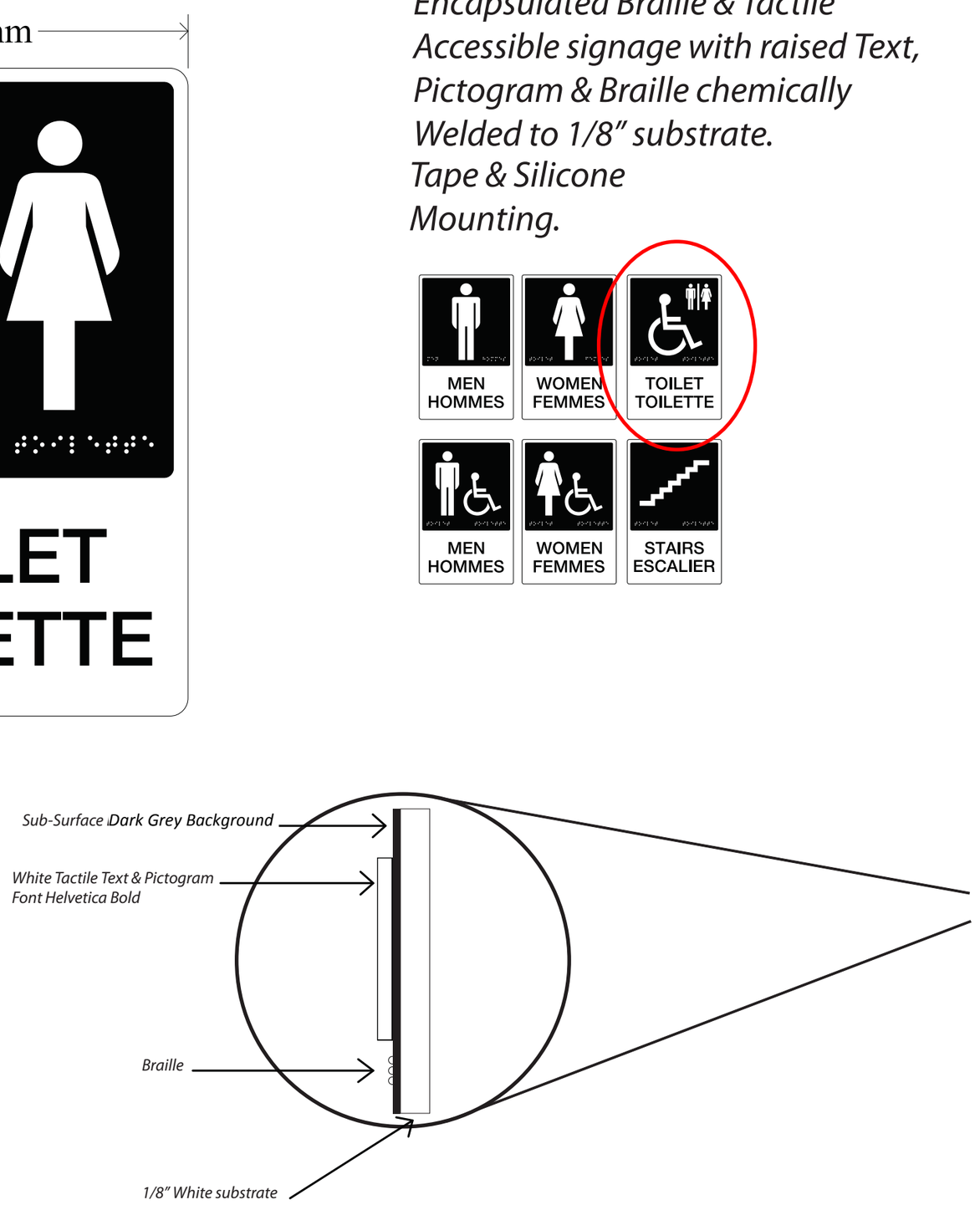
Single sided Room Identification Sign with Slider. ***Dark grey aluminum channel*** *& Removable clear Lexan insert with text.*



TYPE 3

ASK.1-c

Encapsulated Braille & Tactile Accessible signage with raised Text, Pictogram & Braille chemically Welded to 1/8" substrate.
Tape & Silicone Mounting.

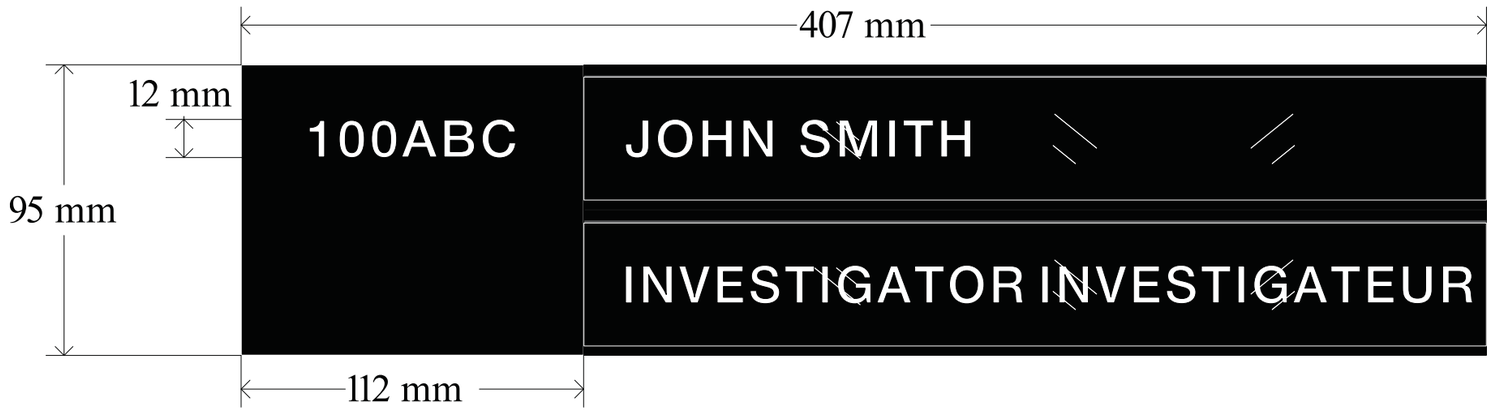


Color Index

Dark Grey *White*

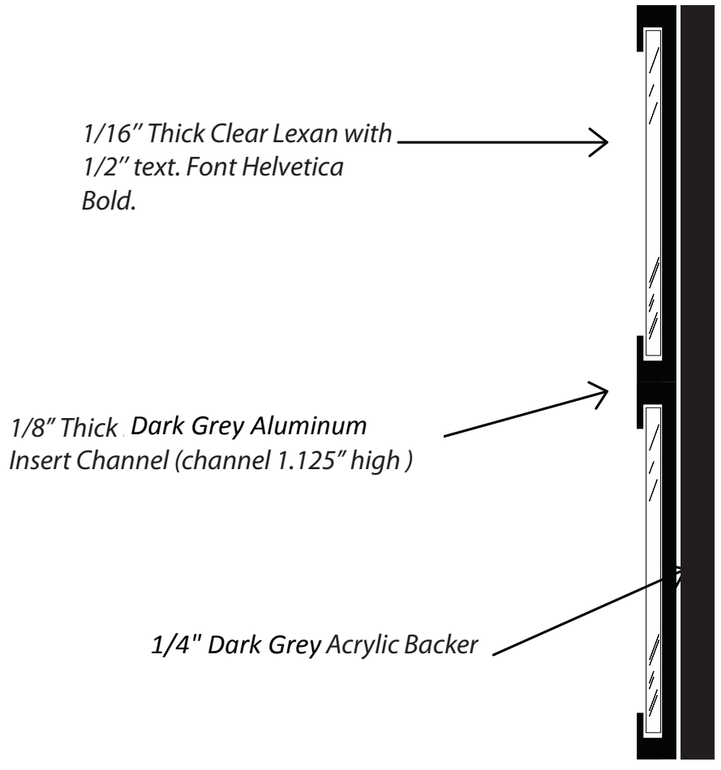
TYPE 4

ASK.1-d



Side View Room ID's

Single sided Room Identification
Sign with ***dark grey aluminum channel***
& Removable clear Lexan insert with text.



Color Index

Dark Grey

White

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 10 28 13 - Toilet Accessories.

1.2 REFERENCES

.1 Canadian Standards Association (CSA).

.1 CSA B651-12, Accessible Design for the Built Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product data:

.1 Compartment literature shall clearly indicate material thickness; type of material and finish, hardware and other relevant information.

.3 Shop drawings:

.1 Indicate room plans, partition locations and dimensions, elevations, and installation details.

.2 Plans shall indicate clear interior dimensions of barrier-free compartments.

.3 Dimensions to be metric or imperial with metric conversions. Imperial only dimensions are not acceptable.

.4 Samples:

.1 Submit duplicate samples of each hardware item, including brackets, fastenings and trim.

.5 Closeout submittals:

.1 Provide maintenance data for incorporation into maintenance manual

1.4 SUSTAINABLE DESIGN SUBMITTALS

.1 Construction waste management plan.

.1 A Construction Waste Management Plan is in place to divert waste material from landfill. Wherever practical, send waste material for reuse or recycling, and generally document this for the contractor's waste management final report.

.2 Recycled Content.

.1 If products within this section are indicated on the "List of Products Requiring Recycled Content", only products with recycled content will be acceptable.

.2 For products not identified on list, source products with highest recycled content available when practical.

.3 Include following information with product data submission.

.1 Percentage of pre-consumer and post-consumer recycled content for each product.

.3 Adhesives and Sealants.

.1 Include following information with Product Data submission for materials specified under this section:

.1 Submit manufacturer's certification indicating VOC limits of Products used onsite and within the building envelope. Product shall comply with California's SCAQMD #1168.

.1 If requesting substitute product, ensure proposed substitution achieves above stated goals.

1.5 MAX. VOC CONTENT FOR SOLVENT CLEANING ACTIVITIES

.1 Following are some of the Maximum allowed VOC Content for following activities, as per SCAQMD Rule 1171-9 (refer to SCAQMD manual for complete list and updates):

.1 Product cleaning during onsite surface preparation for coatings or adhesives application, and repair and maintenance cleaning:

.1 General maximum VOC 25g/L.

.2 Electrical apparatus components and electronic components.

.3 Cleaning of coatings or adhesives application equipment max. VOC 25g/L.

.2 Refer to SCAQMD for additional information and clarification and complete list of applications.

.3 Any discrepancies are to be approved by Departmental Representative. Obtain written approval prior to use on site.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements and manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect compartments from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 COMPARTMENTS

.1 Type: solid phenolic core panel, Class 'A' fire rating; floor supported, overhead braced.

2.2 MATERIALS AND HARDWARE

.1 Solid core laminate for compartments: rigid self-supporting moisture resistant phenolic core, consisting of a multi-layer resin impregnated core built up to required thickness under intense heat and pressure to fuse layers into a solid panel.

.2 Posts: 25 mm x 38mm tubing; 18-8, type-304, 1.6 mm stainless steel with satin-finish.

.3 Post height to extend from floor to underside structure.

.4 Hardware:

.1 General:

.1 Hinges: Heavy duty stainless steel, satin finish; adjustable door-open angle.

.2 Latch, keeper/bumper: stainless steel construction. Allows for emergency access by lifting door.

.3 Coat hook: Heavy Duty Hook with exposed mounting. Minimum projection of hook 85mm.

.4 Material and Finish: Satin Nickle plated finish

.5 Mounting hardware: of type 304 stainless steel, satin finish.

.1 Continuous U-channels for panel-to-pilaster connection.

.2 Continuous angle both sides for panel-to-wall connections.

.6 Partition Door Privacy strips: Filler plates designed to eliminate any gaps between door and pilaster on both hinge and latch side of doors.

.2 Barrier-free hardware:

.1 Door pulls: 19 mm diameter x minimum 150 mm pull centres; satin stainless steel.

.2 Door stop: rubber bumper, tape application, 31.8 mm diameter x 23.8 projection.

.3 Coat hook: single hook, maximum 40 mm projection, flat face, stainless steel.

.4 Headrail: anodized aluminum with satin finish, anti-grip design.

.5 Levelling device: corrosion-resistant, chromate-treated, double zinc-coated steel levelling bar bolted to top of pilaster.

.6 Shoe: minimum 75 mm high polished stainless steel, one-piece construction.

.7 Fasteners: tamper-resistant; hex-pin, Torx-pin or similar as approved by Departmental Representative.

2.3 FABRICATION

.1 Dividing panels: 13 mm thick plastic laminate panels.

.2 Doors and pilasters: 19 mm thick plastic laminate panels.

.3 Factory install threaded steel inserts for installation of hinges and door latch.

.4 Chamfer edges uniformly at approximately 20°.

2.4 FINISH

.1 Laminate to have suede finish.

.2 Colour to be selected later from manufacturer's standard range by Departmental Representative.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for toilet compartment installation in accordance with manufacturer's written instructions.

.1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation only after unacceptable conditions have been remedied.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 INSTALLATION

.1 Do work in accordance with CSA B651 and manufacturer's written instructions.

.2 Install partitions secure, plumb and square.

.3 Anchor mounting brackets to masonry or concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors.

.4 Attach pilasters to overhead support with pilaster supports and level, plumb, and tighten installation with levelling device. Conceal with shoe

.5 Attach panel and pilaster to brackets with through type sleeve bolt and nut.

.6 Secure pilaster shoes in position.

.7 Set tops of doors parallel with overhead brace when doors are in closed position.

.8 Install post at ends of panels that have no pilaster.

.9 Hardware installation.

.1 Equip standard toilet compartments with:

.1 Hinges.

.2 Latch and keeper.

.3 Continuous door stop.

.4 Door bumper/coat hook mounted on door.

.5 Partition Door Privacy strips.

.2 Equip barrier-free toilet compartments with:

.1 Hinges.

.2 Latch and keeper.

.3 Continuous door stop.

.4 Partition Door Privacy strips.

.5 Bumper mounted on wall.

.6 Exterior pull, mounted horizontally; midpoint located 120 mm to 220 mm from latch edge of door and 800 mm to 1000 mm from floor.

.7 Interior pull, mounted horizontally; midpoint located 200 mm to 300 mm from hinge side of door and 800 mm to 1000 mm from floor.

.8 Barrier-free coat hook mounted on side wall; mounting height 1400 mm.

.3 Adjust and align hardware for proper function. Set door open position at 30° to front.

3.4 CLEANING

.1 Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 10 10 - General Requirements.

.1 Clean surfaces after installation using manufacturer's recommended cleaning procedures.

.2 Clean aluminum with damp rag and approved non-abrasive cleaner.

.3 Clean and polish hardware and stainless components.

.2 Clean work area daily

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Commercial grade bathroom accessories.
.2 Custodial accessories.
.3 Framed mirrors of predetermined size.

.2 Related Work:

.1 Section 01 33 00 - Submittal Procedures.
.2 Section 01 61 00 - Common Product Requirements
.3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
.4 Section 06 10 53 - Miscellaneous Rough Carpentry for blocking.
.5 Electrical hook-up for warm-air dryers.

.3 This Section does not include:

.1 Public-use washroom accessories.
.2 Public-use shower room accessories.
.3 Childcare accessories.
.4 Frameless glass mirrors.
.5 Framed glass mirrors of custom size to suit site dimensions.
.6 Safety glass mirrors, framed and frameless.
.7 One-way mirror glass.
.8 Residential washroom accessories.
.9 Hospitality washroom accessories.
.10 Detention washroom accessories.
.11 Healthcare toilet accessories.

1.2 REFERENCES

.1 ASTM International

.1 ASTM A 153/A 153M-09, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
.2 ASTM A167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
.3 ASTM A 666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
.4 ASTM A 1008/A 1008M-15, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
.5 ASTM A653/A653M-09, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.6 ASTM A924/A924M-09, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.7 ASTM B456-03, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

.8 ASTM C1503-08, Standard Specification for Silvered Flat Glass Mirror

.9 ASTM F 446-90, Standard Consumer Safety Specification for Grab Bars and Accessories Installed in the Bathing Area

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.

.2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.

.3 CGSB 31-GP-107MA-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.

.3 CSA International

.1 CAN/CSA-B651-04, Accessible Design for the Built Environment.

.2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SUBMITTALS

.1 Product Data: For each type of product indicated. Include the following:

.1 Construction details and dimensions.

.2 Anchoring and mounting requirements, including requirements for cut-outs in other work and substrate preparation.

.3 Material and finish descriptions.

.4 Features that will be included for Project.

.5 Manufacturer's warranty.

.2 Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

.1 Identify locations using room designations indicated.

.2 Identify products using designations indicated.

.3 Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

.1 Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

.2 Electrical Components, Devices, and Accessories: CSA or ULc listed and labelled for intended location and application.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect toilet and bathroom accessories from nicks, scratches, and blemishes .

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse by manufacturer of padding, in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 COORDINATION

.1 Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

.2 Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Stainless Steel: ASTM A 666, Type 304, 0.8 mm minimum nominal thickness unless otherwise indicated.

.2 Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.9 mm minimum nominal thickness.

.3 Galvanized-Steel Sheet: ASTM A 653/A 653M, with Z180 hot-dip zinc coating.

.4 Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

.5 Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

.6 Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

.7 ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 COMMERCIAL WASHROOM ACCESSORIES

.1 Toilet Tissue (Double-Roll) Dispenser:

.1 Coordinate with Departmental Representative for type, model and location.

.2 Towel (Roll) Dispenser:

.1 Coordinate with Departmental Representative for type, model and location.

.3 Liquid-Soap Dispenser:

.1 Coordinate with Departmental Representative for type, model and location.

.4 Grab Bar:

.1 Mounting: Flanges with concealed fasteners.

.2 Material: Stainless steel, 1.2 mm thick.

.1 Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.

.3 Outside Diameter: 32 mm.

.4 Configuration and Length: As indicated on Drawings.

.5 Back Supports at Accessible Designated Toilets

.1 Mounting: 32 mm diameter steel bar with flanges with concealed fasteners.

.2 Projection: To suit toilet dimension.

.3 Back Support: 12 mm solid phenolic with melamine finish, 100 high x 250 mm wide.

.4 Location: Mount on wall behind accessible designated toilets that have no water tank or are not equipped with seat lids. Coordinate installation to avoid interference with plumbing pipes, valves, and controls.

.6 Sanitary-Napkin Disposal Unit:

.1 Mounting: Surface mounted.

.2 Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.

.3 Receptacle: Removable.

.4 Material and Finish: Stainless steel, No. 4 finish (satin).

.7 Mirror Unit:

.1 Frame: Stainless-steel angle, 1.2 mm thick; or stainless-steel channel.

.1 Corners: Manufacturer's standard.

.2 Hangers: Produce rigid, tamper and theft-resistant installation, using method indicated below.

.1 One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

.2 Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

.3 Size: As indicated on Drawings.

.8 Fold-Down Purse Shelf

.1 Description: Hinged unit with spring-loaded shelf that automatically returns to vertical position.

.2 Nominal Size: 381 mm long by 140 mm wide.

.3 Material and Finish: Stainless steel, No. 4 satin finish.

.9 Sharps Disposal Unit

.1 Description: Puncture resistant, leakproof container with one handed disposal. Counterbalanced door that inhibits tampering or removal of contents. Clearly marked as "Hazardous Material". Surface mounted.

.10 Robe Hook:

.1 Description: Heavy Duty Hook with exposed mounting. Minimum projection of hook 85mm.

.2 Material and Finish: Satin Nickle plated finish

.11 Bench:

.1 Bench w/ Hardwood Laminate Seat & Clear Lacquer Finish

.2 1830mm long x 240mm wide.

.3 Powder Coated Aluminum Legs Secured To Floor.

2.3 CUSTODIAL ACCESSORIES

.1 Mop and Broom Holder:

.1 Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.

.2 Length: 864 mm.

.3 Hooks: Four.

.4 Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.

.5 Material and Finish: Stainless steel, No. 4 finish (satin).

.1 Shelf: Not less than nominal 1.2 mm thick stainless steel.

.2 Rod: Approximately 6 mm diameter stainless steel.

2.4 FABRICATION

.1 General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

.2 Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Departmental Representative.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

.2 Grab Bars: Install to withstand a downward load of at least 1112 N, when tested according to ASTM F 446.

.3 Install private-use washroom accessories in private bathrooms located adjacent to meeting rooms, private offices, and in other locations designated.

3.2 ADJUSTING AND CLEANING

.1 Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

.2 Remove temporary labels and protective coatings.

.3 Clean and polish exposed surfaces according to manufacturer's written recommendations.

.4 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes fire protection cabinets for portable fire extinguishers.

.1 Rated and non-rated type for recessed and semi-recessed applications.

.1 Complete with stainless steel exterior.

1.2 ACTION SUBMITTALS

.1 Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

.1 Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

.2 Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function.

1.3 CLOSEOUT SUBMITTALS

.1 Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.4 COORDINATION

.1 Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

.2 Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

.2 Stainless-Steel Sheet: ASTM A 666, Type 304.

.3 Acrylic Bubble: One piece.

2.2 FIRE PROTECTION CABINET

.1 Cabinet Type: Suitable for fire extinguisher.

.2 Cabinet to maintain fire resistive rating of construction in which they occur.

.3 Cabinet Material: Steel sheet.

.1 Shelf: Same metal and finish as cabinet.

.4 Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.

.1 Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

.5 Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi -recessed cabinet installation.

.1 Square-Edge Trim: 32- to 38 mm backbend depth.

.6 Fire resistant: Where required provide cabinets with double-wall construction, lined with fire resistant material.

.7 Cabinet Trim Material: Stainless steel sheet.

.8 Door Material: Stainless steel sheet.

.9 Door Style: Full bubble with frame.

.10 Door Glazing: Moulded acrylic bubble.

.1 Acrylic Bubble Colour: Clear, transparent.

.11 Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

.1 Provide manufacturer's standard.

.2 Provide manufacturer's standard hinge permitting door to open 180 degrees.

.12 Accessories:

.1 Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

.13 Finishes:

.1 Manufacturer's standard baked-enamel paint for the following:

.1 Interior of cabinet and door.

.2 Stainless Steel: No. 4.

2.3 FABRICATION

.1 Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

.1 Weld joints and grind smooth.

.2 Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

.1 Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 13 mm thick.

.2 Mitre and weld perimeter door frames.

.3 Cabinet Trim: Fabricate cabinet trim in one piece with corners mitred, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

.1 Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

.2 Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

.3 Finish fire protection cabinets after assembly.

.4 Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STEEL FINISHES

.1 Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 8, *Pickling*. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

.2 Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 0.05 mm.

.1 Colour and Gloss: As selected by Departmental Representative from manufacturer's full range.

2.6 STAINLESS-STEEL FINISHES

.1 Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

.2 Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

.1 Directional Satin Finish: No. 4.

.2 Run grain of directional finishes with long dimension of each piece.

.3 When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Prepare recesses for recessed and semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

.1 General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

.2 Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

.1 Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semi-recessed fire protection cabinets.

.2 Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

3.4 ADJUSTING AND CLEANING

.1 Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

.2 Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

.3 On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

.4 Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

.5 Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

.6 Clean worksite daily.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI/NFPA 10, Portable Fire Extinguishers.

.2 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S508, Rating and Fire Testing of Fire Extinguishers and Class "D" Extinguishing Media.

1.2 SUBMITALS

.1 Submit manufacturer's technical data for each type of fire extinguisher and safety blanket.

1.3 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into manual.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with municipal regulations.

PART 2 PRODUCTS

2.1 MULTI-PURPOSE DRY CHEMICAL EXTINGUISHERS

.1 Stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Size 4.5 kg or as indicated on drawings.

2.2 CARBON DIOXIDE

.1 Extinguishers insulated handle, hose and horn discharge assembly, self-closing lever or squeeze-grip operation, fully charged, ULC labelled for B and C class protection. Size 4.5 kg or as indicated on drawings.

2.3 EXTINGUISHER BRACKETS

.1 Type recommended by extinguisher manufacturer.

2.4 CABINETS

.1 Surface or semi-recessed type as indicated, constructed of 1.6 mm thick steel, 180^{o} opening door of 2.5 mm thick steel with latching device.

.2 Cabinet to maintain fire resistive rating of construction in which they occur.

.3 Cabinet door: with 5.0 mm thick full clear safety glass panel.

.4 Finish:

.1 Tub: prime coated with finish painted with a hand-baked matte black enamel.

.2 Door and frame: No.4 satin finish 304 stainless steel.

2.5 IDENTIFICATION

.1 Identify extinguishers in accordance with recommendations of ANSI/NFPA 10 and CAN/ULC-S508.

.2 Attach bilingual tag or label to extinguishers, indicating month and year of installation. Provide space for service dates.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install or mount extinguishers in cabinets or on brackets as indicated on drawings.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 06 10 53 - Miscellaneous Rough Carpentry.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-44.40, Steel Clothing Locker.

1.3 SUBMITTALS

.1 Indicate type and class of locker, thicknesses of metal, fabricating and assembly methods, tops, rods, hooks, shelves, bases, trim, numbering, filler panels, end/back panels, doors, handles, ventilation method, finishes.

.2 Submit duplicate 50 x 50 mm samples of colour and finish on actual base metal.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

.1 Lockers: to CAN/CGSB-44.40.

.1 E001: Double tier locker, 457mm W x 610mm D x 2134mm H.

.2 E002: Three tier locker, 380mm W x 535mm D x 1828mm H.

.3 Material Sizes: hinges 2.0 mm, frame 1.6 mm, door 1.0 mm, top 0.85 mm, top and sides 0.70 mm.

.4 Assembly types: knock down construction for onsite assembly using pop rivet fastening.

.5 Top: flat where bulkheads or ventilation chase spaces are installed, sloped elsewhere. Provide perforated tops for ventilation into bulkhead where required.

.6 Door Construction:

.1 Double pan construction (0.91 mm x 0.61 mm) outer panel x inner panel, door swing out, perforated vents.

.2 Door handle: recessed handle steel with bright chromium finish.

.3 Locking system: padlocks supplied by others.

.7 Finish ends where lockers are exposed to match fronts.

.8 Base: steel.

.2 Accessories

.1 Locking system: Single point by means of hasp and padlock. Locks supplied by Departmental Representative.

.2 Unobstructed ventilation through two sets of louvers.

.3 Options: To CAN/CGSB-44.40, steel end panels, (where locker ends are exposed) number pates, manufacturer's standards, coat hooks-metal chromium finish, one shelf per locker, width equal to locker width, depth to be 16 mm short of locker depth, two (2) per double locker, one (1) per single wide locker, single and double lockers as per drawings.

.3 Finish:

.1 Electrostatically spray parts with one coat high-grade alkyd baking enamel, and bake using proper temperature time relationship to ensure thorough drying and tough durable finish.

.2 Colours: As selected by Departmental Representative from manufacturer's standard range. Only one colour will be used. Frame and doors shall be same colour.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Assemble and install lockers in accordance with manufacturer's written instructions.

.2 Securely fasten lockers to grounds and nailing strips.

.3 Install finished end panels to exposed ends of locker banks.

.4 Install locker numbers

.5 Install coat hooks at height of 1395 mm.

3.2 LOCATION

.1 Location and layout as per plans.

END OF SECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:

.1 Post-and-beam metal storage shelving.

1.3 PERFORMANCE REQUIREMENTS

.1 Delegated Design: Design metal storage shelving, including comprehensive engineering analysis by a professional engineer, using performance requirements and design criteria indicated.

.2 Structural Performance for Four-Post Metal Storage Shelving: Capable of withstanding the loads indicated according to ANSI MH 28.1.

1.4 SUBMITTALS

.1 Product Data: For each type of product indicated. Include rated capacities, construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal storage shelving.

.2 Sustainability Submittal:

.1 Product Data: For particleboard, documentation indicating that product contains no urea formaldehyde.

.3 Shop Drawings: For customized metal storage shelving. Include plans, elevations, sections, details, and attachments to other work. Include installation details of connectors, lateral bracing, and special bracing.

.4 Samples for Initial Selection: For units with factory-applied colour finishes. Include similar Samples of accessories involving colour selection.

.5 Product Schedule: For metal storage shelving.

.6 Maintenance Data: For metal storage shelving to include in maintenance manuals.

1.5 QUALITY ASSURANCE

.1 Source Limitations: Obtain metal storage shelving from single source from single manufacturer.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations: Do not deliver or install metal storage shelving until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

.1 Coordinate sizes and locations of blocking and backing required for installation of metal storage shelving attached to wall and ceiling assemblies.

.2 Coordinate locations and installation of metal storage shelving that may interfere with ceiling systems including lighting, HVAC, speakers, sprinklers, access panels, electrical switches or outlets, and floor drains.

1.8 EXTRA MATERIALS

.1 Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Shelves: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than five shelves.

.2 Shelf-to-Post Connectors: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 connectors.

.3 Shelf-Label Holders: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 holders.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

.2 Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

.3 Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with Z180 zinc (galvanized) or ZF180 zinc-iron-alloy (galvannealed) coating.

.4 Steel Tubing: ASTM A 513, Type 2.

.5 Particleboard: ANSI A208.1, made with binder containing no urea formaldehyde.

.6 Hardboard: ANSI A135.4.

.7 Floor Anchors: Galvanized-steel, post-installed expansion anchors, power-actuated fasteners, or threaded concrete screws. Provide number per unit recommended by manufacturer unless additional anchors are indicated in calculations.

.8 Wall Anchors: Manufacturer's standard, galvanized-steel anchors designed to secure metal storage shelving to adjacent wall. Provide one per shelving unit for each shelving unit adjacent to a wall unless additional anchors are indicated in calculations.

2.2 POST-AND-BEAM METAL STORAGE SHELVING

.1 General: Factory-formed, field-assembled, freestanding, post-and-beam metal storage shelving system, designed for shelves to be supported by beams that span between and are supported by corner posts, with beams adjustable over the entire height of shelving unit. Fabricate initial shelving unit with a post at each corner. Fabricate additional shelving units as add-on units, designed to share two corner posts with initial shelving unit. Provide fixed top and bottom beams, adjustable intermediate beams, and accessories indicated.

.2 Load-Carrying Capacity per Shelf: not less than 907 kg, unless otherwise indicated.

.3 Posts: Fabricated from cold-rolled steel; in manufacturer's standard shape; with perforations at 38 mm o.c. to receive beam-to-post connectors.

.1 Steel Thickness, Nominal: As required for load-carrying capacity per shelf and number of shelves.

.2 Add-On Shelf Posts: Fabricated from hot-rolled steel, T-shape; perforated to match main posts and of same thickness.

.3 Post Base: Cold-rolled steel floor plate, drilled for floor anchors.

.4 Beams: Fabricated from cold-rolled steel; in manufacturer's standard shape; with projecting manufacturer's standard beam-to-post connectors at each end designed to engage posts. Provide beam at each side of each shelf, with center supports as required for load-carrying capacity of shelf.

.1 Steel Thickness, Nominal: As required for load-carrying capacity per shelf.

.2 Provide top and bottom shelf beams with double beam-to-post connectors and intermediate shelf beams with single beam-to-post connectors.

.3 Provide beams for five shelves per shelving unit in addition to top and bottom shelf beams, unless otherwise noted.

.5 Shelves: Contractor's choice of the following, unless otherwise noted.

.1 Flat Metal Shelves: Fabricated from steel sheet as follows:

.1 Steel-Sheet Thickness, Nominal: As required for load-carrying capacity per shelf.

.2 Fabricate fronts and backs of shelves with box-formed edges, with corners lapped and welded.

.6 Shelf Quantity: Five shelves per shelving unit in addition to top and bottom shelf, unless otherwise indicated.

.7 Size: Refer to drawings for sizes and locations.

.8 Accessories:

.1 Tie Plates: Cold-rolled steel, finished to match posts; designed for joining posts of adjacent shelving units.

.2 Supports: Back-to-wall and back-to-back type that bolt to posts; as required for shelving unit stability.

.9 Finish: Baked enamel or powder coat.

.1 Colour and Gloss: As selected by Departmental Representative from manufacturer's full range.

2.3 FABRICATION

.1 Shop Fabrication: Prefabricate shelving components in shop to greatest extent possible to minimize field fabrication; temporarily preassemble shelving components where necessary to ensure that field-assembled components fit together properly. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

.2 Fabricate metal storage shelving square and rigid, with posts plumb and true and shelves flat and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.

.1 Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

.2 Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.

.3 Build in straps, plates, brackets, and other reinforcements as needed to support shelf loading.

.4 Cut, reinforce, drill, and tap metal fabrications to receive hardware, fasteners, and similar items.

.3 Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

.4 Form edges and corners free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a 13 mm wide hem on the concealed side; ease edges of metal plate to radius of approximately 0.8 mm. Shear and punch metals cleanly and accurately. Remove burrs.

.5 Weld corners and seams continuously to develop strength, minimize distortion, and maintain the corrosion resistance of base metals. At exposed locations, finish welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces before finishing.

2.4 GENERAL FINISH REQUIREMENTS

.1 Comply with NAAMM's *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.

.2 Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 METALLIC-COATED STEEL-SHEET FINISHES

.1 Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint, complying with SSPC-Paint 20, to comply with ASTM A 780.

.2 Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry thickness.

2.6 STEEL FINISHES

.1 Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, *White Metal Blast Cleaning* or SSPC-SP 8, *Pickling*.

.2 Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry thickness.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

.2 Examine floors for suitable conditions where metal storage shelving will be installed.

.3 Examine walls and ceilings to which metal storage shelving will be attached for properly located blocking, grounds, or other solid backing for attachment of support fasteners.

.4 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

.1 Vacuum finished floor and wet mop resilient flooring over which metal storage shelving is to be installed.

3.3 INSTALLATION

.1 Install metal storage shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.

.1 Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.

.2 Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.

.3 Adjust post-base bolt leveller to achieve level and plumb installation.

.4 Anchor shelving units to floor with floor anchors through floor plate if required for stability or indicated. Shim floor plate to achieve level and plumb installation.

.5 Connect side-to-side and back-to-back shelving units together.

.6 Install solid shelving unless otherwise indicated.

.7 Install shelves in each shelving unit at spacing indicated on Drawings or, if not indicated, at equal spacing.

.1 Post-and-Beam Metal Storage Shelving: Install beams with beam-to-post connectors fully engaged in post perforations.

3.4 ERECTION TOLERANCES

.1 Erect four-post metal storage shelving to a maximum tolerance from vertical of 13 mm in up to 3 m of height, not exceeding 25 mm for heights taller than 3 m.

.2 Erect post-and-beam metal storage shelving to a maximum tolerance from vertical of 6 mm in 2134 mm of height.

3.5 ADJUSTING

.1 Adjust metal storage shelving so that connectors and other components engage accurately and securely.

.2 Adjust and lubricate operable components to operate smoothly and easily, without binding or warping. Check and readjust operating hardware.

.3 Touch up marred finishes or replace metal storage shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal storage shelving manufacturer.

.4 Replace metal storage shelving that has been damaged or has deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.

END OF SECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

.1 Types of items described in this Section:

.1 Gun lockers.
.2 Unloading Stations.

.2 Types of items you will not find described in this Section:

.1 Acoustical panels located inside the cell block.
.2 Prisoner effects lockers.
.3 Security key cabinets.
.4 Detention bunks.
.5 Detention mattresses.
.6 Detention desks.
.7 Detention tables.
.8 Detention seating.
.9 Building anchors into concrete construction.
.10 Building anchors into and grouting detention furniture installed in masonry construction.
.11 Detention toilet and bath accessories.

1.3 SUBMITTALS

.1 Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of detention furnishing indicated.

.2 Shop Drawings: For each type of detention furnishing. Include plans, elevations, sections, details, and attachments to other Work.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver keys of pistol lockers to Owner by registered mail or overnight package service.

PART 2 PRODUCTS

2.1 GUN LOCKERS

.1 Four-Compartment Pistol Locker: Products: Subject to compliance with requirements, provide the following:

.1 Hand Gun Locker Model #EDHGS04V as marketed by Spacesaver Corp, http://www.spacesaver.com or approved alternate; as follows:

.1 Cabinet: Minimum 330 mm wide by 663 mm high by 165 mm deep; formed from minimum 16 gauge thick steel sheet. Line each compartment with moth-proofed felt or nonabsorbing, closed-cell padding.

.2 Doors: Formed from minimum 18 gauge thick steel sheet material, supported by continuous bottom hinge.

.3 Locks: Lock, keyed differently; provide one lock for each compartment.

.4 Mounting: flush as indicated on drawings.

.5 Surface.

.1 Wall mounted.

.2 Finish: Factory powder coated.

.2 Alternative Products: Approved by addendum in accordance with the General Instructions to Bidders.

.2 Rifle Locker: 800 mm wide x 1828 mm high x 400 mm deep. Lockable.

.1 Rifle locker model to be Spacesave UWR-16 or equivalent from DASCO.

2.2 UNLOADING STATIONS

.1 Armour containment clearing station capable of containing ammunition discharged from handguns and rifles; complete with muzzle guide designed to not scratching barrels:

.1 Approved Floor Mounted models include the following:

.1 The Slugmaster as marketed by Slugmaster

.2 PSP Unloading Station as marketed by Pacific Safety Products Inc.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of detention furniture.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing detention furniture to in-place construction. Include threaded fasteners for concrete and masonry inserts, security fasteners, and other connectors.

.2 Cutting, Fitting, and Placement: Obtain manufacturer's written approval for cutting, drilling, and fitting required for installing detention furniture. Set detention furniture accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

.3 Adjust doors and latches of detention gun lockers and key cabinets to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Types of items described in this Section:

.1 Roller shades for windows, manually operated chain clutch.

.2 Types of items you will not find described in this Section:

.1 Other types of roller window shades:

.1 Motorized shades.

.2 Audiovisual grade light blocking shades.

.3 Skylight shades.

.2 Custom metal pockets for window treatments fabricated from metal extrusions.

.3 Custom sheet metal pockets for window treatments.

.4 Wood blocking and grounds for mounting roller shades and accessories.

.5 Electrical service and connections for motor operators, controls, limit switches, and other powered devices and for system disconnect switches for motorized shade operation.

1.2 SUBMITTALS

.1 Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.

.2 Samples for Verification:

.1 Complete, full-size operating unit not less than 400 mm wide for each type of roller shade indicated.

.2 For the following products:

.1 Shade Material: Not less than 76 mm square, with specified treatments applied. Mark face of material.

.3 Window Treatment Schedule.

.4 Maintenance Data: For roller shades to include in maintenance manuals. Include the following:

.1 Methods for maintaining roller shades and finishes.

.2 Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.

.3 Operating hardware.

1.3 QUALITY ASSURANCE

.1 Source Limitations: Obtain roller shades through one source from a single manufacturer.

.2 Mock-ups: Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

.1 Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 Deliver shades in factory packages, marked with manufacturer and product name, lead-free designation, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.5 PROJECT CONDITIONS

.1 Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

.2 Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Departmental Representative of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 EXTRA MATERIALS

.1 Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

.1 Rollers Shades: Before installation begins, for each size, colour, texture, and pattern indicated, full-size units equal to 5 percent of amount installed.

PART 2 PRODUCTS

2.1 ROLLER SHADES

.1 Shade Band Material: PVC-coated fibreglass and polyester blends, unless otherwise indicated.

.1 Types: Double shades; one (1) blackout including side tracks, One (1) approximately 5% openness factor.

.1 Sidelights in offices to receive just blackout blind

.2 Colour: manufacturer's standard slate grey, unless otherwise indicated.

.3 Bottom Hem: Straight.

.2 Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminium tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be

easily removable from support brackets; with manufacturer's standard method for attaching shade material. Provide capacity for one roller shade band(s) per roller, unless otherwise indicated.

.3 Direction of Roll: Regular, from back of roller.

.4 Mounting Brackets: Galvanized or zinc-plated steel.

.5 Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.

.6 Mounting: Face of frame mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.

.7 Shade Operation: Manual; with continuous-loop bead-chain, clutch, and cord tensioner and bracket lift operator.

.1 Position of Clutch Operator: Right side of roller, as determined by hand of user facing shade from inside, unless otherwise indicated in a window treatment schedule.

.2 Clutch: Capacity to lift size and weight of shade; sized to fit roller or provide adaptor.

.3 Loop Length: Length required to make operation convenient from floor level. Assume all windows may have furniture placed in front and allow for loops that are long enough to be accessed easily.

.4 Bead Chain: Stainless steel.

.5 Operating Function: Stop and hold shade at any position in ascending or descending travel.

.6 Provide limit stops at top to keep black out shades from leaving side tracks.

2.2 ROLLER SHADE FABRICATION

.1 Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.

.2 Concealed Components: Non-corrodible or corrosion-resistant-coated materials.

.1 Lifting Mechanism: With permanently lubricated moving parts.

.3 Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 23 deg C:

.1 Shade Units Installed between (Inside) Jambs: Edge of shade not more than 6 mm from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.

.2 Shade Units Installed Outside Jambs: Terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

.4 Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting roller, and operating hardware and for hardware position and shade mounting method indicated.

.5 Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.

.1 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

.1 Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 50 mm to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

.1 Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

.1 Clean roller shade surfaces after installation, according to manufacturer's written instructions.

.2 Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

.3 Replace damaged roller shades that cannot be repaired, in a manner approved by Departmental Representative, before time of Substantial Completion.

.4 Clean worksite daily.

3.5 SCHEDULE

.1 Install roller shades over those windows indicated on drawings.

.2 Install one shade for each column of vertically aligned windows, unless otherwise noted.

.3 Seek direction from Departmental Representative on type of shade installation prior to fabrication, unless otherwise indicated:

.1 Shade units installed between (inside) jambs.

.2 Shade units installed outside jambs.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Solid-surface-material countertops and back and endsplashes.

.2 Types of items not included in this Section

.1 Other items fabricated from solid-surfacing materials.

1.2 ACTION SUBMITTALS

.1 Product Data: For countertop materials and sinks.

.2 Shop Drawings: For countertops. Show materials, finishes, edge and back and end splash profiles, methods of joining, and cutouts for plumbing fixtures.

.3 Samples for Verification: For the following products:

.1 Countertop material, 150 mm square.

1.3 PROJECT CONDITIONS

.1 Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.4 COORDINATION

.1 Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

.1 Type: Provide Standard Type unless Special Purpose Type is indicated.

.2 Colours and Patterns: When not otherwise indicated, then selected by Departmental Representative from manufacturer's full range.

2.2 MATERIALS

.1 Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

.1 Type: Provide Standard Type unless Special Purpose Type is indicated.

.2 Superficial damage to a depth of 0.25 mm shall be repairable by sanding and/or polishing.

.3 Thickness: 12.5 mm.

.4 Mounting: Seamed under mount.

.2 Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

.1 SS1: Dark grey and stone-like with reflective pigments. Final colour to be chosen by Departmental Representative from manufacturer's mid-range.

.2 SS2: White with light grey reflective pieces and speckles. Final colour to be chosen by Departmental Representative from manufacturer's mid-range.

2.3 ACCESSORIES

.1 Joint adhesive:

.1 Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.

.2 Sealant:

.1 Manufacturer's standard mildew-resistant silicone sealant in colours matching components.

.3 Sink/lavatory mounting hardware:

.1 Manufacturer's standard bowl clips, panel inserts and fasteners for attachment of under mount sinks/lavatories.

2.4 FABRICATION

.1 Shop Fabrication:

.1 Fabricate from 12.5 mm thick material.

.2 Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.

.3 Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.

.1 Reinforce with strip of solid polymer material, 50 mm wide.

.4 Provide factory cut-outs for plumbing fittings and bath accessories as indicated on the drawings.

.5 Rout and finish component edges with clean, sharp returns.

.1 Rout cut-outs, radii and contours to template.

.2 Smooth edges.

.3 Repair or reject defective and inaccurate work.

.2 Exposed Edge: slightly eased at top, unless noted otherwise.

.3 Back and End Splashes:

.1 Fabricate from same material as countertop, 12.5 mm thickness.

.2 Fabricate countertops with the following front and backsplash style:

.1 Backsplash: Straight, slightly eased at corner, unless noted otherwise.

.2 Endsplash: Matching backsplash.

2.5 FINISH

.1 Colours and Patterns: When not otherwise indicated, then selected by Departmental Representative from manufacturer's standard range.

.2 Finish:

.1 Provide surfaces with a uniform finish.

.2 Matte; gloss range of 5–20; unless noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.

.2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

.1 A. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

.1 Provide product in the largest pieces available.

.2 Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work.

.3 Exposed joints/seams shall not be allowed.

.4 Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.

.5 Cut and finish component edges with clean, sharp returns.

.6 Route radii and contours to template.

.7 Anchor securely to base cabinets or other supports.

.8 Align adjacent countertops and form seams to comply with manufacturer's written recommendations using adhesive in colour to match countertop.

.9 Carefully dress joints smooth, remove surface scratches and clean entire surface.

.10 Install countertops with no more than 3 mm sag, bow or other variation from a straight line.

.2 Applied back and endsplashes:

.1 Adhere to countertops using manufacturer's standard colour-matched silicone sealant.

3.3 REPAIR

.1 Repair or replace damaged work which cannot be repaired to architect's satisfaction.

3.4 CLEANING AND PROTECTION

.1 Keep components clean during installation.

.2 Remove adhesives, sealants and other stains.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 01 78 00 - Closeout Submittals.

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM

.1 ASTM B221, alloy 6105-T5, 6105-T6 for extrusions Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

.2 ASTM D-2047-11, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine

.3 ASTM E648-15, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

.2 National Building Code of Canada 2015

.3 CSA International

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings in sufficient detail showing recessed entrance mat dimensions and locations and layout of grid and frame specified including details indicating construction relative to materials, direction of traffic, spline locations, profiles, anchors and accessories.

.3 Submit product data for each type of floor grid and frame, and walk-off mat specified, including manufacturer's specifications and installation instructions.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit one representative assembled section of floor grid and frame members with selected tread insert showing each type of colour for exposed floor grid, frame and accessories required.

.3 Submit samples of Walk-off mat.

.4 Submit duplicate samples of manufacturer's standard colours for selection by Departmental Representative.

.5 Submit Warranty.

1.5 QUALITY ASSURANCE

.1 Flammability in accordance with ASTM E648, Class 1, Critical Radiant Flux, Minimum0.45 watts/m².

.2 Slip resistance in accordance with ASTM D-2047-96, Coefficient of Friction, minimum0.60 for accessible routes.

.3 Standard rolling load performance is 500 lb/wheel for Recessed Entrance Mat.

1.6 PROJECT CONDITIONS

.1 Field measurements: Check actual opening for grids by accurate field measurements before fabrication. Record actual measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.

.2 Coordinate frame installation with concrete construction to ensure recess and frame anchorage are accurate and that the base is level and flat. Defer frame installation until building enclosure is complete and related interior finish work is in progress.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Remove and dispose from site all packaging materials at appropriate recycling facilities.

PART 2 PRODUCTS

2.1 MATERIALS AND FABRICATION

.1 Aluminum: ASTM B 221, alloy 6105-T5 for rail extrusions and 6061-T6 for key lock bars.

.2 Flexible and prime EPDM extrusions.

.3 All products to meet the most stringent of accessibility requirements under either the National Building Code (2015), or referenced CSA standards.

2.2 **MATERIALS**

.1 Floor Grids - General

.1 Type 304 stainless steel in 15.97mm depth. Wires to be 2.28mm x. 3.81mm electronically welded and spaced 3.68mm apart. Unit must withstand 500 lb./ wheel loads

.2 Grid Frames

.1 Stainless Steel Angle Frame with drain pan shall be Type 304 stainless steel with 3.2mm exposed surface. Drain pan to be 1.3mm Aluminum.

.3 Lock Down Mechanism

.1 Hidden Lock Down shall be a hidden device to secure the floor grid to the concrete surface. Made from Type 304 stainless steel.

.4 Wires and Support bars: Type 304 stainless steel for surface wires and support bars.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Install the work of this section in strict accordance with the manufacturer's recommendations.

.2 Set grid at height recommended by manufacturer for most effective cleaning action.

.3 Use latex screed to ensure level base under recessed entrance mat.

.4 Coordinate top of grid surfaces with bottom of doors that swing across to provide ample clearance between door and grid.

3.2 PROTECTION

.1 After completing frame installation, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION