

**TRANSPORTS CANADA
PROGRAM GROUP
QUEBEC REGION**

**PUBLIC SERVICES AND
PROCUREMENT CANADA
CSU-DFO/TC**

SEPT-ÎLES AIRPORT

**Safety-Related Interventions for Asset Maintenance
1000 E, boulevard Laure, Sept-Îles (Québec)**


Project no PWGSC: R.075196.001

Architecture
BGLA | Architecture + Design Urbain

Engineering
SNC-Lavalin inc.

For Tender

November 12, 2018

	
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Part 1 General

1.1 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.2 WORK SEQUENCE

- .1 Construct Work in stages to accommodate the Departmental Representative's use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with the Departmental Representative Occupancy during construction.
- .3 Required stages:
 - .1 Contractor shall submit work execution and phasing schedule to Owner.
- .4 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .5 Maintain fire access/control. Also provide means of firefighting.

1.3 CONTRACTOR USE OF PREMISES

- .1 Restricted use of site until Substantial Completion, as directed by Departmental Representative
- .2 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 The Departmental Representative occupancy.
 - .2 Maintaining operations by users.
 - .3 Public usage.
- .3 Co-ordinate use of premises under direction of Departmental Representative.
- .4 Storage areas needed for operations under this Contract shall be made available to Contractor as indicated in plans.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work that have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.4 OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE

- .1 The Departmental Representative will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with the Departmental Representative in scheduling operations to minimize conflict and to facilitate the Departmental Representative usage.

1.5 PARTIAL OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE

- .1 Execute Certificate of Substantial Completion for each designated portion of Work prior to the occupancy by the Departmental Representative. Contractor shall allow:
 - .1 Access for the Departmental Representative personnel.
 - .2 Use of parking facilities and traffic lanes.
 - .3 Operation of HVAC and electrical systems.

1.6 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- .2 For the transport of workers, materials and equipment, co-ordinate with the Departmental representative.
 - .1 Accept liability for damage, safety of equipment and overloading of existing equipment.

1.7 EXISTING UTILITY SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian vehicular traffic and users operations.
- .3 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .4 Submit schedule to and obtain approval from Departmental Representative for any shutdown or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .5 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .8 Record locations of maintained, re-routed and abandoned service lines.

- .9 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.8 REQUIRED DOCUMENTS

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .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 specified.

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 ACCESS AND EGRESS

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Protection: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 72 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide for personnel, pedestrian and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.5 SPECIAL REQUIREMENTS

- .1 Submit schedule in accordance with Section 01 32 16.19 - Construction Progress Schedule - Bar (GANTT) Chart.
- .2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic, and security regulations.
- .3 Remain within the limits of work areas and access paths.
- .4 Ingress and egress of Contractor vehicles at site is limited to areas indicated on plans.
- .5 Maintain sanitary public utilities functional at all times during execution of Work to maintain at least 50% in operation during the day.

- .6 Work hours will be between 8h00 and 17h00, except for service cuts which are to be coordinated with the Departmental Representative. Contractor shall take these restrictions into account for organization and site management fees. Evening and night work is to be expected for service cuts, such as electricity or water services cuts.
- .7 Contractor is solely responsible for Work performed in winter conditions and associated costs. Contractor must ensure that all clauses, conditions specific to various specifications sections and manufacturer requirements are respected at all times during performance of Work. When required, Contractor must demonstrate to Departmental Representative that said conditions and requirements are met. Contractor must take measures to correct situation to satisfaction of Departmental Representative.

1.6 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Identification or access cards
 - .1 It is the responsibility of the Contractor that all personnel assigned to these works possess and visibly wear an identification or access card issued by the Ministry to determine the allowed access areas.
 - .2 The Contractor shall ensure that any identification or access cards are returned to the Ministry 30 days after acceptance of the work. A fee of 50\$ per missing card will be retained.
- .3 Security clearances
 - .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
 - .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
 - .3 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

1.7 BUILDING SMOKE ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted in the Work area, outside the "air" side and in a radius of 9 metres around the building on "city" side. Use designated smoking areas.

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 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2 If schedule changes, notify Departmental Representative of meeting four (4) days in advance of meeting date.
- .3 Meetings will be held in Transport Canada's administrative facilities.
- .4 Departmental Representative will record meeting minutes.
- .5 Departmental Representative will distribute copies of minutes to meeting participants via email within four (5) days after meetings.
- .6 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRE-CONSTRUCTION MEETING

- .1 Schedule a pre-construction meeting within 15 Days after date of Contract Award with Contract parties to discuss administrative procedures and define parties' responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors and site inspectors shall attend pre-construction meeting.
- .3 Establish time and location of meeting and notify parties concerned minimum five (5) days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative (Cont'd) of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.19 - Construction Progress Schedules - Bar (GANTT) Chart.
 - .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 52 00 - Construction Facilities.
 - .5 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .8 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
 - .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
 - .10 Monthly progress claims, administrative procedures, photographs, hold back.
 - .11 Appointment of inspection and testing agencies or firms.

- .12 Insurances, transcripts of policies.

1.3 CONSTRUCTION PROGRESS MEETINGS

1. During course of Work and prior to project completion, schedule progress meetings bi-weekly.
2. Contractor and Departmental Representatives are to be in attendance.
3. Notify parties minimum five (5) days prior to meetings.
4. Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.
5. Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, and conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 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 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five days work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision-making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essential elements of this contract.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within ten (10) working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Ensure the delivery date of doors, frames, windows and hardware before February 28, 2019.

1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative and Consultant will review and return revised schedules within five (5) working days.
- .3 Revise impractical schedule and resubmit within five (5) working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed project schedule from master plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows.
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .1 Supplied materiel with long delivery time – including a date of delivery.
 - .2 All required documens.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Siding and Roofing.
 - .6 Interior Architecture (Walls, Floors and Ceiling).
 - .7 Plumbing.
 - .8 Lighting.
 - .9 Electrical.
 - .10 Piping.
 - .11 Controls.
 - .12 Heating, Ventilating, and Air Conditioning.
 - .13 Millwork.
 - .14 Joinery/Woodworking.
 - .15 Doors, Windows and Hardware.
 - .16 Fire Systems.
 - .17 Metalwork.

.18 Testing and Commissioning

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.02 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular work site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

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 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information are not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data that are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Québec, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where structures or elements attach or connect to other structures or elements, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross-references to design drawings and specifications.

- .4 Allow (7) days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions to include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 1. Subcontractor.
 2. Supplier.
 3. Manufacturer
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents;
 - .5 Details of appropriate portions of Work as applicable:
 1. Materials and details of fabrication.
 2. Layout, showing dimensions, including identified field dimensions, and clearances.
 3. Setting or erection details.
 4. Capacities.
 5. Performance characteristics.
 6. Standards.
 7. Operating weight.
 8. Wiring diagrams.
 9. Single line and schematic diagrams.
 10. Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit one (1) electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

- .2 Testing must have been within three (3) years of date of contract award for project.
- .12 Submit one (1) electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit one (1) electronic copy of manufacturers' instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit one (1) electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that Department approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended.
- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

1.5 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit one (1) electronic copy of colour digital photography in jpg format, standard resolution, monthly with progress statement.
- .2 Project identification: name and number of project and date of exposure indicated.

1.6 CERTIFICATES AND TRANSCRIPTS

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Transport Canada.

1.2 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to present minimum of interferences and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .3 No roadway can be closed without written approval of Departmental Representative.
 - .1 Before rerouting traffic, install appropriate signage, in compliance with Work Area Traffic Control Manual.

1.3 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, flashing warning lights and other devices to indicate construction activities or other temporary unusual conditions resulting from Project Work which requires road user response.
- .2 Supply, place, and erect signs, delineators, barricades and miscellaneous warning devices as required.
- .3 Before commencing Work, consult Departmental Representative to prepare list of signals and other necessary devices for work. If the situation on Work site changes, revise list to satisfaction of Departmental Representative.
- .4 Continually maintain traffic control devices in use by:
 - .1 Checking signs daily for legibility, damage, suitability and location. Clean as required to ensure clarity and reflectance. Immediately repair or replace any defective, unsafe or non-compliant traffic control devices.
 - .2 Removing or covering signs which do not apply to conditions existing from day to day.

1.4 TEMPORARY PARKING

- .1 Contractor shall refer architectural plans for areas delimited and reserved for Contractor during performance of Work.

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 GENERAL PROTECTION

- .1 Do not disrupt airport business except as permitted by Departmental Representative.
- .2 Provide temporary protection for safe handling of public, personnel, pedestrians and vehicular traffic: to Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 MOVEMENT OF EQUIPMENT AND PERSONNEL

- .1 In areas of airport not closed to aircraft traffic:
 - .1 Obtain Departmental Representative's approval on scheduling of Work;
 - .2 Control movements of equipment and personnel as directed by Departmental Representative;
 - .3 Post, at locations designated by the Ministerial Representative, competent persons who will transmit signals from the control tower to equipment attendants and personnel who are required to cross traffic areas in service;
 - .4 Immediately observe signals from control tower.

1.3 UNSERVICEABLE AREAS

- .1 Mark off areas made unserviceable for aircraft by Work of this Contract by providing highly visible danger markings by day and red lights by night, by TP312 – Aerodromes Standards and Recommended Practices.
- .2 Open flames and flammable fuels are not permitted.
- .3 Park equipment not in use and stockpile materials so that stockpile tops are below 50 to 1 ratio from ends of useable landing strip and below 20 to 1 ratio from sides of aircraft traffic areas.
 - .1 Mark tops with red lights as directed by TP312 – Aerodromes Standards and Recommended Practices and by Departmental Representative.

1.4 TRENCHING

- .1 Obtain Departmental Representative's written permission to undertake trenching on pavements open to aircraft traffic.

1.5 AIRPORT FACILITIES

- .1 Departmental Representative will stake or indicate location of underground facilities such as cables, pipes, ducts and other services and utilities.
- .2 Notify Departmental Representative of work areas 48 hours minimum in advance of operations to allow sufficient time for underground facilities and service to be located.

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 Contractor shall manage his operations so that safety and security of the public and of site workers always take precedence over cost and scheduling considerations.

1.2 REFERENCES

- .1 Canada Labour Code - Part II, Canadian Occupational Safety and Health Regulations.
- .2 Canadian Standards Association (CSA)
- .3 Workplace Hazardous Materials Information System (WHMIS)
 - .1 Data Sheets (DS)
- .4 Act Respecting Occupational Health and Safety, R.S.Q. Chapter S-2.1.
- .5 Construction Safety Code, S-2.1, r.6.

1.3 SUBMITTALS

- .1 Submit the documents required according to section 01 33 00 – Submittals.
- .2 Submit to Departmental Representative, the CNESST, the Association paritaire en santé et sécurité du secteur de la construction (ASP Construction), the site-specific safety program, as outlined in 1.8 at least 10 days prior to start of work. The Contractor must review his program during the course of the project if any change occurs in work methods or site conditions. The Departmental Representative may, after receiving the program or at any time during the project, ask the Contractor to update or modify the program in order to better reflect the reality of the construction site and activities. The Contractor must make the required changes before work begins.
- .3 Submit to Departmental Representative the site inspection sheet, duly completed, at the intervals indicated in 1.13.1.
- .4 Submit to Departmental Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by federal or provincial inspectors.
- .5 Submit to Departmental Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard.
- .6 Submit to Departmental Representative all safety data sheets for hazardous material to be used at the site at least three (3) days before they are to be used.
- .7 Submit to Departmental Representative copies of all training certificates required for application of the safety program, in particular:
 - .1 General construction site safety and health courses;
 - .2 Safety officer attestations;
 - .3 First aid in the workplace and cardiopulmonary resuscitation;
 - .4 Work likely to release asbestos dust;
 - .5 Work in confined spaces;
 - .6 Lockout procedures;
 - .7 Wearing and fitting of individual protective gear;

- .8 Forklift truck;
- .9 Positioning platform;
- .10 Any other requirement of Regulations or the safety program.
- .8 Medical examinations: Wherever legislation, regulations, directives, specification or a safety program require medical examinations, Contractor must:
 - .1 Prior to start-up, submit to Departmental Representative certificates of medical examination for all concerned supervisory staff and employees who will be on duty when the site opens.
 - .2 Thereafter, submit without delay certificates of medical examination for any newly hired concerned personnel as and when they start work at the site.
- .9 Emergency plan: The emergency plan, as defined in 1.8.3, shall be submitted to Departmental Representative at the same time as the site-specific safety program.
- .10 Notice of site opening: Notice of site opening shall be submitted to the Commission de la santé et de la sécurité du travail before work begins. A copy of such notice shall be submitted to Departmental Representative at the same time and another posted in full view at the site. During demobilization, a notice of site closing shall be submitted to the CNESST, with copy to Departmental Representative.
- .11 Plans and certificates of compliance: Submit to the CNESST and to Departmental Representative a copy signed and sealed by engineer of all plans and certificates of compliance required pursuant to the Construction Safety Code (S-2.1, r. 6), or by any other legislation or regulation or by any other clause in the specifications or in this contract. Copies of these documents must be on hand at the site at all times.
- .12 Certificate of compliance delivered by the CNESST: The certificate of compliance is a document delivered by the CNESST confirming that the contractor is in rule with the CNESST, i.e. that he had pay out all the benefits concerning this contract. This document must be delivered to Departmental Representative at the end of the work.

1.4 HAZARDS ASSESSMENT

- .1 The contractor must identify all hazards inherent in each task to be carried out at the site.
- .2 The contractor must plan and organize work so as to eliminate hazards at source or promote mutual protection so that reliance on individual protective gear can be kept to a minimum. Where individual protection against falling is required, workers shall use safety harness that meets standard Can - CSA- Z-259.10 - M90. Safety belts shall not be used as protection against falling.
- .3 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.
- .4 All mechanical equipment shall be inspected before delivery to the site. Before using any mechanical equipment, submit to Departmental Representative a certificate of compliance signed by a qualified mechanic. Whenever he suspects a defect or accident risk, Departmental Representative may at any time order the immediate shut-down of equipment and require a new inspection by a specialist of his own choosing.
- .5 For use of equipment for lifting persons or materials, ensure that the inspections required by the standards are met and be able to provide a copy of certificates of inspection upon request of Representative of the Ministry.

1.5 MEETINGS

- .1 Contractor decisional representative must attend any meetings at which site safety and health issues are to be discussed
- .2 Set up a site safety committee, and convene meetings in accordance with the Construction Safety Code (S-2.1, r.6).

1.6 LEGAL AND REGULATORY REQUIREMENTS

- .1 Comply with all legislation, regulations and standards applicable to the site and its related activities.
- .2 Comply with specified standards and regulations to ensure safe operations at site containing hazardous or toxic materials.
- .3 Regardless of the publication date shown in the construction safety code, always use the most recent version.

1.7 SITE-SPECIFIC CONDITIONS

- .1 At the site, the contractor must take account of the following specific conditions:
 - .1 Airport terminal personnel and user circulation near the construction area.

1.8 SAFETY AND HEALTH MANAGEMENT

- .1 Acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the Act Respecting Occupational Health and Safety (R.S.Q., chapter S-2.1) and the Construction Safety Code (S-2.1, r.6).
- .2 Develop a site-specific safety program based on the hazards identified and apply it from the start of project work until close-out is completed. The safety program must take account of all information appearing in 1.7 and must be submitted to all parties concerned, in accordance with the provisions set forth in 1.3. At a minimum, the site-specific safety program must include:
 - .1 Company safety and health policy.
 - .2 A description of the work, total costs, schedule and projected workforce curve.
 - .3 Flow chart of safety and health responsibility.
 - .4 The physical and material layout of the site.
 - .5 First-aid and first-line treatment standards.
 - .6 Identification of site-specific hazards.
 - .7 Risk assessment for the tasks to be carried out, including preventive measures and the procedures for applying them.
 - .8 Training requirements.
 - .9 Procedures in case of accident/injury
 - .10 Written commitment from all parties to comply with the prevention program.
 - .11 A site inspection schedule based on the preventive measures.
- .3 The contractor must draw up an effective emergency plan based on the characteristics and constraints of the site and its surroundings. Submit the emergency plan to all parties concerned, pursuant to the provisions of 1.3. The emergency plan must include:
 - .1 Evacuation procedure;

- .2 Identification of resources (police, firefighters, ambulance services, etc.);
- .3 Identification of persons in charge at the site;
- .4 Identification of those with first-aid training;
- .5 Training required for those responsible for applying the plan;
- .6 Any other information needed, in the light of the site characteristics.

1.9 RESPONSIBILITIES

- .1 No matter the size of the construction site or how many workers are present at the workplace, designate a competent person to supervise and take responsibility for health and safety. Take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the site and likely to be affected by any of the work.
- .2 Take all necessary measures to ensure application of and compliance with the safety and health requirements of the contract documents, applicable federal and provincial regulations and standards as well as the site-specific safety program, complying without delay with any order or correction notice issued by the Commission de la santé et de la sécurité du travail.
- .3 Take all necessary measures to keep the site clean and in good order throughout the course of the work.

1.10 COMMUNICATIONS AND POSTING

- .1 Make all necessary arrangements to ensure effective communication of safety and health information at the site. As they arrive on site, all workers must be informed of their rights and obligations pertaining to the site-specific safety program. The Contractor must insist on their right to refuse to perform work that they feel may threaten their own health, safety or physical integrity or that of other persons at the site. The Contractor must keep and update a written record of all information transmitted with signatures of all affected workers.
- .2 The following information and documents must be posted in a location readily accessible to all workers:
 - .1 Notice of site opening;
 - .2 Identification of principal Contractor;
 - .3 Company OSH policy;
 - .4 Site-specific safety program;
 - .5 Emergency plan;
 - .6 Data sheets for all hazardous material used at the site;
 - .7 Minutes of site committee meetings;
 - .8 Names of site committee representatives;
 - .9 Names of those with first-aid training;
 - .10 Action reports and correction notices issued by the CNESST.

1.11 UNFORESEEN CIRCUMSTANCES

- .1 Whenever a source of danger not defined in the specifications or identified in the preliminary site inspection arises as a result of or in the course of the work, immediately

suspend work, take appropriate temporary measures to protect the workers and the public and notify Departmental Representative, both verbally and in writing. Then the Contractor must modify or update the site-specific safety program in order to resume work in safe conditions.

1.12 INSPECTION OF SITE AND CORRECTION OF HAZARDOUS SITUATIONS

- .1 Inspect the work site and complete the site inspection sheet at least once a week.
- .2 Immediately take all necessary measures to correct any lapses from legislative or regulatory requirements and any hazards identified by a government inspector, by the Departmental Representative, by the site safety and health coordinator or during routine inspections.
- .3 Submit to Departmental Representative written confirmation of all measures taken to correct lapses and hazardous situations.
- .4 Give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order interruption and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and site workers and environmental protection take precedence over cost and scheduling considerations.
- .5 Without limiting the scope of sections 1.8 and 1.9, Departmental Representative may order cessation of work if, in his/her view, there is any hazard or threat to the safety or health of site personnel or the public or to the environment.

1.13 BLASTING

- .1 Blasting and other use of explosives are forbidden unless authorized in writing by Departmental Representative.
- .2 Any operation involving explosives must be carried out under the supervision of a qualified shot firer.
- .3 The purchase, carriage, storage and use of explosives must comply with all applicable federal and provincial legislation:
 - .1 Canada: Explosives Act (E-17) , Explosives Regulations (C.R.C. CH. 599), Standard for Storage of Blasting Charges and Detonators, Transportation of Dangerous Goods Act and Regulations.
 - .2 Quebec: Explosives Act (E-22), Explosives Regulations (E-22, r.1), Safety Code for the Construction Industry (S-2.1, r.6), Transportation of Dangerous Goods Regulations.
- .4 Contractor shall obtain all permits required pursuant to the legislation and regulations referred to above and keep copies on hand at the site.
- .5 Contractor shall facilitate inspection of the site, stored explosives and vehicles used to transport explosives by any government representatives or police officers whose jurisdiction encompasses explosives.

1.14 POWDER ACTUATED DEVICES

- .1 Use of power hammers must be authorized by Departmental Representative. Explosive-actuated devices are not permitted.

- .2 Any person using a power hammer shall hold a training certificate and meet all requirements of Section 7 of the Construction Safety Code (S-2.1, r. 6).
- .3 Any other explosive-actuated devices are not permitted.

1.15 LOCKOUT

- .1 For every work on energized equipment or equipment that may be started accidentally, the Contractor shall draw up and implement a lockout procedure and complete the Request for Electrical Isolation Form provided by the Manager in Charge of Worksite.
- .2 Although the hereunder list is not exhaustive, here are some examples for which the use of the form is obligatory:
 - .1 Main building power feeders;
 - .2 Feeder supply panels and sub-panels;
 - .3 Bus ducts;
 - .4 Motor control centres;
 - .5 Emergency power circuits;
 - .6 Fire alarm and fire protection equipment;
 - .7 Mechanical protective equipment (sump pump, etc.);
 - .8 Alarm circuit for building services, including all heating, ventilating and air conditioning equipment;
 - .9 Circuits supplying more than one (1) piece of equipment;
 - .10 Circuits affecting one (1) single piece of equipment used in a cooling or heating system.
- .3 After having completed the form, the Contractor, shall have it countersigned by the Manager in Charge of Worksite before starting work.
- .4 Notwithstanding the previous paragraphs, the Contractor shall, in emergency situation, receive an oral guarantee of isolation of the Manager in Charge of Worksite and immediately countersign the request of electrical transfer or isolation.
- .5 The procedure requested at paragraph 1 must comply with the principles listed in the “Le cadenassage” pamphlet published by the Association paritaire pour la santé et la sécurité du travail secteur construction (ASP Construction).
- .6 Supervisors and all workers concerned must have followed ASP Construction’s “Les techniques de cadenassage” course [(514 355-6190 or 1 800 361-2061)] or an equivalent course given by another firm.
- .7 Identify every work that must absolutely be done on live equipment and establish the safety measures that will be applied, including the personal protective equipment.

1.16 WORK IN HEIGHT

- .1 General
 - .1 The Contractor must ensure that any person carrying out work that poses a risk of falling more than 2,4 m use fall protection equipment.
 - .2 Plan and organize work so as to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment. When personal fall protection is required, workers must use a safety

- harness that complies with CSA standard CAN/CSA Z-259.10 M90. A safety belt must not be used as fall protection.
- .3 Every person using an elevating platform must have training regarding this equipment.
- .4 Wearing of safety harness is obligatory in any elevating platform with telescopic, articulated or rotary boom.
- .5 Delimit a danger zone in any place where equipment for work in height is used.
- .2 Special requirements - scaffolding
 - .1 Foundation:
 - .1 Scaffolding shall be installed on a solid foundation so that it does not slip or rock.
 - .2 Contractors wishing to install scaffolding on a roof, overhang, canopy or awning shall submit their calculations and loads to the Engineer and shall obtain permission from the Engineer before beginning installation.
 - .2 Assembly, bracing and mooring:
 - .1 All scaffolding shall be assembled, braced and moored in accordance with the manufacturer's instructions and the provisions of the Safety Code for the construction industry.
 - .2 Where a situation requires the removal of part of the scaffolding (e.g., crosspieces), the Contractor shall submit an assembly procedure signed and sealed by an engineer certifying that the scaffolding assembled in that manner will allow the work to be done safely given the loads to which it will be subject.
 - .3 For scaffolding where the span between two supports is greater than 2.4 m, the Contractor shall provide an assembly plan signed and sealed by an engineer.
 - .3 Protection against falls during assembly:
 - .1 Workers working above the ground shall be protected against falls at all times during assembly.
 - .2 Before the work begins, the Contractor shall submit to the Engineer a procedure stating the protective measures used and, if applicable, identifying the anchor points for the safety cables or moorings. This procedure shall be in accordance with sections 3.9.4.5, 2.9.1 and 2.10.12 of the Safety Code for the construction industry.
 - .4 Platforms:
 - .1 Scaffolding platforms shall be designed and installed in accordance with the provisions of the Safety Code for the construction industry.
 - .2 If planks are used, they shall be approved and stamped in accordance with section 3.9.8 of the Safety Code for the construction industry.
 - .3 The platforms must cover the entire surface protected by the guardrails.
 - .4 The above notwithstanding, scaffolding 4 sections (or 6 metres) high or higher shall have a full platform covering the entire surface of the putlogs every 3 m or fraction thereof, and the components of that platform shall not be moved at any time to create an intermediate landing.
 - .5 Guardrails:

- .1 A guardrail must be installed on every landing.
- .2 Cross braces shall not be considered guardrails.
- .3 Where scaffolding 4 sections (or 6 metres) high or higher requiring full platforms is used, guardrails shall be installed on each landing at the start of work and shall remain in place until the work is completed.
- .6 Access:
 - .1 The Contractor shall ensure that access to the scaffolding does not compromise worker safety.
 - .2 Where the platforms of the scaffolding are comprised of planks, ladders shall be installed in such a way that planks extending beyond the platform do not block the way up or down.
 - .3 Notwithstanding the provisions of the Safety Code for the construction industry, stairs shall be installed on all scaffolding that has 6 or more rows of uprights or is 6 sections (or 9 metres) high or higher.
- .7 Protection of the public and occupants:
 - .1 The Contractor shall identify the boundaries of and barricade the work area so as to limit access to authorized workers only.
 - .2 The Contractor shall install covered walkways, nets or other similar devices to protect the public or the occupants against falling objects.
- .8 Use of public thoroughfares:
 - .1 Where it is necessary to encroach on a public thoroughfare, the Contractor shall obtain at the Contractor's expense any authorizations and permits required by the competent authority.
 - .2 The Contractor shall install at the Contractor's expense any signage, barricades or other devices needed to ensure the safety and security of the public and the Contractor's own facilities.

1.17 LIFTING MATERIAL

- .1 Lifting devices shall be positioned in such a way that loads are not carried over workers, occupants or the public.
- .2 The Contractor must transmit to Engineer a work procedure, signed and sealed by an engineer, including inter alia the position of the crane, a sketch of the trajectory of the transported loads, the length of the mast and a plan of lifting for the handling of loads above occupied buildings. Engineer can, if judge necessary, impose work of evening and weekend.
- .3 All mobile cranes manufactured after January 1st 1980 must be equipped with a safety device against overload.
- .4 All mobile cranes with cables manufactured after January 1st 1970, except if they are used for other end than lifting loads, must be provided with a safety device against two-blocking. Regarding mobile cranes with cables manufactured before January 1st 1970, they will have to be equipped with the device at the latest on December 31st 2006.
- .5 The Contractor shall provide the Engineer with a mechanical service inspection certificate for each lifting device. Inspections must be carried out just prior to the delivery of the equipment to the work site.
- .6 For all winch installations, the Contractor shall provide the Engineer with the installation method recommended by the manufacturer. If unavailable, the Contractor shall then

provide an installation procedure signed and sealed by an engineer. The installation procedure must take into account load bearing capacity, the amount, weight and location of counterweight and any other detail that may affect the capacity and stability of the device.

- .7 In addition to the mechanical service inspection certificate, the annual inspection certificate and the crane logbook must be aboard all crane and crane-truck cabs.
- .8 The entire lifting area shall be closed off to prevent non-authorized people from entering it.
- .9 The Contractor shall obtain all of the permits at his own expense, in the event the thoroughfare must be temporarily closed off to meet the requirement stipulated in the preceding paragraph or for any other reason pertaining to the safety of workers, occupants or the public.
- .10 The Contractor shall carefully inspect all of the slings and lifting accessories and make sure that those in poor condition are destroyed or scrapped.
- .11 Compressed-gas cylinders shall be lifted with a basket specially designed for this purpose.

1.18 SILICA

- .1 Preventive measures to apply to the work site:
 - .1 Source reduction methods
 - .1 Work in wet environment or use tools with inflow of water in order to reduce dustiness, if not, collect dust at the source and retain it with a high efficiency filter not to propagate dust in the environment.
 - .2 Clean surfaces and tools with water, never with compressed air.
 - .3 Sand and pickle surfaces by using an abrasive containing less than 1 % of silica (also called amorphous silica).
 - .4 When required, install shields or other containment device to prevent silica dust from migrating toward other workers and the public.
 - .2 Individual protection equipments
 - .1 Wear individual respiratory protection equipment (mask) during all the operations that could generate silica dust. Select respiratory protection in accordance with the « Guide des appareils de protection respiratoire utilisés au Québec » http://www.prot.resp.CNESST.qc.ca/Guid_APR.pdf
 - .2 Wear an ocular protection (glasses or visors).
 - .3 Wear coveralls to prevent contamination outside the worksite.
 - .3 Personal hygiene
 - .1 Do not eat, drink, or smoke in a dusty environment.
 - .2 Wash the hands and the face before drinking, eating or smoking.

1.19 LEAD

- .1 Work involving a low exposure to lead
 - .1 Adequate measures
 - .1 The Contractor shall be aware of all hazards associated with exposure to lead. The Contractor agrees to take all necessary measures to protect the

health of its workers and the public. The following rules are the minimum and in no way diminish the requirements set out in current statutes and regulations. If, after the workers have undergone blood tests or the air has been analysed, it is determined that the measures taken are not sufficient, the Contractor shall stop the work and, at its own expense, modify the work procedure, provide other protective equipment or take any other measures needed to ensure that the health of the workers and the public is not compromised.

- .2 The Contractor shall use work methods that make it possible to contain and control contaminated residue. Decontamination shall be done using a wet process unless that process is impossible or gives rise to other hazards. Depending on the processes used, it may be necessary to keep the work area under negative pressure in order to prevent contaminated dust or mist from escaping.

.2 Training

- .1 Before authorizing them to enter the contaminated area, the Contractor shall train all its workers and any subcontractor's workers so that they are able to do their work safely. This training shall include, but is not limited to:
 - .1 Hazards of lead exposure;
 - .2 Ways lead can enter the body;
 - .3 Detailed description of work methods;
 - .4 Preventive measures;
 - .5 Essential sanitation measures;
 - .6 The right of workers under the Act respecting occupational health and safety and the Canada Labour Code to refuse any work that could compromise their safety and health.

.3 Respiratory protection

- .1 Without limiting the other regulatory requirements applicable to respiratory protection, every person who is in a decontamination area shall wear a mask with a HEPA (high-efficiency particulate air) filter. At the time of hiring, the Contractor shall conduct the necessary tests to ensure that all workers are able to properly wear the required respiratory protection. Workers who have a beard or whose face is a shape that does not allow the mask to fit perfectly shall not be permitted to enter the contaminated area.

.4 Work clothes

- .1 The Contractor shall provide the workers with disposable coveralls with a hood and rubber safety boots. The workers shall remove and dispose of their coveralls and remove their boots every time they leave the contaminated work area, whether they are leaving to eat, take a break or simply go to the bathroom. A supply of clean coveralls shall be available outside the contaminated area. Soiled coveralls shall be treated as contaminated materials.

.5 Washroom facilities

- .1 Wash basins (or equivalent) with disposable towels shall be made available to the workers. The workers shall wash their hands and face every time they leave the contaminated area.

- .6 Rest and/or dining room
 - .1 The Contractor must clean (by wet process) the floors and the tables of the rest and/or dining room in order to limit the possibility of contamination per ingestion or inhalation.
- .7 Equipment provided to the Engineer
 - .1 The Contractor shall provide at no charge to the Engineer or persons designated by the Engineer protective equipment (coveralls, boots, masks and other equipment as required depending on the procedure), access, and the facilities needed to safely perform normal monitoring and inspection duties.
- .2 Work involving a medium or high exposure to lead
 - .1 In addition to the requirements for work involving low exposure to lead, the contractor shall take the following measures:
 - .1 Environmental monitoring
 - .1 The Contractor shall retain the services of a private laboratory to check lead levels at least once a day in every area occupied by workers at some time during the day (including washroom facilities and break rooms) and outside the building, halfway between the building and the living quarters. Testing shall be done while activities are under way in those areas. The tests consist in taking ambient air samples in work areas and outside the building and dust samples in break rooms and cloakrooms. The results shall be made available within 24 hours and shall be recorded in a log book. The log book or a copy thereof shall be accessible to all workers. The Contractor shall take the necessary measures to maintain an airborne lead concentration of less than 0.05 mg/m³ in areas deemed not to be contaminated.
 - .2 Medical surveillance
 - .1 The contractor must give a filled copy of the « *Rapport de conformité médicale : Aptitude à travailler en présence de contamination au plomb* » form for each employee. The virgin copies of the form are available via the Engineer.
 - .2 The Contractor shall contact public health departments and, if necessary, authorized private clinics and laboratories so that the following requirements can be met:
 - .1 Before the beginning of work, all workers shall undergo a medical blood-lead measurement (time zero).
 - .2 Blood-lead testing of all workers shall be repeated every two (2) weeks after decontamination work begins, and workers whose blood-level is more than 30 µg/dl shall be removed from the contaminated area. Workers whose blood-lead level is more than 40 µg/dl shall be removed from the work site.
 - .3 The test results shall be forwarded to the Engineer within 14 calendar days. Please ensure that the laboratory is capable of providing the results within the required period.

- .4 Workers removed from the site shall not be permitted to return until their blood-lead level has returned to less than 15 µg/dL. Pregnant women shall not be permitted to enter the site at any time while the work is being done.
- .3 If one or more workers undergo a second blood-lead test and the results are higher than the first test, the Contractor shall review its work methods, protective measures and prevention program monitoring measures. The Contractor shall forward to the Engineer a written list of the measures it plans to take to further reduce exposure levels.

1.20 ASBESTOUS WORK

- .1 Before undertaking work liable to emit asbestos dust, the contractor must:
 - .1 Provide a written procedure considering all items specified in the Safety Code for the construction industry S-2.1, r-6.
 - .2 Show that the worker has been trained of the risks, prevention methods and safe working methods (ASP Construction) (art.3.23.7).
 - .3 Show that he has under the hand all the material and the equipment necessary to the respect of the procedure and of the safe execution of work.

1.21 EXCAVATING AND TRENCHING

- .1 To follow CNESST guidelines on excavations.

1.22 HOT WORK

- .1 General
 - .1 Hot work means any work where a flame is used or a source of ignition may be produced, i.e., riveting, welding, cutting, grinding, burning and heating.
 - .2 Before the beginning of work, the Contractor must have received the "Hot Work Permit" of PWGSC (ELF 367) completed by the Manager in Charge of Worksite when the duties to be undertaken involve hot work..
 - .3 Work on construction sites must be carried out in compliance with Fire Commissioner of Canada Standard CI 301, Standard for Construction Operations, June 1982. This standard is available at the following website: http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/301/page00.shtml
 - .4 A working portable fire extinguisher suitable to the fire risk shall be available and easily accessible within a 5 m radius from any flame, spark source or intense heat.
 - .5 An individual shall be appointed to go on rounds (fire) for a period of 30 minutes after the end of the shift. This individual shall countersign the permit and give it to the person in charge of the work site (or the individual he/she appoints) after the 30 minutes period.
 - .6 The storage of propane cylinders shall comply with the CAN/CSA-B149.2-15 Propane Storage and Handling Code and meet the specific conditions outlined in this document. The cylinders shall be stored outdoors, in a safe place, away from any unauthorized handling, in a storage cabinet specially designed for this

purpose. The cylinders shall be securely kept upright and locked at all times in a place where no vehicles are allowed, unless the cylinders are protected by bars or the equivalent.

- .7 All of the cylinders used or stored on the work site shall be equipped with a collar designed to protect the valve.
- .8 Filling the cylinders on the work site is forbidden, unless a procedure compliant with CAN/CSA B149.2 is approved and authorized by the Departmental Representative.

.2 Welding and cutting

- .1 Note: For welding and cutting activities, make sure that the following conditions are met moreover that the ones mentioned above.
- .2 The works must be carried out in accordance with the articles “3.13 Compressed gas supply” and “3.14 Welding and cutting” of the Safety Code for the construction industry, S-2.1, r. 6.
- .3 Work on construction sites must be carried out in compliance with Fire Commissioner of Canada Standard CI 302, Standard for Welding and Cutting, June 1982. This standard is available at the following website: http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/commissioner/302/page05.shtml
- .4 The welding and cutting devices are excessively dangerous with regard to the fire risk on the building work place. The following precautions must be taken at the time of this type of work:
 - .1 Store all compressed gas cylinder on a fireproof fabrics and make sure that the room is well ventilated.
 - .2 Store all oxygen cylinders more than 6 metres from a flammable gas cylinder (ex: acetylene) or a combustible such as oil or grease, unless the oxygen cylinder is separated from it by a wall made of non-combustible material as mentioned in the article 3.13.4 of the Safety Code for the construction industry, S-2.1, r. 6.
 - .3 Set up fireproof fabrics when work of welding is done in superposition and that there is risk of spark fall.
 - .4 Store the bottles far from all heat sources.
 - .5 Not to store the bottles close to the staircases, exits, corridors and elevators.
 - .6 Not to put acetylene in contact with metals with metals such as silver, mercury, copper and alloys of brass having more than copper 65%, to avoid the risk of an explosive reaction.
 - .7 Check that welding equipment with electric arcs have the necessary tension and are grounded.
 - .8 Ensure that the conducting wires of electric welding equipment are not damaged.
 - .9 Place the welding equipment on flat ground protected from the bad weather.
 - .10 Move away or protect combustible materials that are near welding equipment.
 - .11 Prohibition to weld or cut any closed container.

- .12 Provide protection measures when welding or cutting is carried out near drains, tanks or other containers containing inflammable materials.
- .13 Do not perform any cutting, welding or work with naked flame on a container, a tank, a pipe or other container containing a flammable or explosive substance unless:
 - .1 Air Samples indicating that work can be made without danger has been taken; or
 - .2 Provisions to ensure the safety of the workers have been made.

1.23 CHANGING LIGHT BULBS AND LIGHTING TUBES

- .1 In addition to the other safety requirements set out in this document, the Contractor has to comply with the following requirements to prevent electric shock when changing light bulbs and lighting tubes:
 - .1 Ensure that the workers assigned to the work have received all of the information needed to carry out the work safely and that they at least apply the following safety measures.
 - .2 Check the condition of the work area before beginning the work. If the area is very humid, if there is water in the vicinity or if the electrical system is explosion-proof, do not carry out the work and notify the Departmental Representative
 - .3 Check the condition of the light bulbs and fluorescent tubes to be changed. If a light bulb or fluorescent tube shows signs of damage or wear, if it is difficult to remove or if there are traces of a ballast leak, do not carry out the work and notify the Departmental Representative.
 - .4 Wear leather gloves. Ensure that they do not show signs of damage or wear every time such work is to be performed.
 - .5 Wear safety goggles.
 - .6 The ladders and stepladders used have to be made of fibreglass.
 - .7 Block off areas where climbing equipment is being used.
 - .8 Insulate light switches whenever possible (switch off).
 - .9 Stick a danger label on the switch indicating that it should not be switched on.
 - .10 Replace the light bulbs and fluorescent tubes with the same type of bulbs and tubes of the same size and wattage. If there is a doubt, notify the Departmental Representative.

1.24 CLEANING WORK

- .1 The Contractor must be in compliance with the Workplace Hazardous Materials Information System Regulation, and must ensure that the material safety data sheets for all hazardous products used are permanently kept in the building where these products are stored, that these data sheets are updated further to product purchases, and that containers of all sizes are duly labeled. The Contractor must demonstrate to Departmental Representative satisfaction that all of its employees have received adequate WHMIS training.
- .2 The Contractor must ensure that non-compatible chemicals are stored in such a way that they never come into contact with each other.
- .3 Ensure workers wear the proper gloves when using cleaning products.

- .4 Ensure the public is protected from any risk of slipping on freshly washed floors.
- .5 Ensure workers wear the proper gloves when cleaning outdoors if there is a risk of contact with biological contaminants (droppings, birds' nests, etc.).
- .6 For outdoor work, advise the Departmental Representative of any accumulation of bird or animal droppings so he/she can advise you of the necessary procedures to follow.

1.25 SPECIFIC CONDITIONS FOR CONFINED SPACES

- .1 Class 1
 - .1 Regarding all class 1 (low-risk) confined spaces, all persons involved shall have followed a basic training. Though it is not necessary to implement special work practices in low-risk confined spaces, the Contractor shall implement methods that ensure the health and general safety of persons who must work in these spaces.
 - .2 Before having access to confined spaces, the manager responsible for the workplace shall be informed of the expected date and time of entry and exit.
 - .3 Persons who have access to low-risk confined spaces must record the relevant information in the Confined Space Entry Log (ELF 103 form), i.e., all persons entering this class of confined space shall record each entry and each exit.
- .2 Class 2 and 3
 - .1 Regarding all class 2 and 3 confined spaces (medium- and high-risk), the following measures shall be strictly applied.
 - .1 The Contractor's prevention program shall include a written procedure which identifies:
 - .1 Necessary work tools;
 - .2 Instruments, installed or to be installed in the confined space, and measures to take for their installation, use, maintenance, protection and moving;
 - .3 Pipes and conduits entering the confined space;
 - .4 Risks and security measures to be taken depending on the work to be carried out;
 - .5 Hazardous material that may be found in the confined space;
 - .6 Appropriate rescue methods and equipment as well as emergency plan.
 - .2 The Contractor shall complete an access permit (ELF 101 form). The permit shall be valid for the duration of a work shift and shall take into account information contained in the assessment report and special conditions related to the work to be carried out. The Contractor may use his own form if it provides all the information that appears on the appended form.
 - .3 The Contractor shall complete a Hot Work Permit when the work to be carried out includes operations such as welding, cutting or any other activity that creates flames or sparks.
 - .4 All persons having access to the confined space and the safety guard shall have the following training certificates:
 - .1 Safety for work in PWGSC confined spaces (ASP Construction or equivalent training)

- .2 Workplace First Aid and CPR (organization recognized by the CNESST)
- .3 Use of ventilating equipment (ASP Construction or equivalent training)
- .4 Use of safety harness (ASP Construction or equivalent training)
- .5 Use and maintenance of respiratory protection equipment (ASP Construction or equivalent training)
- .6 Gas detection equipment (ASP Construction or equivalent training)
- .7 When the use of air adduction respirators or autonomous respirators is planned for, thorough training in the preparation, maintenance and use of such equipment (Manufacturer, supplier or recognized organization).
- .8 In remote areas where no local rescue and emergency intervention unit is available, the Contractor shall designate persons who are capable of carrying out rescue operations in confined spaces. First-aid attendant designated by the Contractor shall have relevant training in the use of rescue equipment.
- .5 All persons who must use air adduction respirators or autonomous respirators shall present a medical certificate confirming that they are fit to use this kind of equipment. This certificate shall be valid for two years.
- .6 Employees who are required to work in sewage collection systems or other similar systems shall be immunized against infectious diseases, in compliance with the immunization program prescribed by Health Canada, which is, against diphtheria and tetanus and for work to be done at the Correctional Service Canada, against hepatitis « B ».
- .7 The Tetanus and Diphtheria Vaccine is strongly recommended, though it is not mandatory.
- .8 The Contractor shall establish emergency and rescue procedures in co-operation with municipal and ambulance services. These procedures, together with the relevant phone numbers and the whereabouts of the nearest phone shall be conspicuously posted near the work station.
- .9 Before entry into a confined space, and every 15 minutes thereafter, the Contractor shall take readings of oxygen concentration, flammable gases and all toxic gases likely to be present, carbon monoxide and hydrogen sulphide in particular. These readings shall be recorded in a register, unless the detecting devices are equipped with an alarm and operate on a continuous basis. Detecting devices that are used shall be calibrated and adjusted by a competent person according to the manufacturer's directives, so that the alarms comply with the limits set out on the permit. NOTE: for welding and cutting tasks, readings of concentration must be done on a continuous basis.
- .10 The Contractor is responsible for the provision and maintenance of gas detecting devices. The Engineer may at any time require the Contractor's equipment to be checked for accuracy by a qualified person. In the event of failure of a detecting device, work shall be suspended immediately and all workers shall leave the confined space. In these circumstances, no claim for time lost shall be accepted.
- .11 If a detecting device alarm is set off, all workers shall leave the confined space. The Contractor shall then find the source of contamination, neutralize it, ventilate the confined space to eliminate contaminant residues and authorize access to the confined space only when concentrations of oxygen and gas have returned to normal.

- .12 Compressed gas cylinders or welding equipment shall not be brought into confined spaces: this equipment shall remain outside and shall not block entrances or exits; all cylinders shall be properly secured.
- .13 Tools and electrical devices used to gain access to confined spaces shall be grounded and, when necessary, designed to be explosion-proof. All equipment must be connected to a ground fault interrupter outlet or to a step-down transformer. The Contractor shall, at his own cost, hire a qualified electrician to adjust power receptacles and/or circuit breakers that he intends to use which do not meet these criteria.
- .14 The Contractor shall provide a ventilation system to keep concentrations of contaminants below admissible limits.
- .15 The Contractor shall put up posters to prevent unauthorized persons from entering the confined space.
- .16 When it is impossible to maintain the noise level under 85 dB, the Contractor shall provide all workers with ear protection adapted to the desired level of attenuation and work to be carried out.
- .17 The Contractor shall ensure that all workers wear the required personal protection equipment.
- .18 The Contractor shall assign a competent person to assume the function of safety guard. The safety guard must:
 - .1 Be properly informed of work procedures in a confined space.
 - .2 Ensure constant communication with all workers in the confined space. The instructions that are applied shall be adapted to confined spaces. The Contractor shall choose means of communication according to identified risks and other relevant factors, that is the protection equipment the workers must wear, noise levels in confined spaces and surrounding areas, remoteness, lighting conditions, etc.
 - .3 Be familiar with gas detecting devices and see to their proper functioning for the duration of the work.
 - .4 Be familiar with auxiliary ventilation systems and see to their proper functioning for the duration of the work.
 - .5 Be familiar with emergency procedures.
 - .6 Ensure that:
 - .1 All workers who enter the confined space respect the Contractor's work procedure.
 - .2 The working conditions and the environment inside the confined space are in no way detrimental to workers' health and safety.
- .19 The safety guard shall, at all times, be posted at the entrance of the confined space and shall not leave his station as long as there is a worker inside the confined space.
- .20 The Contractor shall designate a person to be in charge of the safety of the confined space. This person shall be present at all times on the job site.
- .21 The same person may act as a security guard and be responsible for the safety of confined spaces, provided all requirements of both functions are met.

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 REFERENCES

- .1 Definitions
 - .1 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.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data
 - .1 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 Include in Environmental Protection Plan.
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .6 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .8 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
 - .9 Contaminant Prevention Plan identifying 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 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

1.3 FIRES

- .1 Fires and burning of rubbish on site is not permitted.
- .2 Provide supervision, attendance and fire protection measures as directed.

1.4 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Minimize stripping of topsoil and vegetation.

1.6 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where directed by Departmental Representative.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
- .2 Leave Work area clean at end of each day.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .5 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .6 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
 - .1 Contract documents.
 - .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.
- .2 Mold: stop work immediately when material resembling mold is encountered during demolition work. Notify Departmental Representative.

1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

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 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Work Site, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be retained by the Departmental Representative. Cost of such services will be borne by Departmental Representative.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Use of external inspection/testing agencies does not relieve the Contractor from responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for re-testing and re-inspection.

1.3 ACCESS TO WORK SITE

- .1 Allow inspection/testing agencies access to Work Site, and off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable means for such access.

1.4 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, so that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Promptly make good other Contractor's work damaged by such removals or replacements.
- .3 If the Departmental Representative judges it not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.6 REPORTS

- .1 Submit three (3) copies of inspection and test reports to [Departmental Representative].

1.7 MOCK-UPS

- .1 Prepare mock-ups for Work specifically requested in specifications. Requirements laid out in this subsection apply to all sections of the Specifications that call for the production of mock-ups.
- .2 Construct in locations acceptable to Departmental Representative as specified in specific Section.
- .3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in due time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such delay will be allowed.
- .5 If requested, Departmental Representative will assist in preparing schedule of dates for preparation of mock-ups.
- .6 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.8 MILL TESTS

- .1 Submit mill test certificates as required in Specification Sections.

1.9 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

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 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute Work quickly.
- .2 Remove from site all such equipment after use.

1.2 WATER SUPPLY

- .1 The contractor will provide continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .3 The contractor will pay for utility charges at prevailing rates, based on General Conditions of Contract.

1.3 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted.
- .3 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.
- .4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
- .5 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 enough time after cessation of work to ensure removal of harmful contaminants.
- .6 Use of permanent heating system for temporary or secondary heating is not permitted.

- .7 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Departmental Representative.
- .8 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Comply 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.
- .9 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.4 TEMPORARY POWER AND LIGHT

- .1 The contractor will pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 V.
- .2 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lux.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Departmental Representative and provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace light bulbs which have been used for more than three (3) months.

1.5 TELECOMMUNICATIONS

- .1 Provide and pay for temporary telecommunications facilities, including telephone, fax, data hook up, lines, equipment necessary for own use and use of Departmental Representative; ensure hook up of these facilities to main networks and pay costs of all services.

1.6 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

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 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-[00], Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59-[97], Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-[04], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-[M1978(R2003)], Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-[M1987(R2003)], Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-[96(R2001)], Signs and Symbols for the Occupational Environment.

1.2 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to be fenced, area and details of fence installation. Plan must respect architectural plans and locations indicated.
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

1.3 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs.

1.4 HOISTING

- .1 Provide, operate and maintain hoists required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists to be operated by qualified operator.

1.5 SITE STORAGE/LOADING

- .1 Storage areas are indicated on architectural plans.
- .2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

- .3 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.6 CONSTRUCTION PARKING

- .1 Parking will be permitted on site in areas indicated on architectural plans.
- .2 Provide and maintain adequate access to project site.
- .3 Clean (airport) runways and taxi areas where used by Contractor's equipment.

1.7 OFFICES

- .1 The contractor must provide a construction trailer for site office, ventilated and heated to a temperature of 22 degrees Celsius, equipped with reasonable lighting level and of sufficient size to accommodate the site meeting, and provide a table for drawings.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary within designated area. Direct location of these offices.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.
- .3 Ensure that no materials, equipment and devices installed for their protection is likely to catch in the wind and collide with an aircraft or obstruct air visibility.

1.9 SANITARY FACILITIES

- .1 The contractor must provide sanitary facilities for work force in accordance with governing regulations and ordinances.

1.10 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three (3) weeks of signing Contract, in a location designated by Departmental Representative.
- .2 Construction sign 1.2 m X 2.4 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter. <
- .3 Indicate on sign, name of Owner and Contractor of design style established by Departmental Representative.
- .4 No other signs or advertisements, other than warning signs, are permitted on site.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .9 Dust control: adequate to ensure safe operation at all times.
- .10 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .11 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .12 Provide snow removal during period of Work.
- .13 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 CLEAN-UP

- .1 Remove construction debris, waste materials, and packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

1.13 TEMPORARY PARTITIONS

- .1 Provide temporary partitions to delimit the work by zone, in accordance with requirements in architectural plans.

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 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-[97], Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-[00], Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121-[M1978(R2003)], Douglas Fir Plywood.
- .3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.3 GUARD RAILS AND BARRICADES

- .1 Provide and install secure, rigid guard rails and barricades where required.
- .2 Provide and install as required by governing authorities.

1.4 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Design enclosures to withstand wind pressure and snow loads.

1.5 DUST TIGHT SCREENS

- .1 Provide dust tight screens partitions to localize dust-generating activities, and for protection of workers, finished areas of Work and the public.
- .2 Maintain and relocate as needed protection until such work is complete.

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

1.8 EMERGENCY ACCESS ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.10 PROTECTION OF BUILDING FINI

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm location and installation schedule with Departmental Representative three (3) days prior to installation
- .4 Be responsible for damage incurred due to lack of or improper protection.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - 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 REFERENCES

- .1 Within text of each specifications section, reference may be made to reference standards. List of reference standard writing organizations is contained in affected sections.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are compliant with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be born by Departmental Representative in event of compliance with Contract Documents or by Contractor in event of non-compliance.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 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.

1.3 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .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, lumber and sheet material 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 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .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.

1.5 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.6 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided. Obtain written instructions directly from manufacturer.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. The Departmental Representative reserves right to require dismissal from site of workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.8 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.10 REMEDIAL WORK

- .1 Refer to Section 01 73 00 - Execution.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

1.12 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.

- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 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. Use No. 304 stainless steel for exterior areas.
- .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. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

1.15 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

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 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 affect:
 - .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 Owner 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 Owner 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.

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 necessary to complete Work.
- .2 Fit several parts together, to integrate with rest of Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.

- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .8 Restore work with new products in accordance with requirements of Contract Documents.
- .9 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .10 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, to full thickness of the construction element.
- .11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .12 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 Separate waste materials for recycling in accordance with Section 01 74 19 - 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 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Provide and use marked separate bins for recycling. Refer to Section 01 74 19 - Waste Management and Disposal.
- .6 Dispose of waste materials and debris at designated dumping areas on Crown property.
- .7 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

- .6 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls and floors.
- .8 Clean lighting reflectors, lenses, and other lighting surfaces.
- .9 Vacuum clean and dust building interiors, behind grilles, louvers and screens.
- .10 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .13 Remove dirt and other disfiguration from exterior surfaces.
- .14 Sweep and clean roofing, gutters, window wells and areaways.
- .15 Sweep and wash clean paved areas.
- .16 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - 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 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss Contractor's proposed Waste Reduction Work plan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.
- .2 Departmental Representative waste management goal: to divert a minimum 25 percent of total Project Waste from landfill site.
- .3 Target percentage goals are achievable for waste diversion. Contractor to review and confirm Departmental Representative's Waste Audit acceptable values.
- .4 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .5 Protect environment and prevent environmental pollution damage.

1.2 REFERENCES

- .1 Definitions
 - .1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Departmental Representative.
 - .2 Class III: non-hazardous waste - construction renovation and demolition waste.
 - .3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities.
 - .4 Cost/Revenue Analysis Workplan (CRAW): based on information from Waste Reduction Workplan, and intended as financial tracking tool for determining economic status of waste management practices (Schedule E).
 - .5 Inert Fill: inert waste - exclusively asphalt and concrete.
 - .6 Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
 - .7 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
 - .8 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
 - .9 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
 - .10 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

- .2 Returning reusable items including pallets or unused products to vendors.
- .11 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .12 Separate Condition: refers to waste sorted into individual types.
- .13 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.
- .14 Waste Audit (WA): detailed inventory of estimated quantities of waste materials that will be generated during construction, demolition, deconstruction and/or renovation. Involves quantifying by volume/weight amounts of materials and wastes that will be reused, recycled or landfilled.
- .15 Waste Diversion Report: detailed report of final results, quantifying cumulative weights and percentages of waste materials reused, recycled and landfilled over course of project. Measures success against Waste Reduction Workplan (WRW) goals and identifies lessons learned.
- .16 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating required submittal and reporting requirements.
- .17 Waste Reduction Workplan (WRW): written report that addresses opportunities for reduction, reuse, or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. Waste Reduction Workplan information acquired from Waste Audit.

1.3 DOCUMENTS

- .1 Post and maintain in visible and accessible area at job site, one copy of following documents:
 - .1 Waste Audit.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up.
 - .1 One (1) copy and one (1) electronic copy of completed Waste Audit (WA).
- .3 Prepare and submit on monthly basis, throughout project or at intervals agreed to by Departmental Representative the following:
 - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.
 - .2 Updated Waste Materials Tracking form.
 - .3 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled and landfilled, and brief status of ongoing waste management activities.
- .4 Submit prior to final payment the following:
 - .1 Waste Diversion Report, indicating final quantities [in tones] by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials.
 - .2 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

1.5 WASTE AUDIT (WA)

- .1 Departmental Representative will prepare WA prior to project start-up. WA will be provided with bid documentation (Schedule A).
- .2 WA provides detailed inventory, estimated quantities and types of waste materials that will be generated as well as their potential to be reused and/or recycled and project's waste diversion goals and objectives.
- .3 After award of contract, contractor to review WA and confirm that anticipated quantities of waste generated are accurate and goals achievable.
- .4 If after review, contractor determines that indicated quantities or opportunities in WA are not accurate or achievable, contractor to provide written details of discrepancies and revised quantities for areas of concern. Contractor to meet with Departmental Representative to review and justify revisions.
- .5 Post on-site WA where contractor and sub-contractors are able to review content.

1.6 WASTE REDUCTION WORKPLAN (WRW)

- .1 Prepare and submit WRW (Schedule B) at least 10 days prior to project start-up.
- .2 WRW identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and comply with applicable regulations, based on information acquired from WA.
- .3 WRW should include but not limited to:
 - .1 Applicable regulations.
 - .2 Specific goals for waste reduction identify existing barriers and develop strategies to overcome them.
 - .3 Destination of materials identified.
 - .4 Deconstruction/disassembly techniques and schedules.
 - .5 Methods to collect, separate, and reduce generated wastes.
 - .6 Location of waste bins on-site.
 - .7 Security of on-site stock piles and waste bins.
 - .8 Protection of personnel, sub-contractors.
 - .9 Clear labelling of storage areas.
 - .10 Training plan for contractor and sub-contractors.
 - .11 Methods to track and report results reliably (Schedule D).
 - .12 Details on materials handling and removal procedures.
 - .13 Recycler and reclaimer requirements.
 - .14 Quantities of materials to be salvaged for reuse or recycled and materials sent to landfill.
 - .15 Requirements for monitoring on-site wastes management activities.
- .4 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .5 Post WRW or summary on site where workers are able to review content.
- .6 Monitor and report on waste reduction by documenting total volume (in tonnes) and cost of actual waste removed from project (Schedule D).

1.7 USE OF SITE AND FACILITIES

- .1 Execute Work with minimal interference and disturbance to normal use of premises.
- .2 Maintain security measures established by facility provide temporary security measures approved by Departmental Representative.

1.8 WASTE PROCESSING SITES

- .1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

1.9 USE OF SITE AND FACILITIES

- .1 After award of Contract, a mandatory site examination will be held for this Project for Contractor responsible for construction, renovation demolition/deconstruction waste management.
 - .1 Departmental Representative will arrange date, time and location.

1.10 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed and salvaged materials from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .7 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .8 Separate and store materials produced during project in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off site processing facility for separation.
 - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
 - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.
- .10 Cover or contain reusable and recyclable material to prevent any from being blown away,

colliding with an airplane or affecting air visibility.

- .11 Keep materials in closed containers, inaccessible to birds.

1.11 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
- .4 Remove materials on-site as Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the Waste Audit.

1.12 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 GENERAL

- .1 Do Work in compliance with WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 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 00 - Cleaning.

- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Source separate materials to be reused/recycled into specified sort areas.

3.3 MAIN ENVIRONMENTAL AUTHORITIES

- .1 Ministère du Développement durable, Environnement et Luttres contre les changements climatiques, 675, boulevard René-Lévesque Est, Québec (Québec) G1R 5V7 Tél. : 1 800 561-1616
- .2 Ministère du développement Ministère du développement durable, de l'environnement et des Parcs: *Québec Residual Materials Management Policy 1998-2008*
- .3 RECYC-QUÉBEC: Répertoire québécois des récupérateurs, recycleurs et valorisateurs
<http://www.recyc-quebec.gouv.qc.ca/client/fr/repertoires/rep-recuperateurs.asp>
- .4 Public Services and Procurement Canada: Sustainable Development Strategy 2017-2020.
- .5 Conseil de la conservation et de l'environnement, 800, Place d'Youville, 19^{ème} étage, Québec QC G1R 3P4 Tél. : (418) 643-3818.
- .6 Service de l'ingénierie et division de l'environnement, Ville de Sept-Îles, 601, boul. des Montagnais, Sept-Îles, QC, G4R 2R4 Tél. (418) 964-3225

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures
 - .1 Contractor's Inspection: Contractor conducts inspection of Work, identifies deficiencies and defects, and repairs as required to conform with Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection.
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in French that tasks have been performed as follows.
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
 - .4 Certificates required by Boiler Inspection Branch: submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.
 - .6 Work: complete and ready for final inspection.
 - .4 Final Inspection
 - .1 When all previously mentioned tasks are completed, request final inspection of Work by Departmental Representative.
 - .2 When Work is incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
 - .7 Final Payment
 - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

- .2 When Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 10 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

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 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting
 - .1 Convene meeting one (1) week prior to contract completion with contractor's representative and Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements;
 - .2 Review manufacturer's installation instructions and warranty requirements.
 - .2 Departmental Representative to establish communication procedures for.
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative four (4) final copies of operating and maintenance manuals in French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose-leaf 8 ½" X 11" with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Arrange content by systems, under Section numbers and sequence of Table of Contents.

- .5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .6 Text: manufacturer's printed data, or typewritten data.
- .7 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.

1.5 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.

1.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, on site for Departmental Representative, one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.

- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including.
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including.
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records required by individual specifications sections.
- .7 Le Provide digital photos, if requested, for site records.

1.8 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 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.

- .1 Include regulation, control, stopping, shut-down, and emergency instructions.
- .2 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 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturers.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturers.
- .11 Provide Contractor's co-ordination 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 kept in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.
- .15 Additional requirements: as specified in individual specification sections.

1.9 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .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.

1.10 MAINTENANCE MATERIALS

- .1 Spare Parts
 - .1 Provide spare parts, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to site; place and store.
 - .4 Receive and catalogue items.

- .1 Submit inventory listing to Departmental Representative.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials
 - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to site; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools
 - .1 Provide special tools, in quantities specified in individual specification section.
 - .2 Provide items with tags identifying their associated function and equipment.
 - .3 Deliver to site; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.
 - .2 Include approved listings in Maintenance Manual.
 - .3 Submit inventory listing to Departmental Representative.
 - .4 Include approved listings in Maintenance Manual.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.12 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, thirty (30) days before planned pre-warranty conference, for Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

- .5 Submit warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows.
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Include information in warranty management plan as follows.
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include HVAC balancing.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item, material, system or batch.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year (1) overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to keep warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
 - .4 Procedure and status of tagging of equipment covered by extended warranties.
 - .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .9 Respond in timely manner to oral or written notification of required construction warranty repair work.

- .10 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.13 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

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 ADMINISTRATIVE REQUIREMENTS

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to building's personnel and occupants two (2) weeks prior to date of final inspection.
- .2 The Departmental Representative will provide a list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation
 - .1 Verify conditions for demonstration and instructions of devices, equipment and systems as well as training sessions comply with requirements.
 - .2 Verify designated personnel are present.
 - .3 Ensure equipment has been inspected and put into operation in accordance with relevant sections.
 - .4 Ensure testing, adjusting, and balancing have been performed and equipment and systems are fully operational.
- .4 Demonstration and Instructions
 - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the equipment location.
 - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
 - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
 - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two (2) weeks prior to designated dates, for Departmental Representative's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4 Give time and date of each demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions of concerned or related equipment, materials or systems.

1.3 QUALITY ASSURANCE

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
 - .1 Instruct Owner's personnel;

- .2 Provide written report that demonstration and instructions have been completed.

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 RELATED REQUIREMENTS

- .1 Section 01 74 19 – Waste Management And Disposal

1.2 REFERENCES

- .1 Definitions
 - .1 Hazardous Materials: Dangerous substances, goods, items and products including, but not limited to, poisons, corrosives, flammable materials, ammunition, explosives, radioactive substances and any other materials that if misused can have negative impacts on the health or well-being of people, or on the environment.
- .2 References
 - .1 Canadian Standards Association (CSA) CSA Group
 - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

1.3 ADMINISTRATIVE PROCEDURES

- .1 Meetings prior to installation
 - .1 Prior to commencing work in this section, hold a meeting with the Departmental Representative in accordance with Section 01 31 19 - Project Meetings, to address the following.
 - .1 The requirements of the work.
 - .2 Existing conditions near the location where demolition work is to be carried out.
 - .3 Coordination of work with sub trades.
 - .2 Hold weekly meetings.
 - .3 Ensure presence of all key personnel.
- .2 Scheduling
 - .1 Take the necessary steps to ensure that the work schedule is respected.
 - .1 Inform the Departmental Representative in writing of any delays.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Upon request by competent authorities, submit shoring and bracing drawings to the Departmental Representative for approval prior to demolition work. The drawings must be prepared by a qualified engineer licensed to practice in Canada, in the province, and must illustrate the proposed method of work.

1.5 NATURE OF THE WORK

- .1 The Contractor will provide the labor, tools and equipment necessary to complete demolition work as part of the project.
- .2 This section includes, but is not limited to, the demolition and dismantling of building parts for replacement or modification.
- .3 This section generally applies to the demolition of non-load bearing structures, as indicated on the plans.
- .4 All demolition work that is not specifically indicated in the Contract Documents, but which is required to complete other work in this Contract, is part of this section.
- .5 Move all unnecessary materials off site as demolition work progresses.
- .6 The General Contractor will be responsible for any breakage, loss, deformation, total or partial damage due to demolition and / or other work on the site, that could affect the preserved building, and must therefore assume and perform, at own expense, all repairs, total or partial reconstructions so required.
- .7 Check the General Requirements concerning authorization to proceed, the work schedule, use of premises, protection of adjacent buildings and elements, methods used for the execution of the works, cooperation and coordination between sub trades, disposal of waste and any other provisions of "particular conditions" called for in General Requirements.
- .8 Perform demolition and dismantling work so as to obtain the necessary spaces for the complete installation of new structures. They must also be carried out in such a way as to permit connections that are accurate, true to line, solid and as seamless as possible with existing structures that are to be preserved. Demolition and dismantling must be limited to what is strictly necessary for the execution of the new works as specified.
- .9 Before proceeding with any demolition and dismantling, make exact layout of the works for all sub trades; establish defined and clearly visible limit lines and control the structure at all times.
- .10 Removal of existing materials should be done with care so as not to damage adjacent structures that are to be preserved. Removal should be performed in small sections and so as to control noise and excessive dust generation. Dismantling must not impact structures that are to be preserved.

1.6 SITE-SPECIFIC CONDITIONS

- .1 Environmental Protection
 - .1 Carry out work in accordance with Section 01 35 43 - Environmental Protection.
 - .2 Ensure that work does not adversely affect wildlife, groundwater and adjacent watercourses and that they do not generate excessive levels of air or noise pollution.
 - .3 Burning of trash and debris on site will not be permitted.
 - .4 Burying of trash and debris on site will not be permitted.

- .5 Do not dispose of waste or volatile materials, such as mineral spirits, oils, petroleum-based lubricants or toxic cleaning solutions into waterways or storm and sanitary sewers.
 - .1 Ensure that appropriate methods of disposal for this type of waste are use throughout the duration of the work.
- .6 Do not discharge water containing suspended solids into waterways, storm and sanitary sewers, or adjacent lands, by pumping or otherwise.
- .7 Provide for the evacuation of water and the containment of runoff waters containing suspended solids or other harmful substances, in accordance with the requirements of the competent authorities.
- .8 Protect vegetation (trees, plants, shrubs and their foliage) in the field and adjacent properties, as indicated.
- .9 During demolition work, erect temporary protective enclosures to prevent foreign substances or matter from contaminating the air outside work site.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Apply a dust control agent on all temporary access routes.
- .2 The Contractor must maintain sufficient and uninterrupted protection to protect the Owner's property against any damages arising from work included in this Contract. Provide dust screens, tarpaulins, railings, support elements and other necessary protective devices as described in General Requirements.
- .3 The Contractor will be required to correct and perform the necessary repairs resulting from the lack of reasonable protective precautions for the Owner's facilities, at own expenses.
- .4 Protect existing structures that must remain in place and equipment that must be recovered. If they are damaged, make the necessary replacements or repairs immediately, to the satisfaction of the Owner and at no cost to the Owner.
- .5 Take all necessary measures to prevent any movement or settlement of the works, pipes, that are to remain and to avoid any causing damage. Provide and install the necessary reinforcing and shoring parts. Repair damaged structures and take responsibility for any injuries that may result from demolition work.
- .6 Thoroughly support structures and, if it appears that demolition work is a hazard to the rest of the building or adjacent structures or pipelines, stop work and notify the Departmental Representative.
- .7 Limit as much as possible the dust and noise produced by the work, as well as the inconvenience caused to the occupants of the premises.

1.7 EXISTING CONDITIONS

- .1 Structures to be demolished to be based on their condition on date the tender is accepted.
- .2 The Contractor may dispose of materials not recovered by the Owner.
- .3 Notify the Departmental Representative before closing access to the building or cutting services.

Partie 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Stop equipment, tools and machinery when not in use unless extreme temperature conditions require continuous operation.
- .2 Demonstrate that tools, equipment and machinery are being used to recover materials in the best possible condition.
- .3 Coordinate all demolition conditions in relation to repair work that may interfere or affect the work schedule.
- .4 Provide all materials, equipment and tools required to perform demolition and reconstruction work. No fees will be charged for any failure in the method or coordination of this work, the contractor must respect all the conditions of the General Requirements (division 01).

Partie 3 Execution

3.1 PREPARATORY WORK

- .1 Protection
 - .1 Take necessary measures to prevent the movement, settlement or damage of any other type from affecting the utility lines of adjacent works and parts of the building that are to remain. Provide shoring and bracing of structures as required.
 - .2 Limit as much as possible the dust and noise produced by the work, as well as the inconvenience caused to the occupants of the premises. Ensure that dust and other demolition debris do not penetrate the floor through unobstructed openings.
 - .3 Protect appliances, building mechanical and electrical installations, as well as utility lines.
 - .4 Provide dust screens, tarpaulins, railings, support elements and other necessary protective devices.
- .2 Disconnect and reroute service lines of the electrical, telephone and telecommunications networks according to the mechanical / electrical engineers' documents. Post warning signs on electrical lines and equipment which must remain energized to serve other structures during period of demolition.
- .3 Identify and protect utility lines. Do not disrupt active or energized utilities designated to remain undisturbed.
- .4 Disconnect and close designated lines of the mechanical installations.

3.2 RECYCLING AND REMOVAL OF WASTE

- .1 Dispose of all materials not designated for recycling or reuse. Proceed with disposal or recycling of waste material in accordance with the applicable municipal and provincial laws and regulations.

- .2 The Contractor must clear the site of materials from demolition work, to a location accepted by the Quebec Ministry of the Environment.
- .3 Selling or burning demolition materials on site is not permitted.
- .4 Collect contaminated or dangerous materials and remove them from work site, taking all necessary safety precautions.

3.3 DEMOLITION

- .1 Dismantle parts of the existing building where required to accommodate the construction of new structures, new developments, or the installation of new finishes.
- .2 Demolish structures fully, according to indications and drawings.
- .3 Remove equipment, utility and service lines and other equipment that impede the restoration or repair of existing structures and restore them as work progresses.
- .4 Remove materials defined as contaminated or hazardous by the competent authorities for environmental protection, and dispose of them with all necessary safety measures to minimize hazards during their removal and disposal.
- .5 Ensure that no structure is at risk of settlement or collapse, at the end of each work day.
- .6 Demolish so as to minimize dusting.
- .7 Gather and remove from work site demolished materials, taking all appropriate security measures.
- .8 Remove items to be reinstalled, store them as directed by the Owner and reinstall them when appropriate.
- .9 Re-cut the edges of partially demolished elements of the building to the tolerances specified by the Departmental Representative to facilitate the installation of new elements.

3.4 CLEANING

- .1 Keep the work site clean and in good order for the duration of the demolition work.
- .2 Once work is completed, return adjacent areas to condition existing before building demolition operations began.

- .3 Following demolition work, the Contractor will repair the parts of the building that have been demolished or drilled or dismantled for the execution of new work. These repairs involve, among other things, making the composition and surfaces of floors, walls, baseboards and moldings consistent with existing materials. Any new exposed materials or existing materials that have been damaged and are to remain exposed, must be repaired to the satisfaction of the Departmental Representative and at the expense of the Contractor.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 74 00 - Cleaning
- .3 Section 03 30 00.09 – Cast-in-place concrete–short form.

1.2 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
- .2 ASTM International
 - .1 ASTM A123/A123M-15 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A143/A143M-07 (2014), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A641/A641M-09a (2014), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .4 ASTM A775/A775M-17, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
 - .5 ASTM A884/A884M-14, Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
 - .6 ASTM A 1064/A 1064M-17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .3 CSA Group (CSA)
 - .1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA A23.3-14, Design of Concrete Structures.
 - .3 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA G40.20/G40.21-13 (R2014), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CSA W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 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 off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Ministerial Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CSA G30.18.
- .4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.
- .5 Deformed steel wire for concrete reinforcement: to ASTM A1064/A1064M.
- .6 Galvanizing of non-prestressed reinforcement: to ASTM A123/A123M, Coating Grade 85, minimum zinc coating 610 g/m².
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution minimum 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 No restriction applies to temperature of solution.
 - .4 Chromate solution sold for this purpose may replace solution described above, provided if of equivalent effectiveness.
- .7 Chairs, bolsters, bar supports, spacers: to CSA A23.1/A23.2.
- .8 Tie wire: 1.5 mm diameter annealed wire.

2.2 FABRICATION

- .1 Unless indicated otherwise, fabricate reinforcing steel in accordance with CSA A23.1/A23.2 and the Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

- .2 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
- .3 Unless indicated otherwise, use standard hooks.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Galvanizing to include chromate treatment.
 - .1 Duration of treatment 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

3.3 PLACING REINFORCEMENT

- .1 Cutting or puncturing vapour retarder is not permitted; repair damage and reseal vapour retarder before placing concrete.
- .2 Place reinforcing steel as indicated on placing drawings in accordance with CSA A23.1/A23.2.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .4 Maintain cover to reinforcement during concrete pour.
- .5 The reinforcements must be securely attached to ensure that they remain in place during concrete placement.
- .6 Use black standard wire for black reinforced structures and galvanized wire for galvanized reinforcements.

3.4 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

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 74 19 – Waste Management and Disposal
- .4 Section 03 20 00 – Concrete Reinforcing

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A641 / A641M-09a (2014), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
 - .2 ASTM A775/A775M-16, Standard Specification for Epoxy-Coated Reinforcing Steel Bars
 - .3 ASTM A884/A884M-14, Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
 - .4 ASTM A1064/A1064M-16b Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - .5 ASTM C920-14a, Standard Specification for Elastomeric Joint Sealants
 - .6 ASTM D1751-04 (2013) e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non extruding and Resilient Bituminous Types).
 - .7 ASTM C494/C494M-16, Standard Specification for Chemical Admixtures for Concrete.
 - .8 ASTM C1017/C1017M-13e1, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .9 ASTM C 1059/C 1059M-13, Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 CSA Group
 - .1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .3 CAN/CSA-G30.18-09(R2014), Billet-Steel Bars for Concrete Reinforcement.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.

- .2 Provide to Departmental Representative, four (4) weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

- .1 When plant does not hold valid certification, provide test data and certification by qualified independent inspection and testing laboratory that materials used in concrete mixture will meet specified requirements.

- .3 Quality Control Plan: submit a written report to Departmental Representative, as described in PART 3 – VERIFICATION, verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 – PRODUCTS.

- .1 Adjacent intact surfaces.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:

- .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

- .1 Modifying maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2 is prohibited.

- .2 Deviations submitted for review by Departmental Representative.

- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

1.6 AMBIENT CONDITIONS

- .1 Placing concrete during rain or weather events damaging to concrete is prohibited.

- .2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.

- .3 Cold weather protection:

- .1 Maintain protection equipment, in readiness on Site.

- .2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.

- .3 Placing concrete upon or against surface at temperature below 5°C is prohibited.

- .4 Hot weather protection:
 - .1 Protect concrete from direct sunlight when ambient temperature above 27°C.
 - .2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.
- .5 Protect from drying.

PART 2 PRODUCTS

2.1 DESIGN CRITERIA

- .1 Alternative 1 - Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

- .1 Cement: for general use, compliant to CAN/CSA-A3001, de type GU.
- .2 Hydraulic cement: based compound silica fume type GUB-SF compliant to standard CAN/CSA-A3001.
- .3 Water: compliant to standard CSA-A23.1.
- .4 Reinforcing bars:
 - .1 Billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .5 Other concrete materials: to CSA A23.1/A23.2.

2.4 MIXES

- .1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Uniformity
 - .2 Placeability
 - .3 Workability: free of surface blemishes, loss of mortar, colour variations and segregation
 - .4 Finishability: 2 % maximum bleeding and should be absorbed within 24 hours.
 - .5 Set time: normal.

- .3 Provide concrete mix to meet following hard state requirements:
 - .1 Outdoor slab on grade:
 - .1 Durability and class of exposure: C-1.
 - .2 Compressive strength at 56 days: 35 MPa.
 - .3 Aggregate size : 20 mm.
 - .4 Cement : type GU.
 - .5 W/CM ratio : 0.40 maximum.
 - .6 Slump : 80 mm \pm 20 mm.
 - .7 Air content : 5 to 8%.
 - .4 Concrete supplier's certification.
 - .5 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .6 The use of calcium chloride is prohibited.
 - .7 The Contractor shall submit the mix formula to the Departmental Representative for approval. No concrete can be placed without the mix formula being approved.

PART 3 EXECUTION

3.1 PREPARATION

- .1 Obtain Departmental Representative's approval before placing concrete.
 - .1 Provide 48 hours' 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 Concrete delivery and handling to facilitate placing with minimum of rehandling, and without damage to existing structure or Work.
- .4 Protect previous work from staining.
- .5 Clean and remove stains prior to application of concrete finishes.
- .6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .7 Do not place load upon new concrete until authorized by Departmental Representative

3.2 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

3.3 FINISHES

- .1 Pavements, walks, curbs and exposed site concrete:
 - .1 Screed to plane surfaces and use magnesium floats.

- .2 Provide round edges and joint spacings using standard tools.
- .3 Trowel smooth and provide lightly brushed non-slip finish.

3.4 CURING

- .1 Use curing compounds compatible with applied finish on concrete surfaces free of bonding agents and to CSA A23.1/A23.2.
- .2 Retain wet surface 3 consecutive days.
- .3 Use procedures as reviewed by Departmental Representative, or those noted CSA-A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
- .4 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

3.5 FIELD QUALITY CONTROL

- .1 Site tests: conduct following test in accordance with Section 01 45 00 – Quality Control and submit report as described in PART 1 – ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete pours.
 - .2 Slump tests.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative, for review in accordance with CSA-A23.1/A23.2.
 - .1 Ensure testing laboratory is certified in accordance with CSA A283.
- .3 The Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

3.6 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Designate cleaning area for tools to limit water use and runoff.
- .4 Waste Management:
 - .1 Divert unused concrete materials from landfill to local recycling facility after receipt of written approval from Departmental Representative.
 - .2 Provide appropriate area on job site where concrete trucks can be safely washed.
 - .3 Disposal of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location posing health or environmental hazard is prohibited.

3.7 Verification

- .1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established in PART 2 – Products, by Departmental Representative and provide verification of compliance as described in PART 1 – QUALITY ASSURANCE

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 53 – Miscellaneous Rough Carpentry
- .2 Section 09 21 16 - Gypsum Board Assemblies
- .3 Section 09 91 23 - Interior Painting
- .4 Steel structures - See engineering documents.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A 496 / A 496M-07, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - .2 ASTM E 336-11, Standard Test Method for Measuring Airborne Sound Attenuation Between Rooms in Buildings.
- .2 CSA Group
 - .1 CAN / CSA-A165 SERIES-F04 (C2009), CSA Standards for Concrete Masonry Units, contains: A165.1, A165.2, A165.3.
 - .2 CAN / CSA-A179-14, Mortar and Grout for Unit Masonry.
 - .3 CAN / CSA-A370-14, Connectors for Masonry.
 - .4 CAN / CSA-A371-14, Masonry Construction for Buildings.
 - .5 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .6 CSA S304-14 UP1, Design of Masonry Structures.
- .3 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN / ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.

1.3 QUALITY CONTROL AT SOURCE

- .1 At the request of the Departmental Representative, submit laboratory test reports certifying that the masonry units and mortar ingredients meet the prescribed requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal

Procedures.

- .2 Data sheets
 - .1 Submit required data sheets as well as the manufacturer's instructions and documentation regarding masonry, mortar / grout and reinforcements. Data sheets must indicate product characteristics, performance criteria, size, limitations and finish.
 - .2 Submit two (2) copies of Material Safety Data Sheets (MSDS) required by WHMIS.
 - .1 The sheets must indicate the VOC emission rate, in g / L, of the epoxy coatings, galvanizing coatings and retouching products to be applied inside the building envelope.
- .3 Shop drawings
 - .1 The submitted shop drawings must bear the seal and signature of a qualified engineer recognized or licensed to practice in Canada, in the province of Quebec.
 - .2 The shop drawings must include the list of required rebars as well as the folding details and installation drawings for the latter.
 - .3 The installation drawings must indicate the number of reinforcement members, staples and anchors required as well as the dimensions, spacing and location of these parts.
- .4 Samples
 - .1 Submit samples of each proposed product for review and acceptance.
 - .2 The samples will be given back to the Contractor, and must be incorporated into the work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - Common Product Requirements, and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to the work site in their original packaging, which must be labeled with the name and address of the manufacturer.
- .3 Storage and handling
 - .1 Store materials, components, and equipment off of ground, in a dry, clean, well ventilated, indoor location, in accordance with the manufacturer's recommendation.
 - .2 Store masonry materials to protect them from marks and scratches.
 - .3 Replace defective or damaged materials and equipment with new materials and equipment.

- .4 Packaging Waste Management: recover packaging waste for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 MASONRY UNITS

- .1 Type 1: Fire Retardant Concrete Masonry Units: to CAN / CSA-A165 (CAN / CSA-A165.1-05) standards, satisfying the following requirements.
 - .1 Type: H / 15 / A / O, taking into account the fire resistance characteristics mentioned below.
 - .2 Fire Resistance Characteristics: The aggregate used in the manufacture of the concrete and the equivalent thickness of the elements must comply with the requirements of the current National Building Code of Canada.
 - .3 Fire rating: 1.5 hours minimum.
 - .4 Size: 190mm x 390mm x 290mm
 - .5 Special-shaped units: sharp-edged units must be used for exposed corners, and specially shaped units for lintels and connecting beams; other special shaped units must be provided as indicated.

2.2 REINFORCEMENT AND STAPLES

- .1 Rebars: grade 400, to CAN / CSA-A371 and CSA G30.18 standards.
- .2 Horizontal reinforcement: triangular type mesh, 3.66 mm, to ASTM A371 and CSA G30.3-M1983 standards. The width of the mesh must be adapted to the thickness of the walls.
- .3 Reinforcing wire: mesh, to CAN / CSA-A371 and ASTM A496 / A496M standards.
- .4 Staples and anchors: to CAN / CSA-A370 and CSA S304.1.

2.3 MORTARS AND GROUT

- .1 Mortars: to CAN / CSA-A179.
 - .1 Factory-premixed mortar based on hydraulic cements and calibrated sand for the laying and grouting of concrete blocks.
 - .2 Type: N, according to specifications for characteristics.
- .2 Grout: to CAN / CSA-A179, Table 3.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of conditions: Before proceeding with the installation of the masonry, ensure that the conditions of the surfaces / supports previously implemented under other sections or contracts are acceptable for the work to be carried out in accordance with the written instructions of the manufacturer.
 - .1 Visually inspect surfaces / substrates in the presence of the Departmental Representative.
 - .2 Inform the Departmental Representative of any unacceptable conditions immediately upon discovery.
 - .3 Do not proceed with work until unacceptable conditions have been corrected.

3.2 GENERAL

- .1 Unless otherwise specified, perform masonry work in accordance with CAN / CSA-A371.
 - .1 Pattern: stretcher bond ("Greek")
 - .2 Seat height: 200 mm for one (1) row of concrete elements and one (1) joint.
 - .3 Joints: drawn full at the points where they will be exposed, or when the application of a paint or other type of finishing compound is prescribed.
- .2 Construct masonry works of plumb, level and true, with well aligned vertical joints.
- .3 Arrange the rows of blocks according to the prescribed pattern and in such a way as to obtain courses of appropriate height and to maintain the continuity of the brickwork above and below the bays, by cutting a minimum number of masonry elements.

3.3 INSTALLATION

- .1 Exposed masonry structures
 - .1 Remove chipped, cracked or otherwise damaged units from exposed structures and replace with units in good condition.
 - .2 Cut masonry units where they required to install switches, outlets or other recessed or embedded elements.
- .2 Incorporation
 - .1 Lay staples and reinforcements as indicated in the drawings.
 - .2 Embed the elements to be incorporated into the masonry structures.
 - .3 Prevent embedded elements from moving during construction. As work progresses, frequently the elements remain plumb, in alignment and in the correct position.
 - .4 Brace door jambs so that they stay plumb. Fill the spaces between the jambs and the masonry with mortar.
 - .5 Install non-integral lintels above the bays where indicated.

- .3 Lintels made of concrete masonry units
 - .1 When no steel or reinforced concrete lintel is prescribed, make a lintel of reinforced concrete units over openings in the masonry structure.
 - .2 Support at the ends of the lintels: at least 200 mm as shown in the drawings.
- .4 Load support
 - .1 Where grout-filled cells are required instead of solid units, use grout that complies with CAN / CSA-A179.
 - .2 Lay construction paper under the voids to be filled with grout; place the construction paper 25 mm away from the face of the units.
- .5 Movement of masonry elements
 - .1 Leave a space of 3 mm under the support corners.
 - .2 Leave a gap of 6 mm between framing members and the top of non-load-bearing walls and partitions; do not insert shims.
 - .3 Construct masonry structures so as to incorporate stabilizers and plan for, before the implementation of the latter, the vertical movement of the masonry.
- .6 Connection to other works
 - .1 Cut out openings in existing structures as indicated.
 - .2 Any opening in the walls must be approved by the Departmental Representative.
 - .3 Restore the existing structures in good condition using materials corresponding to those used for the realization of the latter.

3.4 INSTALLATION OF FRAMES AND STAPLES

- .1 Install reinforcements, staples and masonry anchors in accordance with CAN / CSA-A370, CAN / CSA-A371, and CSA S304.1, unless otherwise specified.
- .2 Obtain approval from the Departmental Representative for the location of reinforcement, staples and anchors prior to mortar and grout application.

3.5 FASTENING AND CONNECTION

- .1 Connect wall sections of walls of two (2) or more sections with metal studs and anchors in accordance with CAN / CSA-A371 and CSA S304.1 and as indicated.
- .2 Fasten the masonry veneers to the substrate in accordance with the National Building Code (NBC), CSA S304.1 and CAN / CSA-A371 and as indicated.

3.6 REINFORCEMENT OF LINTELS AND CONNECTING BEAMS

- .1 Arm the lintels and connecting beams as indicated.

- .2 Install rebars and grout in accordance with CAN / CSA-A179, CAN / CSA-A371 and CSA S304.1.

3.7 GROUT INJECTION

- .1 Inject grout into the masonry in accordance with CAN / CSA-A179, CAN / CSA-A371 and CSA S304.1 and as indicated.

3.8 INSTALLATION OF ANCHORS

- .1 Provide the required metal anchors and install as indicated.

3.9 INSTALLATION OF ANCHORS AND SIDE SUPPORTS

- .1 Provide the required anchors and side supports and install them in accordance with CSA S304.1 and as indicated.

3.10 INSTALLATION TOLERANCES

- .1 Tolerances given in CAN / CSA-A371 apply.

3.11 MIXING

- .1 Mixing will be done using a mechanical mixer clean and free of dried mortar, traces of rust and other contaminants; do not thaw equipment with salt or antifreeze agents. Mortar can be mixed by hand if necessary with the written approval of the Architect.
- .2 Use cubic feet of volume containers to accurately measure the amount of sand required for the type of grout chosen. Sand cannot be measure by shovel.
- .3 Prepare the mortars according to the instructions of the supplier of the premixed materials for the proportions water / cementitious materials, the steps to follow in the successive introduction in the mixture of all the materials. Carefully observe the amount of water required by the manufacturer per bag of mortar.
- .4 The total duration of mixing shall not be less than 8 minutes nor exceed 10 minutes. Let stand 2 minutes and remix 2 minutes. For mortar coloured on site, mixing will take between 8 and 12 minutes to ensure uniform dispersion of the dyes.

3.12 TIME TO INSTALATION OF MORTAR AND GROUT

- .1 Mortar must be used and put in place definitively within 2-1 / 2 hours of mixing; when the air temperature is equal to or greater than 25 ° C, this time shall be reduced to 1-1 / 2 hours. Beyond these limits, the mortar must be discarded.

3.13 REMIXING

- .1 Remixing of mortar stiffened by evaporation is forbidden and stiffened mortar must be thrown away.

3.14 UNIFORMITY OF COLOURS

- .1 In order to ensure the colour uniformity of the mortars, the contractor will:
 - .1 Use clean water from the same source;
 - .2 Avoid adding water on the job to modify or restore the workability of the mortar.
 - .3 Always smooth joints within the time frame after mortar is applied.
 - .4 Clean tools and mixer thoroughly if they have been used for different blends.

3.15 CLEANING

- .1 Progress cleaning: clean according to Section 01 74 10- Cleaning.
 - .1 Leave site clean at the end of each work day.
- .2 Final Cleaning: Remove surplus materials, rubbish, tools, and equipment from work site in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: Sort waste for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

3.16 PROTECTION OF WORKS

- .1 Protect masonry works, among other things, against marks, mortar spatters and other damage. Use non-staining tarpaulins.
- .2 Repair damage cause by masonry work to adjacent materials and equipment.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements
- .3 Section 01 74 00 - Cleaning

1.2 REFERENCE STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM A36/A36M-08, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A193/A193M-08, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
 - .3 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .4 ASTM A325-07a, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - .5 ASTM A325M-08, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric).
 - .6 ASTM A490M-04ae, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints (Metric).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.
- .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).
 - .1 Handbook of the Canadian Institute of Steel Construction.
 - .2 ICCA/AFPC 1- 73b, Quick-Drying, One-Coat Paint for Use on Structural Steel.
 - .3 ICCA/AFPC 2- 75, Quick-Drying, Primer for use on Structural Steel.
- .4 CSA Group (CSA)
 - .1 CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-S16-01 (R2007), Limit States Design of Steel Structures.
 - .4 CAN/CSA-S136-07, North American Specifications for the Design of Cold Formed Steel Structural Members.
 - .5 CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
 - .6 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.

- .7 CSA W55.3-1965 (R2003), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .8 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .5 Master Painters Institute
 - .1 MPI-INT 5.1-08, Structural Steel and Metal Fabrications.
 - .2 MPI-EXT 5.1-08, Structural Steel and Metal Fabrications.
- .6 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International
 - .1 NACE No. 3/SSPC SP-6-06, Commercial Blast Cleaning.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals 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 Quebec, Canada.
- .3 Erection drawings:
 - .1 Submit erection drawings indicating details and information necessary for assembly and erection purposes including:
 - .1 Description of methods.
 - .2 Sequence of erection.
 - .3 Type of equipment used in erection.
 - .4 Temporary bracings.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials in manufacturer's original, undamaged containers with identification labels intact.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16 to resist forces, moments, shears and allow for movements indicated.

2.2 MATERIALS

- .1 Structural steel: compliant to CAN/CSA-G40.20/G40.21.
 - .1 W, WT, S and I section: ASTM A992 grade 50.
 - .2 Plates and other shapes: 300 W grade
 - .3 Round or square hollow structural section: ASTM A500

- .2 Bolts, nuts and washers: to ASTM A325 and ASTM A490/A490M.
- .3 Welding materials: to CSA W48 Series and CSA W59 and certified by Canadian Welding Bureau.
- .4 Shop paint primer: to CISC/CPMA2-75.

2.3 FABRICATION

- .1 Fabricate structural steel in accordance with CAN/CSA-S16 and in accordance with approved shop drawings.
- .2 Shop connections must be welded and field connections must be bolted unless noted otherwise on drawings. Use high strength steel bolts M20 or M24 diameter in accordance with ASTM A325 AND A490 standard. All bolted connections shall be tightened by the turn-of-nut method or equivalent for approved.
- .3 All welding must be according to the requirements of CSA W59 shall be performed by a manufacturer accredited recognized by the Canadian Welding Association according to the specifications of the CSA W47.1 division 2.

2.4 SHOP PAINTING

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Prepare surface according to NACE No.3/SSPC-SP-6.
- .3 Apply one coat of primer in shop to steel surfaces to achieve minimum dry film thickness of 1.5 to 2.0 mil, on all surfaces except:
 - .1 Surfaces to be encased in concrete.
 - .2 Surfaces to receive field installed stud shear connections.
 - .3 Surfaces and edges to be field welded.
 - .4 Faying surfaces of slip-critical connections.
 - .5 Below grade surfaces in contact with soil.
- .4 Apply paint under cover, on dry surfaces when surface and air temperatures are above 5 degrees C.
- .5 Maintain dry condition and 5 degrees C minimum temperature until paint is thoroughly dry.
- .6 Strip paint from bolts, nuts, sharp edges and corners before prime coat is dry.

PART 3 EXECUTION

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

- .1 Structural steel work: in accordance with CAN/CSA-S16.
- .2 Welding: in accordance with CSA W59.
- .3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

3.3 CONNECTION TO EXISTING WORK

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Ministerial Representative for direction before commencing fabrication.

3.4 MARKING

- .1 Mark materials in accordance with CSA G40.20/G40.21. Do not use die stamping. When steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark bearing assemblies and splices for fit and match.

3.5 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16 and in accordance with approved erection drawings.
- .2 Field cutting or altering structural members: to approval of Ministerial Representative.
- .3 If during assembly, adjustments were required to the structure, the Contractor must provide a repair sketch signed by a structural engineer and submit it for approval. Any repairs carried out before approval is at the Contractor's risk.
- .4 Do not enlarge the hole on site with a torch. Do not bend steel with drift pins. When a joint requires an adjustment in the alignment of bolt holes, the erector must ream the diameter greater than all the holes of the same assembly. Replace the assembly bolts with larger diameter bolts. The Contractor must provide a repair sketch signed by a structural engineer and submit it for approval.
- .5 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection
- .6 All field bolted joints shall receive a controlled bolt tightening by the turn of nut method or equivalent method for approval.

3.6 FIELD PAINTING

- .1 Touch up damaged surfaces and surfaces without shop coat with primer to NACE No.3/SSPC-SP-6 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.

3.7 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Section 06 10 53 - Rough Carpentry;
- .2 Section 09 91 23 - Interior Painting;
- .3 See engineering documents.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A 53 / A 53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 269-08, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .3 ASTM A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 CSA Group
 - .1 CSA G40.20-13 / G40.21-13, General requirements for rolled or welded structural quality steel / Structural quality steel
 - .2 CAN / CSA G164-18, Hot dip galvanizing of irregularly shaped articles.
 - .3 CSA S16-14, Design of Steel Structures.
 - .4 CSA W48-14, Filler metals and allied materials for metal arc welding (prepared in collaboration with the Canadian Welding Bureau).
 - .5 CSA W59-13 UP4, Welded steel construction (metal arc welding).
- .3 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN / CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.
 - .2 CAN / CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
- .5 Green Seal Environmental Standards (GS)
- .6 National Association of Architectural Metal Manufacturers (NAAMM)
 - .1 AMP 510-92, Metal Stair Manual
 - .2 CAN / CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data sheets
 - .1 Submit required data sheets and manufacturer's instructions and documentation for the proposed profiles, plates, pipes, tubes and bolts. Data sheets must indicate

- product characteristics, performance criteria, size, limitations and finish.
- .2 Submit two (2) copies of Material Safety Data Sheets (MSDS) required by WHMIS, in accordance with Section 01 35 29.06 - Health and Safety and 01 35 43 - Environmental Protection.
 - .1 For coatings, primers, paints and other finishes applied on work site, indicate the VOC content (in g / L).
- .3 Shop drawings
 - .1 Shop drawings must indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.
 - .2 Take into account all related work when preparing shop drawings. Perform coordination necessary to avoid any conflict.

1.4 QUALITY ASSURANCE

- .1 Test reports: Submit certified test reports showing compliance of products, materials and equipment with specified physical properties and performance criteria.
- .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 and handle materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to work site in their original packaging, which must be labeled with the name and address of the manufacturer.
- .3 Storage and handling
 - .1 Store materials and equipment so that they do not sit on the floor, in a dry, clean, well-ventilated, indoor area, as recommended by the manufacturer.
 - .2 Replace damaged materials and equipment with new materials and equipment.

1.6 MEASUREMENT

- .1 Verify all existing dimensions, clearances and spacings on work site prior to all shop fabrication.
- .2 Notify the Departmental Representative of any significant changes from the verified shop drawings.

1.7 CODES

- .1 Stairs, railings and handrails must be sized in accordance with Part 3 of the applicable NBC.

Part 2 Products

2.1 MATERIALS/EQUIPMENT

- .1 Steel profiles and plates: 300W grade, to CSA G40.20 / G40.21.
 - .1 Steel tubes: to CSA G40.20 / G40.21 , 300W grade, rectangular or round squares, with 2.5 mm wall thickness, size as indicated.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48 series standards.
- .4 Bolts and anchor bolts: to ASTM A 307.
- .5 Grout: non-shrink, non-metallic, fluid and having a resistance of 15 MPa after 24 hours.
- .6 Concrete or concrete block anchors: Stainless steel expansion anchors.

2.2 METAL FABRICATIONS - GENERAL

- .1 Structures must be straight, square, true to line and conform to specified dimensions; joints must be tight and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring connections by screws, unless otherwise specified.
- .3 Interior handrails must be anchored to concrete block walls using stainless steel hollow wall anchors.
- .4 Whenever possible, the structures must be adjusted and assembled in the workshop and delivered ready to be erected.
- .5 Exposed welds must be continuous over the entire length of the joint; they must be ground smooth and flush with adjacent finished surfaces.

2.3 FINISH

- .1 All exposed steel members of interior handrails must be primed for painting.
- .2 All handrail and guardrail steel members must be hot-dip galvanized.
- .3 On-site applied wash primer: to CAN / CGSB-1.40.
- .4 Galvanization: 600 g / m2 hot dip galvanizing process according to CAN / CSA-G164.
- .5 On-site primer: According to CAN / CGSB-1.40.
- .6 Zinc coating for priming coat: Zinc-rich, ready-to-use coating in accordance with CAN / CGSB-1.181.

2.4 INSULATION COATING

- .1 Aluminum members and surfaces must be isolated from the materials listed below using bituminous paint.
 - .1 Metallic members and surfaces of different types, except stainless steel, zinc and small white bronze members and surfaces.
 - .2 Concrete, mortar and other masonry materials.
 - .3 Wood.

2.5 SHOP PAINTING

- .1 Primary: VOC content up to 250 g / L according to GS-11.
- .2 Surfaces must be cleaned according to the instructions in Volume 2 of the Steel Structures Painting Council manual.
- .3 Metal members, unless they are galvanized or bedded in concrete, must be coated with one (1) layer of primer applied in the shop.
- .4 Surfaces inaccessible after assembly must be coated with two (2) layers of distinctly coloured sealer.
- .5 The primer must be used as supplied by the manufacturer, without any modification. It must be applied to dry surfaces, free of rust, grease and deposits, at a temperature of at least 7 degrees Celsius.
- .6 Surfaces to be welded on site must be cleaned and must not be painted.
- .7 For painting of metal elements, see section 09 91 23 Interior Painting.

2.6 HANDRAILS AND GUARDRAILS

- .1 Unless otherwise specified, guardrails and handrails must be made of tubes, rods, plates or other steel profiles.
 - .1 Stair handrails must be of 38 mm outer nominal diameter steel, according to size and profiles shapes indicated on drawings.
 - .2 Guardrails shall be 38 mm steel of external nominal diameter, according to the profiles and sizes indicated on drawings, with 12x12mm galvanized steel rods as shown on drawings.
- .2 Exposed ends of the railings and handrails must be closed and welded.
- .3 End flanges must be used to secure railings to walls.

2.7 METALLIC STAIRCASE

- .1 Stringers must be made of hot-dip galvanized steel C250x23 profiles. Ends must be closed with hot-dip galvanized steel plates.
- .2 Prefabricated steel steps, grating, with closing plate. 51x305x915mm mechanically fastened to the stringers, 11 gauge, with anti-slip nosing. Hot-dip galvanized steel.
- .3 Hot-dip galvanized steel clip angle, as shown in drawings.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of conditions: confirm that conditions of the surfaces / substrates previously implemented under other sections or contracts are acceptable for work in accordance with the manufacturer's written instructions, prior to proceeding with work.
 - .1 Visually inspect surfaces / substrates in the presence of the Departmental Representative.
 - .2 Inform the Departmental Representative of any unacceptable conditions immediately upon discovery.
 - .3 Do not proceed with work until unacceptable conditions have been corrected.

3.2 ERECTION

- .1 Perform welding work in accordance with CSA W59, unless otherwise specified.
- .2 Erect metalwork square, plumb, straight and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to the Departmental Representative, such as dowels, anchor clips, bar anchors, expansion bolts and shields, toggles.
- .4 Exposed fasteners must be compatible have the same finish as the material they pass through or are attached to.
- .5 Provide necessary components for work done by sub trades, in accordance with the nomenclature and submitted shop drawings.
- .6 Perform on site connections using bolts Connect items in place using bolts, per CSA S16.
- .7 Deliver jigs and parts to be bedded in concrete and embedded into masonry to the appropriate location.
- .8 Spot prime existing parts that have been damaged or are now exposed as a result of the demolition of the staircase and guardrail, before installing new elements.
 - .1 Primer: VOC content up to 250 g / L, according to GS-11.
- .9 Spot prime rivets, welds, bolts and burnt or scratched surfaces, after completion of erection.
 - .1 Primer: VOC content up to 250 g / L, according to GS-11.
- .10 Touch-up galvanized surfaces with zinc primer where burned by field welding.
 - .1 Primer: VOC content up to 250 g / L, according to GS-11.

3.3 STAIRCASE INSTALLATION

- .1 Install stairs in accordance with the requirements of the NAAMM Metal Stair Manual.
- .2 Install stairs plumb and true, exactly where indicated; connect elements by welding where possible to obtain maximum rigidity. Fasten stairs to frame using bolts, mounting plates and anchor bolts.
- .3 Fasten stairs to concrete using expansion anchors.

- .4 Perform welding according to CSA W59, unless otherwise specified.
- .5 Touch up bolts, welds, and burned or scuffed surfaces with primer, after completion of installation.

3.5 CLEANING

- .1 Progress cleaning: Perform cleaning according to Section 01 74 00 - Cleaning.
- .2 Leave site clean at the end of each work day.
- .3 Final Cleaning: Remove surplus materials, rubbish, tools, and equipment from work site in accordance with Section 01 74 00 - Cleaning.
- .4 Clean metal structures as soon as possible after installation to remove dust from construction work or the surrounding environment.
- .5 Waste Management: Sort waste for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .6 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

3.6 PROTECTION

- .1 Protect equipment and installed elements from damage during work.
- .2 Repair damage caused by metalwork installation to adjacent materials and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All sections requiring carpentry work other than those described in the structural engineers' documents.
- .2 Before submitting a proposal, carefully review all documents to determine the scope of work in this section and any contract material that may require non-structural carpentry intervention and thus become part of this section in an unexpected manner. . No additional fees can be claimed for failing in this examination of documents.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A123 / A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653 / A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloyed-Coated (Galvanealed) by the Hot-Dip Process.
 - .3 ASTM D1761-06, Standard Test Methods for Mechanical Fasteners in Wood.
 - .4 ASTM C1325-14 Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.
- .2 CSA Group
 - .1 CSA A82.30-M1980, Interior Furring, Lathing, and Gypsum Plastering
 - .2 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples
 - .3 CSA O121-17, Douglas Fir Plywood.
 - .4 CSA O141-05 (R2014), Softwood Lumber.
 - .5 CSA O151-17, Canadian Softwood Plywood.
 - .6 CSA O325-16, Construction Sheathing.
 - .7 CAN / CSA-Z809-16, Sustainable Forest Management.
 - .8 CSA B35.4-1972, Wood Screws.
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules For Canadian Lumber 2017.
- .4 American National Standards Institute (ANSI)
- .5 Wood Marking: grade stamped by an organization recognized by the Canadian Lumber Standards Accreditation Board Authority (most recent revision)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit required data sheets and manufacturer's instructions and documentation for wood products and their accessories. Data sheets must indicate product characteristics, performance criteria, size, limitations and finish.

1.4 QUALITY ASSURANCE

- .1 Wood Marking: grade stamped by an organization recognized by the Canadian Lumber Standards Accreditation Board.
- .2 Marking plywood panels: according to relevant CSA standards.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - Common Product Requirements, and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to the work site in their original packaging, which must be labeled with the name and address of the manufacturer.
- .3 Storage and handling
 - .1 Store materials and equipment so that they do not sit on the ground in a clean, dry, well-ventilated area, as recommended by the manufacturer.
 - .2 Store materials so as to protect them against marks and scratches.
 - .3 Replace defective or damaged materials and equipment with new materials and equipment.

Part 2 Products

2.1 PANELS AND CONSTRUCTION WOOD

- .1 Lumber: softwood with S4S finish (bleached on 4 sides) with moisture content of no more than 19% (R-SEC).
 - .1 Compliant with CSA O141.
 - .2 Compliant with the NLGA's Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, subframes, curbs, cants, fascia backing and sleepers.
 - .1 S2S finish materials are acceptable.
 - .2 Dimension Lumber Size: "Standard" light framing or better grade.
- .3 Interior woodwork: Softwood, S4S finish (bleached 4-sides), moisture content of 15% or less at time of installation and in accordance with CAN/CSA 0141 and NLGA (Standard Grading Rules for Canadian Lumber); white pin, category A or B select (knot free).

- .4 Canadian softwood plywood: to CSA O151, standard construction grade.
- .5 Finger-jointed and glued members are not acceptable.

2.2 FASTENING AND ACCESSORIES

- .1 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .2 Metallic furring, Z-shaped or U-shaped profil, indicated size, 20 gauge minimum: to CSA A82-30.
- .3 Nails, spikes and staples: to CSA B111.
 - .1 Spiral nails and sprigs;
 - .2 Hot-dip galvanized finish steel for exterior work.
- .4 Screw: Standard or stainless steel for exterior work, to CSA B35.4, of the type and size suitable for the purpose.
- .5 Metal bolts for lightweight concrete panels: without toggles under the head, zinc plated and chemical coated.
- .6 Proprietary fastening devices: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

2.3 COMPATIBILITY

- .1 Members in contact with elastomeric membranes must not be pressure treated.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of conditions: Ensure that the conditions of surfaces / substrates implemented under other sections or contracts are acceptable for product installation in accordance with the manufacturer's written instructions, prior to installation of products.
 - .1 Visually inspect surfaces / substrates in the presence of the Departmental Representative.
 - .2 Inform the Departmental Representative of any unacceptable conditions immediately upon discovery.
 - .3 Start installation work only after unacceptable conditions have been corrected and the Departmental Representative's written approval received.

3.2 INSTALLATION

- .1 Coordinate carpentry work after consulting the mechanical and electrical engineers' documents and these documents.
- .2 Comply with the relevant NBC requirements and with the following requirements.
- .3 Install members square and plumb, true to line, levels and elevation.

- .4 Construct the continuous members from pieces of longest practical length.
- .5 Install metal furring to support vertical and sloping panels where assemblies cannot be nailed directly to the framing.
- .6 Install furring and blocking to ensure the flatness of the structures, with permissible deviation of 1: 600.
- .7 Fasten using fasteners as mentioned in 2.02.
- .8 Connect furrings by screwing or with drift bolts. Furring to be spaced 300mm c / c
- .9 Install furring level, with a tolerance of less than 3mm by 2400mm in length.
- .10 Scribe and cut members so that they fit perfectly.
- .11 Install the panels so that end seals are located on a solid support and offset by at least 300 mm.
- .12 Each panel must straddle at least three (3) furring.
- .13 Install panels perpendicular to supports and well secured on them. Screw to supports with a maximum interval of 150mm and at 10 to 15mm from edges and corners.
- .14 Assemble, anchor, fasten and brace members to provide the necessary strength and rigidity.
- .15 Countersink where necessary so that heads do not protrude.

3.3 CLEANING

- .1 Progress cleaning: clean according to Section 01 74 10 - Cleaning.
 - .1 Leave site clean at the end of each work day.
- .2 Final Cleaning: Remove surplus materials, rubbish, tools, and equipment from work site in accordance with Section 01 74 10 - Cleaning.

3.4 PROTECTION

- .1 Protect equipment and installed elements from damage during work.
- .2 Repair any damage caused by carpentry work to adjacent materials and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 84 00 Fire Stopping
- .2 Section 07 92 00 - Joint Sealants.

1.2 REFERENCES

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 CAN / ULC-S124-06 - Standard Method of Test for the Evaluation of Thermal Barriers for Foamed Plastic.
 - .2 CAN / ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
 - .3 CAN / ULC-S102:2018, Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data Sheets:
 - .1 submit required data sheets and manufacturer's documentation for batt and blanket insulation. Data sheets must indicate product characteristics, performance criteria, size, limitations and finish.
- .3 Test reports
 - .1 Submit required data sheets and certified copies of the test reports, and ensure that the fire-retardant coatings applied on substrates installed as part of the work are of a quality that meets or exceeds the requirements in the current specifications.
 - .2 Submit test results in accordance with CAN / ULC-S101 for fire resistance, and in accordance with CAN / ULC-S102 for surface burning characteristics.
 - .3 For any unlisted assemblies which have not undergone the tests, submit proposals based on related applications, fireproofed according to recognized criteria.
- .4 Certificate
 - .1 Submit documents signed by the Manufacturer, certifying that the products and materials meet the requirements for physical characteristics and performance criteria.
 - .2 Provide certificates of qualifications and performance: The ULC or UL tested concepts demonstrate compliance with ULC S101. Submit a copy of the selected design to determine fire retardant thickness based on prescribed fire resistance, construction and existing details for this specific project.

1.4 ACCEPTABLE MATERIALS AND PRODUCTS

- .1 Where materials or products are prescribed by their brand, refer to the "Instructions to Bidders" for instructions on how to apply for approval of materials or substitutes.

1.5 QUALITY ASSURANCE

- .1 Qualification
 - .1 Installer: a company or person who specializes in the use of flame-retardant coatings.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Transport, store and handle materials in accordance with the manufacturer's written instructions.
 - .3 Deliver in original, closed containers bearing an indication of the brand, the name of the manufacturer, and of ULC certification.
- .2 Storage and protection
 - .1 Store materials in a dry location.
 - .2 Store materials in conditions of temperature and humidity compliant with the manufacturer's recommendations, and protected from bad weather.
 - .3 Opened or damaged containers to be refused.
 - .4 Shelf life must be indicated on the packaging and products must be applied before the expiry date.
 - .5 Carefully isolate work area with temporary partitions to prevent contamination of surrounding air.
 - .6 Protect adjacent surfaces and materials from damage that may be caused by spraying beyond intended limits, dispersion and chalking of fire retardant.

1.7 SITE-SPECIFIC CONDITIONS

- .1 When temperature is below 5 degrees Celsius, maintain ambient and substrate temperature at 5 degrees Celsius for the duration of the application and for 24 hours thereafter. Provide natural ventilation during and after application to allow flame retardant to cure properly. If application is performed in an enclosed space with no openings for natural ventilation, take necessary measures to provide indoor air circulation and extraction of stale air to the outside.
- .2 Maintain relative humidity within the limits recommended by the fire retardant's manufacturer.
- .3 Provide natural ventilation during and after application to allow flame retardant to cure properly.

- .4 If application is made in a confined space with no openings for natural ventilation, provide at least four (4) air changes per hour through forced air circulation.

Part 2 Products

2.1 MATERIALS

- .1 Cementitious fireproofing : sprayed applied fireproofing containing no asbestos, free crystalline silica, or mica, in accordance with CAN/ULC-S102.2-M88 and CAN4-S114-M80, latest revisions.
- .2 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified. Use a different color than the fireproofing to facilitate inspection.
- .3 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.
- .4 Flame retardant coating for foam plastics, one component, spray applied. Required rating: 10 minutes, such as:
 - .1 Monokote type Z-3306 from Grace;
 - .2 DC 315 from International Fireproof Technology;
 - .3 Cementitious thermal barrier from AD Fire Protection Systems.
 - .4 Or an alternative product approved by addendum in accordance with Instructions to Bidders.
- .5 Medium density cementitious fireproofing for steel structure (beams, joists, columns, decking): minimum dry density and cohesive / adherence strength of spray applied fire retardant shall be in accordance with:
 - .1 Fire retardant applied to fireproof framing members, unless specified or otherwise specified: Minimum applied dry density of 352 kg/m³, in accordance with ASTM E-605.
 - .2 Deflection strength: Ensure spray-applied fireproofing: does not crack, spall or delaminate under downward deflection conditions over 3m clear span.
 - .3 Minimum compressive strength (10% deformation): 56 240 kg/m².
 - .4 Spray-Applied fireproofing material: not contribute to corrosion of test panels.
 - .5 Dust removal: not exceed 0.000 gram per square meter.
 - .6 Fire resistance rating: 2h
 - .7 Reference product; Monokote Z-106 from Grace or approved equivalent during the solicitation period according to instructions to bidders.
- .6 Provide accessories in accordance with manufacturer's recommendations and to meet fire resistance requirements of the specifications and codes. These accessories include, but are not limited to, bonding agents (adhesive or primer), mechanical fasteners, application accessories such as metal lath, scrim or trellis, and accelerator.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written requirements, recommendations, and specifications, including any available technical bulletins, instructions for handling, storing, and applying products, and data sheet instructions. .

3.2 PREPARATION

- .1 Ensure underlying surfaces (supports) are free from substances that may affect adhesion of the fire retardant.
- .2 Ensure painted surfaces are compatible with the fire retardant to be applied, and have the adhesion characteristics required to receive the product.
- .3 Remove incompatible materials from support's surface.
- .4 Before spraying product, ensure that elements intended to penetrate the fire retardant coating have already been installed.
- .5 Ensure that conduits, pipes, equipment or other elements that may interfere with the fire retardant coating are installed after the product's application.

3.3 IMPLEMENTATION

- .1 Spray fire retardant after fire protection work on vertical structural elements, columns and bracing, and ULC partitions is completed.
- .2 Coat substrate with adhesive or primer if recommended by the manufacturer.
- .3 Spray fire retardant on substrate, making as many passes as necessary to obtain a monolithic layer of uniform density, texture and thickness.
- .4 Spray fire retardant to achieve a coating that matching tested elements, or according to recognized design criteria to meet the fire rating requirements in the drawings.

3.4 RESURFACING

- .1 Repair fire retardant coating damaged during tests or work done by sub trades, before it is covered, or before final inspection if it is to remain exposed.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Clean surfaces that must not receive spray fire retardant within 24 hours of application.
- .3 After completion of work and performance review, remove surplus materials and implements, waste, tools and equipment from site.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 81 00 – Spray-Applied Fireproofing
- .2 Section 08 11 00 – Metal Doors and Frames
- .3 Section 09 21 16 - Gypsum Board Assemblies
- .4 Fire and smoke protection systems installed in mechanical installations (air ducts and dampers for example) and electrical installations (cable trays for example) are prescribed in the engineering documents.

1.2 REFERENCES

- .1 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S115, Standard Method of Fire Tests of Firestop Systems

1.3 DEFINITIONS

- .1 Firestops: special elements intended to close openings or penetrations during a fire, and / or materials intended to block openings in walls or floors and used to receive terminating devices such as outlet boxes with their mounting devices, or to route cables, cable trays, conduits, air ducts and pipes through the walls.
- .2 Single-component firestop systems: Fire-rated elements or materials with standardized design, used alone as firestop without high-temperature insulation or other similar materials or elements.
- .3 Multi-component firestop systems: groups of specific firestop elements or materials that are standardized in design and allow firestop assemblies to be built on site.
- .4 Perfectly watertight penetrations (CNB, 3.1.9.1.1 and 9.10.9.6.1): whose sockets or sleeves are bedded in concrete, in the case of non-combustible buildings, or which have no annular space, in the case of combustible buildings.
 - .1 Penetrations are said to be "perfectly sealed" when they ensure the integrity of the fire-stop separation so that passage of smoke and hot gases to the unexposed face is prevented.
- .5 Manufacturer: The company that specializes in manufacturing the products covered in this section.
- .6 Installer: a company specializing in the implementation of firestop materials or systems and approved by the manufacturer.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit the required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data sheets
 - .1 Submit the required data sheets as well as the manufacturer's specifications and documentation. Specify product characteristics, performance criteria, dimensions, limitations and finish.
- .3 Shop drawings
 - .1 Submit shop drawings showing proposed location, materials, reinforcements, anchors, fasteners and method of implementation.
 - .2 The construction details must accurately reflect conditions of implementation on site.
- .4 Quality Assurance: Submit the following documents in accordance with Section 01 45 00 - Quality Control.
- .5 Test reports: in accordance with CAN-ULC-S101 for building elements and materials fire endurance, and CAN-ULC-S102 for surface burning characteristics.
 - .1 Submit test reports issued by recognized independent laboratories, certifying that the intended firestop products, materials and equipment meet requirements for physical characteristics and performance criteria.
- .6 Certificates: submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the requirements for physical characteristics and performance criteria.
- .7 Manufacturer's instructions: submit the manufacturer's instructions for use, including any indications for special handling, installation, or cleaning procedures.

1.5 QUALITY ASSURANCE

- .1 Product: Manufactured in accordance with ULC standards and quality control program. Each container or package will bear the ULC label or other label approved in the certification list.
- .2 Before concealing or enclosing fire-rated materials and firestops traversed by service ducts, notify the Departmental Representative that works are ready for inspection.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Packaging, transport, handling and unloading.
 - .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Transport, store and handle materials and equipment in accordance with manufacturer's written instructions.

- .3 Deliver materials and equipment in good condition on site and in their original closed container, bearing an inscription of the brand, manufacturer and ULC certification.
- .2 Storage and protection
 - .1 Store materials and equipment in accordance with manufacturer's recommendations in a clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials and equipment with new materials and equipment.
- .3 Waste management and disposal
 - .1 Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS / EQUIPMENT

- .1 Flame retardant coating for foam plastics, one-component, applicable by spraying. Required rating: 10 minutes, such as:
 - .1 Monokote type Z-3306 from Grace;
 - .2 DC 315 from International Fireproof Technology;
 - .3 Cementitious thermal barrier from AD Fire Protection Systems.
 - .4 Or an alternative product approved by addendum in accordance with Instructions to Bidders.
- .2 Provide accessories in accordance with manufacturer's recommendations and to meet fire resistance requirements of the specifications and codes. These accessories include, but are not limited to, bonding agents (adhesive or primer), mechanical fasteners, application accessories such as metal lath, scrim or trellis, and accelerator.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written requirements, recommendations, and specifications, including any available technical bulletins, instructions for handling, storing, and applying products, and data sheet instructions.

3.2 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation.

- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by[Consultant] [DCC Representative] [Departmental Representative] .
- .2 Install floor fire stopping before interior partition erections.
- .3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Mechanical pipe insulation: [certified] fire stop system component.
- .5 Ensure pipe insulation installation precedes fire stopping.

3.5 FIELD QUALITY CONTROL

- .1 Inspections: notify Department Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.7 SCHEDULE

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Top of fire-resistance rated masonry and gypsum board partitions.
 - .3 Intersection of fire-resistance rated masonry and gypsum board partitions.

- .4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
- .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
- .6 Openings and sleeves installed for future use through fire separations.
- .7 Around mechanical and electrical assemblies penetrating fire separations.
- .8 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Provide sealing and caulking products required by other sections, except roofing sealants, to caulk and seal joints between materials inside and outside the building.
- .2 When caulking with sealants is shown in section or detail, it is agreed that the joint (s) must be sealed over the entire perimeter and / or length of the work to be sealed.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C 919-08, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (April 1976 issue confirmed, incorporating amendment number 1).
 - .2 CAN / CGSB-19.13-M87, Sealing Compound, One Component, Elastomeric, Chemical Curing
 - .3 CGSB 19-GP-14M-76, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (April 1976 Confirmation).
 - .4 CAN / CGSB-19.17-M90, One-Component, Acrylic Emulsion Base Sealing Compound.
 - .5 CAN / CGSB-19.21-M87, Sealing and Bedding Compound, Acoustical.
 - .6 CAN / CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 COMPATIBILITY

- .1 Sealants and their primers must be supplied by the same manufacturer.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Data Sheets
 - .1 Submit the required data sheets as well as the manufacturer's instructions and documentation for sealants. Data sheets must indicate product characteristics, performance criteria, size, limitations and finish.
 - .2 The manufacturer's data sheets must cover the following.
 - .1 Caulking products.
 - .2 Primers.

- .3 Sealants (all types), including their compatibility with each other.
- .3 Submit two (2) copies of the Material Safety Data Sheets (MSDS) required by WHMIS, in accordance with Section 01 35 29.06 - Health and Safety and 01 35 43 - Environmental Protection.
- .2 Samples
 - .1 Submit two (2) samples of each colour and type of product offered.
 - .2 If necessary, for the purpose of harmonization with adjacent materials, submit cured samples for each colour of sealants to be left exposed.
- .3 Manufacturer's instructions
 - .1 Submitted instructions must cover each product offered.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit required documents / elements in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: provide operations and maintenance data, to be incorporated into the Management and Building Manual.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and the manufacturer's written instructions.
- .2 Delivery and Acceptance: Deliver materials and equipment to site in their original packaging, which must be labeled with the name and address of the manufacturer.
- .3 Storage and Handling
 - .1 Store materials and equipment in a clean, dry, well-ventilated area, in accordance with manufacturer's recommendations.
 - .2 Replace damaged materials and equipment with new materials and equipment.

1.7 SITE-SPECIFIC CONDITIONS

- .1 Ambient conditions
 - .1 Proceed with installation of sealants only under the following conditions.
 - .1 Ambient and substrate temperatures are within the limits established by the product manufacturer or are greater than 4.4 degrees Celsius.
 - .2 The substrate is dry.
 - .3 The manufacturer's recommendations concerning the temperatures, relative humidity and moisture content of the substrate for the application and curing of sealants, as well as special instructions governing use, are respected.
- .2 Width of joints
 - .1 Proceed with installation of sealants only when joint width is within the manufacturer's recommendations for the specified applications..
- .3 Substrate
 - .1 Proceed with sealants only after the substrate has been cleared of all contaminants that may prevent adhesion of the products.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labeling and provision of Material Safety Data Sheets (MSDS) recognized by Health Canada.
- .2 The Departmental Representative will ensure that the building ventilation system operates at maximum inflow and outflow rates during the application of sealants and caulking. Ventilate work areas as directed by the Consultant, using approved portable blower and exhaust fans.

Part 2 Products

2.1 SEALANTS

- .1 Do not use caulking compounds that emit strong odours, contain toxic chemicals or that are not certified as mould resistant in air handling units.
- .2 When low toxicity caulking compounds are not possible confine usage to areas that off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANTS – DESCRIPTION

- .1 Backup foam
 - .1 General: compatible with primers and sealants, oversized by 30 to 50%.
 - .2 Polyethylene: extruded cellular foam, Shore A scale hardness 20, breaking load 140 to 200 kPa.
- .2 Non-stick product: one-touch plastic tape that does not adhere to sealants.
- .3 Low-modulus, high-performance, single-component, polyurethane sealant. For outdoor use on flashing, frames and doors, window frames and other structures above average ground level:
 - .1 Product compliant with CAN / CGSB-19.13, type 2, non-sagging MCG-2-40. Primer recommended by the manufacturer.
- .4 One-component silicone rubber sealant for firebreak separation:
 - .1 Product compliant with CAN4-S115 and CAN4-S102. Primer recommended by the manufacturer.
- .5 Sealant for interior use as a fire-resistant and paintable seal:
 - .1 ASTM, NFPA compliant product: Primer recommended by the manufacturer.
- .6 Paintable sealant for interior use:
 - .1 One-component, acrylic resin emulsion sealant, to CAN / CGSB-19.17. Primer recommended by the manufacturer.
- .7 Sealant for indoor use for tiles, furniture, lavatory contours and bathroom accessories, etc.:

- .1 One-component, silicone-based sealant, to CAN / CGSB-19.13. Primer recommended by the manufacturer.
- .8 Sealant for acoustic insulation:
 - .1 Synthetic rubber sealant, to CAN / CGSB-19.21. Primer recommended by the manufacturer.
- .9 Colours of exposed sealants at the discretion of the Departmental Representative, within the manufacturer's extended range.

2.3 CLEANING PRODUCTS FOR JOINTS

- .1 Non-corrosive and non-messy cleaning agents compatible with joint materials and sealants, in accordance with written recommendations of the sealant manufacturer.
- .2 Primer: in accordance with the written recommendations of the sealant manufacturer.

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 joint sealants installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect surfaces / substrates in the presence of the Departmental Representative.
 - .2 Notify the Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Start installation work only after correcting unacceptable conditions and receiving the written approval of the Departmental Representative.

3.2 SURFACE PREPARATION

- .1 Check size of joints to be made and condition of the surfaces and ensure a proper width-to-depth ratio for the installation of backing foam and sealants.
- .2 Clean joint surfaces of harmful substances including dust, rust, oil grease, and other matter which may impair work quality.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove preexisting surface coatings as needed.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMER APPLICATION

- .1 Prior to applying primer and caulking compound, conceal adjacent surfaces as necessary to prevent soiling.
- .2 Apply primer to side surfaces of joints immediately before applying sealant in accordance with the manufacturer's instructions.

3.4 INSTALLATION OF BACKING FOAM AND ACCESSORIES

- .1 Install bond breaker tape where required, in accordance with manufacturer's instructions.
- .2 Install backing foam to achieve correct joint depth and shape, with approximately 30% compression.
- .3 Install plastic exhaust tubes under backing foam, ensuring that they pass through foam and sealant.
- .4 The tubes will be placed opposite each vertical joint and also spaced under the panels without exceeding 600mm.

3.5 INSTALLATION

- .1 Sealant application
 - .1 Apply sealant in accordance with the manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply the sealant in continuous beads.
 - .4 Apply sealant using gun with properly sized nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess sealant promptly as work progresses and upon completion.
- .2 Curing
 - .1 Dry and cure sealants in accordance with the manufacturer's written instructions.
 - .2 Do not cover sealants until proper curing has taken place.

3.6 CLEANING

- .1 Progress cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave site clean at the end of each work day.
 - .2 Clean adjacent surfaces immediately.
 - .3 Remove excess and droppings, using recommended cleaners as work progresses.
 - .4 Remove masking tape at the end of initial sealant setting period.
- .2 Final Cleaning: remove surplus materials, rubbish, tools and equipment from site, in accordance with Section 01 74 00 - Cleaning.

3.7 PROTECTION

- .1 Protect installed products and elements from damage during work.
- .2 Repair damage caused by joint sealants installation to adjacent materials and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 92 00 - Joint Sealants;
- .2 Section 08 71 00 - Door Hardware;
- .3 Section 08 80 00 – Glazing;
- .4 Section 09 91 23 - Interior Painting.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A123 / A 123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A 653 / A 653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM A924M-94, Specification General Requirements for Steel Sheet, Metallic-Coated by Hot-Dip Process.
 - .4 ASTM E152-81a, Method for Fire Test of Door Assemblies.
- .2 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.
- .3 Canadian Standards Association (CSA) / CSA Group
 - .1 CSA-G40.20-13 / G40.21-13, General requirements for rolled or welded structural quality steel / Structural quality steel.
 - .2 CSA W59-13 UP4, Welded steel construction (metal arc welding)
- .4 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.
- .5 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.
- .6 Underwriters Laboratories of Canada (ULC)
 - .1 CAN / ULC-S70.1:2017, Standard for Thermal Insulation, Polystyrene Boards.
 - .2 CAN / ULC-S702-14, Standard for Mineral Fibre Thermal Insulation for Buildings.

- .3 CAN / ULC-S704.1:2017, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced
- .4 CAN4-S104-M80, Standard Method for Fire Test of Door Assemblies.
- .5 CAN / ULC-S101-14, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .6 CAN / ULC-S105:2016, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.

1.3 DESIGN REQUIREMENTS

- .1 Frames installed in exterior walls must be designed so that the elements (doors and frames) can expand and contract freely when their surface is subjected to temperatures ranging from -35 degrees Celsius to 35 degrees Celsius.
- .2 The maximum deflection for bay closing elements under 1.2 kPa wind load must not exceed 1/175 of the span.
- .3 Fire Rated Doors and Frames: certified by a Standards Council of Canada accredited body, to CAN / ULC-S104, NFPA 252 and ASTM E152 standards for prescribed or indicated fire ratings, and bearing the certifying body's label.
- .4 Certified fire-stops must be provided for openings to be closed by fire rated elements. Products must be tested in accordance with CAN / ULC-S104, ASTM E152, NFPA 252 and be certified by a nationally recognized organization providing factory inspection services.
- .5 Notify the Architect prior to fabrication if the specified frames do not meet the fire resistance certification requirements because the model, detail, finishing hardware, glazing or any other reason.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit required data sheets in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 The shop drawings must indicate each type of door proposed, the nature of the materials used, the thickness of the bare metal, the mortise joints, the reinforcing members, the location of anchors and exposed fastenings, the openings intended to receive glazing or louver, the hardware layout, the fire rating and the finishes.
 - .2 The shop drawings must indicate each type of frame proposed, the nature of the materials used, the thickness of the bare metal, the reinforcing pieces, the glazing beads, the location of the anchors and exposed fastenings and the types of finishes .
 - .3 The shop drawings must include a nomenclature of doors with markings and numbers corresponding to those used on the drawings and on the list of doors.
 - .4 Submit test results, technical data and installation instructions.
- .4 Submit required samples in accordance with Section 01 33 00 - Submittal Procedures.

- .5 Submit, as mock-up, a 300 mm x 300 mm corner for each type of frame proposed.
 - .1 The mock-up must show all assembly details, including a hinge cutout, glazing beads, a 300 mm long mullion connection and a pressure molding, with brackets.

1.5 TEMPORARY IDENTIFICATIONS

- .1 Do not mark exposed faces of frames or doors with a felt pencil.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste management and disposal
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

1.7 WARRANTY

- .1 Provide a written document, signed and issued to the owner stating that all steel doors and door frames are guaranteed against any material or labor defect for a period of 1 (one) year starting from date of the provisional acceptance inspection.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Hot-Dip Galvanized Steel Sheet: to ASTM A653M, zinc plated ZF75; minimum thickness of bare metal conforming to the relevant CSDMA standard, Table 1 - Thickness for Component Parts.
- .2 Extrusions and reinforcements: in steel conforming to CSA-G40.20 / G40.21, grade 44W, zinc-plated ZF75 according to ASTM A 653M.

2.2 DOOR CORES

- .1 Honeycomb core
 - .1 "Honeycomb" type, with cells of no more than 24.5 mm, made of Kraft paper, having a mass of no less than 36.3 kg per ream and a density of no less than 16.5 kg / m², sanded to obtain required thickness.
- .2 Fire rating (thermal protection rating): the core material of doors must be able to limit the heating obtained on the unexposed side of the door to 250 degrees Celsius for 90 minutes, 120 minutes or according to indications on the plans. The core must be tested as an integral part of the door, to CAN /ULC-S104, ASTM E152 and NFPA 252 for door fire rating and must be certified by a nationally recognized testing agency providing factory inspection services.

2.3 ADHESIVES

- .1 Honeycomb cores and steel members: thermoresistant, vaporizable contact adhesive based on neoprene rubber (polychloroprene) with incorporated resin filler, low viscosity.

- .2 Locked seam doors: Fire-resistant adhesive / sealant based on polychloroprene with incorporated resin filler, high viscosity.

2.4 PRIMER

- .1 Anti-rust touch-up coating, to CAN / CGSB-1.181.

2.5 PAINTING

- .1 Steel doors and frames to be painted in accordance with Section 09 91 23 - Interior Painting. Weatherstrip is not to be painted. Finished surfaces must be free from scratches or other imperfections.

2.6 INSULATION

- .1 Blanket insulation for installation in steel frames: Rock wool insulation made from basalt or volcanic rock, to CAN/ULC-S702, and with the following properties:
 - .1 Thermal performance: ($\text{m}^2 \text{ } ^\circ\text{C/W}$): 0.66 / 25 mm thickness;
 - .2 Density: 32 kg/m^3 ;
 - .3 Test for Determination of Non-Combustibility (CAN4 S114) : Non-combustible;
 - .4 Surface Burning Characteristics to CAN/ULC-S102.2:
 - .1 Flame spread requirement: 0 ;
 - .2 Smoke development requirement: <5;
 - .5 Thickness: according to frames.

2.7 ACCESSORIES

- .1 Accessories for doors and frames: meet the minimum requirements of the AMCCPA.
- .2 Shock absorbers for doors: rubber, insert type, gray colour.
 - .1 Provide three (3) shock absorbers on the jamb strike for single frames and two (2) dampers on the head of double frames.
- .3 U-shaped extrusions at top and bottom of doors: 1.6mm thick.
- .4 Glazing beads must be made from shaped extrusions at least 16 mm high; they must be properly fitted, headed at corners and fastened to frame members with countersunk oval headed screws.
- .5 Metal filler: according to the manufacturer's specifications.
- .6 Fire rating labels: fastened with metal rivets.
- .7 Where interior fire doors are required, their steel frame must be of the same grade, legibly certified on the frame.
- .8 Stiffening extrusions: hot-dip galvanized steel with a minimum coating weight of 0.4 kg / m^2 , to CAN3-G40.20-M81.
- .9 Sealant: see section 07 92 00 - Joint Sealants.
- .10 Glazing: see section 08 80 00 - Glazing.

- .11 Plan installation of glazing, as specified, and provide the necessary glazing beads.
 - .1 Glazing must be secured by means of removable stainless steel glazing beads for use with glazing tape and putty and fastened with countersunk stainless steel screws allowing dry glazing by simple pressure.

2.8 FABRICATION OF FRAMES - GENERAL

- .1 Frames must be manufactured in accordance with CSDMA standards.
- .2 Frames must be manufactured to the maximum frontal dimensions and profiles shown.
- .3 Door frames: 16 gauge, removable, 3 parts.
- .4 Window frame: 16 gauge, welded.
- .5 Frames must be cut, reinforced, drilled and threaded to receive shaped and mortised hardware and the necessary electronic equipment, using the jigs provided by the hardware supplier. Frames must be reinforced as needed to accommodate surface-mounted hardware.
 - .1 Frames must be engineered to receive the hinges and strike as specified for the mechanical frames.
 - .2 Hinge reinforcements must be protected by metal boxes when installed in concrete block walls.
- .6 The mortises must be protected by means of steel mortise covers.
- .7 Single door frames must be fitted with three dampers, and two-leaf door frames with two dampers installed on the top rail.
- .8 Manufacturer's identification plates must not be placed on frames and panels.
- .9 Fasteners must be concealed, unless otherwise specified.
- .10 Retouch frames with primer where zinc coating has been damaged during fabrication.
- .11 Insulate frames where fire resistance is required with rock wool insulation.

2.9 FRAME ANCHORING

- .1 Appropriate devices to secure the frames to walls and floors must be provided and installed.
- .2 Wall anchors must be placed immediately above or below each hinge brace on the hinge side jamb, and directly opposite of the lock stile.
- .3 Jambs with a rabbet height equal to or less than 1520 mm must be fitted with 2 anchors; additional anchorage must be provided for each additional segment or segment portion of 760 mm.
- .4 Anchors that will be embedded in frames of bays made before the installation of door frames must be placed at most 150 mm from the top and bottom of each jamb, and then at a maximum center to center distance of 660 mm.

2.10 REMOVABLE FRAMES (3 PARTS) FOR DOORS

- .1 Removable frames must be delivered disassembled.
- .2 Frames must be made of solidly interlocking members with mechanical joints, and must have satisfactory functional performance once assembled and installed in accordance with the requirements of the "Recommended Installation Guide for Steel Doors and Frames", published by the CSDMA.
- .3 Ground anchors must be securely fastened inside each jamb.

2.11 WELDED FRAMES FOR WINDOW

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach anchors to concrete block wall.

2.12 DOOR FABRICATION - GENERAL

- .1 Doors must be flat, swinging and must have an opening for the installation of glazing or louvers, as indicated.
- .2 Longitudinal edges of doors must be lock seamed, with flush weld near hardware perforations. Longitudinal joint must be made flush, filled with metal filler, and sanded to a smooth, even finish.
- .3 A 16 "U-shaped steel cap must be electrically welded at the top and bottom of the door every 152mm center to center.
- .4 Doors must be of special construction, tested and / or designed to be part of a fully functional assembly including a door, frame, packing and hardware, to ASTM E330.
- .5 Doors must be cut, reinforced and threaded to accommodate the mortised and shaped hardware and electronic equipment required.
- .6 Openings with a diameter of 12.7 mm or greater must be drilled at the factory, except for those intended to accommodate mounting bolts and through bolts, which must be drilled in place at the time of installation of the hardware.
- .7 Doors must be reinforced where hardware is to be mounted. Inner doors shall be provided at the top and at the bottom with a recessed, spot welded extrusion.
- .8 Spot prime doors where zinc coating has been damaged during fabrication.
- .9 Approved fire doors must be provided for openings that are to be closed by elements with fire resistance, according to the established list or nomenclature. Products must be tested

in accordance with CAN / ULC-S104, ASTM E152 NFPA 252 and be certified by a nationally recognized body providing factory inspection services, and be manufactured in accordance with the details specified in the monitoring procedures and factory inspection manuals published by the certification body and provided to individual manufacturers.

- .10 Do not place manufacturer identification plates on doors.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written requirements, recommendations, and specifications, including any available technical bulletins, instructions for handling, storing, and installations, and data sheet instructions.

3.2 INSTALLATION - GENERAL

- .1 Install fire rated doors and racks bearing the appropriate certification label in accordance with NFPA 80, unless otherwise specified.
- .2 Install doors and frames in accordance with the CSDMA Installation Guide.

3.3 INSTALLATION OF FRAMES

- .1 Install elements plumb, square, level and at the appropriate height.
- .2 Fasten anchors to adjacent building elements.
- .3 Hold frames securely in position using braces until installation is complete. Install temporary bridging horizontally, at the thirds of the opening to keep width constant. Install a vertical shore under the top rail in the center of the bay when the width of the bay is greater than 1200 mm. Remove wooden spacers once the frames are in place.
- .4 Leave clearances necessary for bending to prevent live loads exerted by the building framing to be transmitted to the frames.
- .5 Caulk perimeter between frames and adjacent elements where the opening is part of a fire wall.

3.4 INSTALLATION OF DOORS

- .1 Install doors and hardware using the jigs provided, in accordance with the manufacturer's instructions and the requirements of Section 08 71 00 - Door Hardware.
- .2 Provide a uniform spacing between doors and jambs and between doors and the finished floor, as follows:
 - .1 hinge side: 1.0 mm;
 - .2 lock side and top rail: 1.5 mm;
 - .3 finished floor: 13 mm.
- .3 Adjust moving parts so that doors operate smoothly.

- .4 Install the louvers where required.

3.5 EXECUTION OF TOUCH-UPS

- .1 Spot-prime surfaces that were damaged during installation.
- .2 Cover the exposed surface of frame anchors and surfaces showing metal fill imperfections, then sand down to a smooth, even finish.

3.6 INSTALLATION OF GLAZING

- .1 Install glazing in accordance with Section 08 80 00 - Glazing.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 08 11 00 - Metal Doors and Frames;
- .2 Division 26 – Electricity;

1.2 REFERENCE

- 1. CAN / CGSB-69.20-M90 Door Controls (Closers)
- 2. CNB 2010 - National Building Code
- 3. The Builders Hardware Manufacturers Association (BHMA)
- 4. National Fire Protection Association (NFPA 101)
- 5. Underwriters Laboratories of Canada (ULC 294)
- 6. Canadian Steel Door Manufacturers Association (CSDMA)
- 7. American National Standards Institute / Builders Hardware Manufacturers Association (ANSI / BHMA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Data Sheets
 - .1 Submit data sheets and manufacturer's instructions and documentation for door hardware. Data sheets must indicate product characteristics, performance criteria, size, limitations and finish.
- .4 Samples
 - .1 Submit a sample of each type of hardware item for review and acceptance.
 - .2 Place a label on each sample indicating the corresponding paragraph in the specifications, the identification number and brand name, the finish and the batch number of the hardware.
 - .3 Once samples have been approved, they will be returned to the Contractor, and must be incorporated into the work.
- .5 List of Hardware Items
 - .1 Submit contract hardware list of door hardware using numbering system established by Architect.
 - .2 The list must contain required hardware items and indicate brand, model, material, function and finish, as well as any other relevant information.
 - .3 List to include door and frame information.

- .6 Test Reports: Submit test reports certifying that products and materials comply with physical properties and performance criteria requirements.
- .7 Manufacturer's Instructions: Submit installation instructions provided by the manufacturer.

1.4 CLOSEOUT SUBMITTALS

- 1. Submit required documents / elements in accordance with Section 01 78 00 - Closeout Submittals.
- 2. Operation and maintenance data: provide instructions for the use and maintenance of door hardware, to be incorporated into the manual.

1.5 REPLACEMENT MATERIALS TO BE DELIVERED

- .1 Provide replacement materials and equipment required in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide (2) two sets of keys for the maintenance of door closers, locks and accessories for exit doors.

1.6 ACCEPTABLE MATERIALS AND PRODUCTS

- .1 Where materials or products are prescribed by their brand, refer to the "Instructions to Bidders" for instructions on how to apply for approval of materials or substitutes.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements
 - .1 Door hardware mounted on firewalls must be certified by a Canadian Standards Council accredited certification body.
- .2 Certificates: submit documents signed by the manufacturer, certifying that the products and materials comply with the requirements for physical properties and performance criteria.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 53 - Common Product Requirements and the manufacturer's written instructions.
- .2 Delivery and acceptance: deliver materials and equipment to work site in their original packaging, which must bear the name and address of the manufacturer.
- .3 Pack hardware, including fasteners, separately or in groups of similar items, and label each package according to the nature and purpose of the items.
- .4 Storage and Handling
 - .1 Store materials and materials in a clean, dry, well-ventilated area as recommended by the manufacturer.

- .2 Store door hardware so as to protect it from marks and scratches.
- .3 Protect finished surfaces with removable film.
- .4 Replace damaged materials and equipment with new materials and equipment.

1.9 WARRANTY

- .1 Provide a written document, signed and issued to the Owner stating that all hardware items are guaranteed against any defects for a period of one (1) year, ten (10) years for the door closers, seven (7) years for the locks, three (3) years for mechanical panic bar, starting from date of the provisional acceptance inspection.

1.10 COMPLEMENTARITY

- .1 The plans and the door, frame and hardware schedule complement each other and any contradiction or missing item to any of the documents will not be added to the contract unless haven been reported to the Architect prior to bid entry.

Part 2 Products

2.1 GENERAL

- .1 All items of the same type must come from the same manufacturer.

2.2 DOOR HARDWARE

- .1 All hardware items must comply with CAN / CGSB-69.20-M90 and applicable ANSI / BHMA standards.
- .2 Hardware described below corresponds to the standards of the establishment. Any deviation from the descriptions and brands that follow must be the subject of a written request before bid opening. All supporting documents must be provided at the request of the Departmental Representative.
- .3 Refer to the enclosed Hardware Schedule.
- .4 Verify the necessary hardware quantities by consulting drawings, specifications and the doors, frames and hardware table.
- .5 If certain items needed to complete the work were not specifically listed, obtain information and clarifications before bidding, or take responsibility for providing these items at no additional cost to the Owner.
- .6 Provide all spacers and accessories required for the installation of the various hardware parts. Pay particular attention to door closers, weatherstrips and soundproofing.

2.3 FASTENERS

- .1 Only use fasteners supplied by the manufacturer. Failure to comply with this requirement may compromise the warranties and invalidate the certification labels, if any.
- .2 Provide screws, bolts, expansion shields and other fasteners necessary for satisfactory fastening and proper operation of hardware.
- .3 Exposed fasteners must have the same finish as the installed hardware item.
- .4 Where there is a pull handle on one side and a push plate on the other side of a door, provide the necessary fasteners and install them so that the handle is secured on both sides. Place the plate so as to conceal the fasteners.
- .5 Fasteners must be compatible with the material they pass through.

2.4 KEYS

- .1 Door cylinders will be provided by the Owner.
- .2 Provide temporary cylinders for premises that must lock for the duration of work. To be coordinated with contractor. They must all be on the same key.

Part 3 Execution

3.1 INSTALLATION

- .1 Manufacturer's instructions: Comply with the manufacturer's written requirements, recommendations and specifications, including the technical bulletins and installation instructions specified in the product catalogs and on the packing cartons, as well data sheets specifications.
- .2 Provide manufacturers of metal doors and frames with installation templates and complete instructions so as to allow them to prepare their products to receive the hardware items prescribed in this section.
- .3 Provide the manufacturer's installation instructions with each hardware item.
- .4 If a door stop would touch the handle, install the door stop at the bottom the door instead.
- .5 Install a key control cabinet.
- .6 Only use fasteners provided by the manufacturer.
 - .1 Quick-disconnect fasteners, unless specifically supplied by the manufacturer, will not be accepted.
- .7 Remove temporary rotors from locks upon request of the Departmental Representative.

- .1 Replace temporary rotors with permanent rotors, then check all locks for proper operation.

3.2 INSTALLATION OF ELECTRIFIED HARDWARE

- .1 Installation of electrified hardware must be performed by a specialized firm accredited by electrified hardware's manufacturer. This firm must hold all required licenses and permits.
- .2 Coordinate the work of this section with related trades and provide electrical diagrams and all required information to the various stakeholders.
- .3 Provide and install all low voltage wiring between various hardware items.
- .4 Consult the Engineer's documents for the coordination of the power supply, empty conduits, electrical boxes and any other item relevant to the connections of the electrified hardware described in this section.
- .5 Supply and install all required transformers and relays for the electrified hardware.
- .6 Start up the electrified hardware and explain operations in detail to the Departmental Representative.

3.3 SETTINGS

- .1 Adjust hardware, operating and control devices, and door closers to ensure smooth operation, safety, and tightness of closing.
- .2 Lubricate hardware, operating and control devices and all moving parts.
- .3 Adjust door hardware to ensure proper door-to-door contact.

3.4 CLEANING

- .1 Progress cleaning: carry out cleaning in accordance with Section 01 74 10 - Cleaning.
 - .1 Leave site clean at the end of each work day.
 - .2 Clean hardware with damp cloth and non-abrasive cleaner and polish according to manufacturer's instructions.
 - .3 Remove protective film covering hardware, if applicable.
 - .4 Final Cleaning: remove surplus materials, rubbish, tools and equipment from site in accordance with Section 01 74 10 - Cleaning.
- .2 Waste Management: sort waste for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

3.5 DEMONSTRATION

- .1 Information given to maintenance personnel.
 - .1 Give maintenance personnel the necessary information on the following.
 - .2 Proper methods for cleaning and maintaining hardware.
 - .3 Characteristics, function, handling and storage of keys.
 - .4 Function, handling and storage of keys used to adjust door closers, locks, and hardware for exit doors.
- .2 Demonstrate component operation, and adjustment and lubrication features.

3.6 PROTECTION

- .1 Protect installed equipment and elements from any damage during work.
- .2 Repair damage caused by door hardware installation to adjacent materials and equipment.

3.7 LIST OF HARDWARE ITEMS

- .1 The hardware groups below are not restrictive and therefore do not constitute quantity lists. These groups are given as a guide to establish the type, function, quality and finish of the required items. Check these groups in conjunction with the drawings and the table of doors and frames and provide any additional hardware items not included in these groups but required to complete the work according to the intent of the documents.
- .2 Hardware Groups:

GROUP 001 - DOOR P201

Existing frame, door and hardware, except:

1	Nylon brush	D480-1 x L.R.	AL	Unique
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GROUP 001A - DOORS P108 AND P110A

Existing frame, door and hardware, except:

2	Nylon brush	D480-1 x L.R.	AL	Unique
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GROUP 002 - DOOR P109A

3	Hinges	LH168BB 114 x 101 FNA	652	Lawrence
1	Lock	ND80LD RHO	626	Schlage
1	Cylinder	Provided by Owner		
1	Door closer	4040XP	689	LCN
1	Protection plate	80A 305 x L.R. x 3MAdhesive	630	Gallery
1	Smoke gasket	CF-12 x Perim.	Black	Unique
1	Nylon brush	D480-1 x L.R.	AL	Unique
1	Wall bumper	240	626	Gallery

GROUP 002A - DOOR P126

3	Hinges	LH168BB 114 x 101 FNA	652	Lawrence
1	Lock	ND80LD RHO	626	Schlage
1	Cylinder	Provided by Owner		
1	Door closer	4040XP	689	LCN
1	Mounting plate	4040XP-18TJ x ST-1630	689	LCN
1	Overhead door stop	100S	630	G-J
1	Protection plate	80A 305 x L.R. x 3M Adhesive	630	Gallery
1	Smoke gasket	CF-12 x Perim.	Black	Unique
1	Nylon brush	D480-1 x L.R.	AL	Unique

GROUP 003 - DOORS P105 AND P125A

3	Hinges	LH168BB 114 x 101 FNA	652	Lawrence
1	Lock	ND10S RHO	626	Schlage
1	Door closer	4040XP	689	LCN
1	Protection plate	80A 305 x L.R. x 3M Adhesive	630	Gallery
1	Smoke gasket	CF-12 x Perim.	Black	Unique
1	Nylon brush	D480-1 x L.R.	AL	Unique
1	Wall bumper	240	626	Gallery

GROUP 003A - DOORS P111A AND P112

3	Hinges	LH168BB 114 x 101 FNA	652	Lawrence
1	Lock	ND10S RHO	626	Schlage
1	Door closer	4040XP	689	LCN
1	Protection plate	80A 305 x L.R. x 3M Adhesive	630	Gallery
1	Smoke gasket	CF-12 x Perim.	Black	Unique
1	Nylon brush	D480-1 x L.R.	AL	Unique
1	Floor bumper	218	626	Gallery

GROUP 003B - DOORS P114 AND P123

3	Hinges	LH168BB 114 x 101 FNA	652	Lawrence
1	Lock	ND10S RHO	626	Schlage
1	Door closer	4040XP	689	LCN
1	Mounting plate	4040XP-18TJ x ST-1630	689	LCN
1	Overhead door stop	100S	630	G-J
1	Protection plate	80A 305 x L.R. x 3M Adhesive	630	Gallery
1	Smoke gasket	CF-12 x Perim.	Black	Unique
1	Nylon brush	D480-1 x L.R.	AL	Unique

GROUP 004 - DOOR P121

6	Hinges	LH168BB 114 x 101 FNA	652	Lawrence
1	Flush bolts	FB51P	630	Ives
1	Lock	ND80LD RHO x 14-042	626	Schlage
1	Cylinder	Provided by Owner		
2	Door closer	4040XP	689	LCN
2	Mounting plate	4040XP-18TJ x ST-1630	689	LCN
2	Overhead door stop	100S	630	G-J
1	Coordinators	COR_ x FL_	628	Ives
2	Protection plate	80A 305 x L.R. x 3M Adhésive	630	Gallery
1	Smoke gasket	CF-12 x Perim.	Black	Unique
2	Nylon brush	D480-1 x L.R.	AL	Unique
1	Astragal	A4 x H.R.	AL	Unique

GROUP 004A - DOOR P127

6	Hinges	LH168BB 114 x 101 FNA	652	Lawrence
1	Flush bolts	FB51P	630	Ives
1	Lock	ND80LD RHO x 14-042	626	Schlage
1	Cylinder	Fournir par le propriétaire		
2	Door closer	4040XP	689	LCN
1	Mounting plate	4040XP-18TJ x ST-1630	689	LCN
1	Overhead door stop	100S	630	G-J
1	Coordinator	COR_ x FL_	628	Ives
2	Protection plate	80A 305 x L.R. x 3M Adhesive	630	Gallery
1	Smoke gasket	CF-12 x Perim.	Black	Unique
2	Nylon brush	D480-1 x L.R.	AL	Unique
1	Astragal	A4 x H.R.	AL	Unique
1	Wall bumper	240	626	Gallery

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 92 00 - Joint Sealants;
- .2 Section 08 11 00 – Metal Doors and Frames.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN / CGSB-12.1-2017, Safety Glazing.
 - .2 CAN / CGSB-12.2-M91, Flat, Clear Sheet Glass.
 - .3 CAN / CGSB-12.3-M91, Flat, Clear Float Glass.
 - .4 CAN / CGSB 19.18-M87, Sealing Compound, One Component, Silicone Base, Solvent Curing.
- .2 ASTM International
 - .1 ASTM C 542-05, Standard Specification for Lock-Strip Gaskets.
 - .2 ASTM D 1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.
 - .3 ASTM D 1929-96 (R2001) e1, Standard Test Method for Determination Ignition Temperature of Plastics.
 - .4 ASTM D 2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
 - .5 ASTM E 84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .6 ASTM E119-15, Standard Test Methods for Building Construction and Materials Testing
 - .7 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
 - .8 ASTM F 1233-08, Standard Test Method for Safety Glazing Materials and Systems.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN / ULC-S101, Standard Fire Resistance Test Methods for Buildings and Building Materials.
 - .2 CAN / ULC-S106-15, Standard Method for Fire Tests of Window and Glass Block Assemblies.
- .4 National Fire Protection Association (NFPA)
 - .1 NFPA 80, Standard for Fire Doors and Windows Fire.
 - .2 NFPA 251, Standard Methods of Testing of Fire Resistance of Building Construction and Materials.
 - .3 NFPA 257, Standard on Fire Test for Windows and Glass Block Assemblies.
- .5 Environmental Choice Program (ECP)
 - .1 DCC-045-95 (R2005), Sealants and Caulking.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Data Sheets
 - .1 Submit data sheets and the manufacturer's instructions and documentation for glazing, sealants and glazing accessories. Data sheets must indicate product characteristics, performance criteria, size, limitations and finish.
- .3 Certificates: Submit documents signed by the manufacturer, certifying that the products, materials and equipment comply with physical properties and performance criteria requirements.
- .4 Test Reports: Submit test reports certifying that products, materials and equipment meet physical properties and performance requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit required documents / elements in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: provide instructions for the use and maintenance of glazing, to be incorporated into the O & M manual.

1.5 QUALITY ASSURANCE

- .1 Certificates: submit documents signed by the manufacturer, certifying that the products, materials and equipment comply with the physical properties and performance criteria.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and the manufacturer's written instructions.
- .2 Delivery and acceptance: deliver materials and equipment to work site in their original packaging, which must bear the name and address of the manufacturer.
- .3 Storage and handling
 - .1 Store materials, components, and equipment off of ground, in a dry, clean, well ventilated, indoor location, in accordance with the manufacturer's recommendation.
 - .2 Store glazings to protect them from marks and scratches.
 - .3 Replace damaged or defective materials and equipment with new materials and equipment.

1.7 DESIGN REQUIREMENTS

- .1 The construction of junction details around the glazed section between rooms 124 and 128 must be made as drawn on the plans, so that the entire wall between these two spaces forms a rate of fire endurance of two (2) hours, satisfying the requirements of ASTM E-119 and CAN / ULC-S101.

- .2 The maximum bending of the glazing must not exceed 1/200 of the endurance limit in bending of the glass, and this deformation must not in any way alter the physical properties of glass materials.
- .3 The dimensions of glazing shall be such that they withstand dead loads, live loads due to wind and pressure and suction forces acting perpendicularly to the glazing plane, to a nominal pressure compliant with ASTM E330.

1.8 WARRANTY

- .1 Provide a written document, signed and issued to the owner stating that all glazing prescribed in this section are guaranteed against any defect that may impair vision, and this for a period of 10 (ten) years starting from date of the provisional acceptance inspection

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Wired glass (WG): to CAN/CGSB-12.11, with 12x12 square style wire mesh, 6mm thick.
- .2 Glazing: fire rated glass ceramic
 - .1 Thickness: 5mm (3/16")
 - .2 Weight : 2.5lbs./sq.ft.
 - .3 Sound transmission rating : must be 31 STC
 - .4 Appearance : must have neutral coloration free of amber tints.
 - .5 Fire rating: 90 minutes
 - .6 Impact safety rating : must meet CPSC 16 CFR 1201 Category I et II.
- .3 Sealant: sealing compound, one-component, silicone base, solvent curing, to CAN/CGSB-19.18-M87, color similar to frame.

2.2 ACCESSORIES

- .1 Setting blocks: Neoprene, with 80 to 90 Shore A durometer hardness to ASTM D2240, width appropriate for glass thickness, to suit glazing method, weight of glass panel and surface area.
- .2 Spacer shims: Neoprene, 50 to 60 Shore A durometer hardness to ASTM D2240, self-adhesive on one face, 75 mm long x half the height of glazing beads x thickness to suit application.
- .3 Preformed Glazing Adhesive Tapes: Premixed butyl compound with integrated spacer, resilient and tubular, with Shore A hardness of 10 to 15, durometer tested to ASTM D2240, coiled on backing paper, 3mm x 10mm. , black colour.
- .4 Sealer and cleaning products: according to glass manufacturer's specifications.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of conditions: Ensure that conditions of surfaces / substrates previously implemented under other sections or contracts are acceptable for installation according to the manufacturer's installation instructions, before proceeding with work.
 - .1 Verify that openings for glazing are correctly sized and within tolerance.
 - .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
 - .3 Visually inspect surfaces / substrates in the presence of the Departmental Representative.
 - .4 Notify the Departmental Representative of any unacceptable conditions immediately upon discovery.
 - .5 Begin installation work only after unacceptable conditions have been corrected and written approval from the Departmental Representative has been received.

3.2 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.3 GENERALITIES

- .1 Glass must be cut with precision so that appropriate and necessary clearance for installation can be prepared. The glazing beads of the openings to be fitted with glass must be fixed in place with proper alignment and provide a good fit for glazing.
- .2 Clamp marks from tempering must be affixed to concealed surfaces. Exposed marks will not be accepted.
- .3 Installation of glazing must be rigid; it must prevent any contact between glass and metal. Glazing splines must be flush with the face of glazing bead. Glazing beads must be installed to be removable and to allow future glass replacement.
- .4 Each glass sheet must be prominently marked with a removable label, issued by the manufacturer, with the manufacturer's name and the type and quality of the glass. Such labels can be removed only with the written permission of the Departmental Representative.
- .5 Remove protective coatings, clean contact surfaces with solvent and dry.
- .6 Do not cut or grind tempered, fireproof, heat treated or coated glass.

3.4 INTERIOR GLAZING - MIXED ASSEMBLIES (ADHESIVE TAPE / SEALANT)

- .1 Perform work in accordance with GANA Glazing Manual specifications and GANA Laminated Glazing Reference Manual specifications for glazing assembly methods.
- .2 Cut adhesive strips to appropriate length and press against steel frame projecting 1.6 mm above sight line.
- .3 Place setting blocks at one quarter points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape for full contact at perimeter of unit.
- .5 Fill the gap between glazing and the steel frames with sealant to a depth equal to the glazing channel, making a uniform and level line.
- .6 Knife trim protruding tape.

3.5 CLEANING

- .1 Progress cleaning: carry out cleaning in accordance with Section 01 74 00 - Cleaning.
- .2 Remove traces of primer, caulking. Remove glazing materials from finish surfaces.
- .3 Remove labels after work is complete.
- .4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
- .5 Any glass scratched, broken or damaged in any way whatsoever must be replaced without delay at no additional cost to the Departmental Representative.

3.6 PROTECTION

- .1 Protect installed equipment and elements from any damage during work.
- .2 Repair damage caused by glazing work to adjacent materials and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 20 00.08 Masonry for Minor Works;
- .2 Section 06 10 53 Miscellaneous Rough Carpentry;
- .3 Section 07 92 00 - Joint Sealants;
- .4 Section 09 91 23 - Interior Painting.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C473-12, Standard Test Methods for Physical Testing of Gypsum Panel Products.
 - .2 ASTM C 475 / C475M-12, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .3 ASTM C 840-11, Standard Specification for Application and Finishing of Gypsum Board.
 - .4 ASTM C 1002-07, 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.
 - .5 ASTM C 1280-07, Standard Specification for Application of Gypsum Sheathing.
 - .6 ASTM C1396 / C1396M-11, Standard Specification for Gypsum Board.
- .2 Underwriters Laboratories of Canada (ULC)
 - .7 CAN / ULC-S102-10, Standard Test Method - Superficial Burning Characteristics of Construction Materials and Assemblies.
- .3 CSA Group
 - .8 CAN / CSA-A82.27-M91 Gypsum Board.
 - .9 CSA A82.30-M1980 Interior Furring, Lathing, and Gypsum Plastering.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Data Sheets
 - .1 Submit required data sheets and manufacturer's instructions and documentation for gypsum board assemblies. Data sheets must indicate product characteristics, performance criteria, size, limitations and finish.

.2 Samples

- .2 The samples will be given to the Contractor, and must be incorporated into the work.
- .3 Submit two (2) samples of corner reinforcements and casing beads 300 mm in length.

1.4 TRANSPORTATION, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with the manufacturer's written instructions.
- .2 Delivery and acceptance: deliver materials and equipment to work site in their original packaging, which must bear the name and address of the manufacturer.
- .3 Storage and Handling
 - .1 Store gypsum board assemblies dry, in a clean, dry, well-ventilated area as recommended by the manufacturer.
 - .2 Store gypsum board assemblies so as to protect them from marks and scratches.
 - .3 Protect gypsum boards against bad weather, other materials and potential damage from other construction work and activities.
 - .4 Handle gypsum boards in a manner that does not damage surface or perimeter.
 - .5 Replace defective or damaged materials and equipment with new materials and equipment.

1.5 AMBIENT CONDITIONS

- .1 Maintain an ambient air temperature of least 10 degrees Celsius and no more than 21 degrees Celsius for 48 hours prior to laying and finishing gypsum boards, during laying and finishing, and for at least 48 hours after joint completion.
- .2 Install gypsum boards finish joints on dry, non-frosted surfaces.
- .3 Provide good ventilation in areas of the building lined with gypsum boards so as to remove excessive moisture that could prevent drying of joint products immediately after application.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Gypsum board: compliant with ASTM C1396 / C1396M, standard or type X, thickness as indicated, 1200 mm wide and maximum useful working length, with squared edges at ends and bevelled edges at sides.
- .2 Screw: compliant with ASTM C1002, Type S for gypsum board installation on steel studs and wall plates. The screws must be long enough to allow a minimum insertion of 10 mm into the support.
- .3 Casing beads, corner reinforcements, control joints and edges: compliant with ASTM C1047, hot-dip galvanized metal, 0.5 mm thick, perforated flanges, one piece.
- .4 Sealant: in accordance with Section 07 92 00 - Joint Sealants.

- .5 Joint compound: to ASTM C475, asbestos free.
- .6 Joint tape: specially treated Kraft paper tape with tiny perforations

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of conditions: prior to installation of gypsum boards, ensure condition of surfaces / substrates previously installed under other sections or contracts is acceptable and allow work to proceed in accordance with the manufacturer's written instructions.
 - .1 Visually inspect surfaces / substrates in the presence of the Departmental Representative.
 - .2 Notify the Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Start installation work only after correcting unacceptable conditions and receiving the written approval of the Departmental Representative.

3.2 ASSEMBLY

- .1 Install and finish gypsum board assemblies in accordance with ASTM C840, unless otherwise specified.
- .2 Install assemblies in accordance with ASTM C1280.
- .3 Install elements level, allowable gap 1: 1200.
- .4 Frame openings housing inspection panels, lighting fixtures, diffusers, grilles, etc., with extrusions.
- .5 Install wall furring to secure gypsum board in accordance with ASTM C840, unless otherwise specified.
- .6 Install extrusions around building openings and around built-in equipment, signs, etc. Consult with equipment suppliers regarding the clearances required.

3.3 LAYING

- .1 Do not install gypsum board until subframes, anchors, shims, acoustic insulation materials and electrical and mechanical installations have been approved.
- .2 Lay boards vertically or horizontally, in the direction that will provide the least amount of joints.
- .3 Fasten gypsum board layer to metal framing with screw anchors.
- .4 Space screws on board edges by 200 mm center-to-center, and 300mm center-to-center on the board faces. Screws must be driven by means of an electric gun, with the head slightly below the surface of the board.
- .5 Install boards with the facing side to the exterior.
- .6 Do not install damaged or damp gypsum boards.
- .7 Place butt joints on support members. Offset vertical joints to different studs on each side of the wall.

3.4 INSTALLATION

- .1 Install accessories square, plumb, level, and fastened securely on the appropriate plane. Use full length pieces where possible. Ensure joints are tight, aligned and securely fastened. Cut the miter corner joints and adjust them perfectly, leaving no rough or irregular edges. Fasten elements at 150 mm center-to-center with contact glue applied over entire length.
- .2 Install casing beads on perimeter of suspended ceilings.
- .3 Install casing beads at junction of gypsum boards and surfaces without joint covers, and at various locations as indicated. Seal joints with a sealant.
- .4 Make control joints square and true to line.
- .5 Install inspection hatches for electrical and mechanical equipment as specified in the appropriate sections.
 - .1 Fasten subframes securely to furrings or structural members.
- .6 Finish joints between boards and in re-entrant corners with: joint compound, tape and tape coating. Apply these products according to the manufacturer's recommendations and smooth by slimming everything to level with surface finish of the boards.
- .7 Degree of finishing 4: bed tape laid on joints and inside corners in joint compound and apply three separate layers of compound over the joints, corners and heads of fasteners and other accessories used. Surfaces must be smooth and free from tool marks and dents.
- .8 Cover corner moldings, control joints and trims if necessary, with two coats of joint compound and one coat of tape coating smoothed and thinned to level with board surface finish.
- .9 Fill depressions left by screw heads with joint compound and tape to obtain a smooth surface flush with adjacent gypsum surfaces, so that these depressions are invisible once finishing is complete.
- .10 Lightly sand irregular ends and other imperfections. Avoid sanding adjacent surfaces.
- .11 Upon completion of installation, the structure must be smooth, level or plumb, free from wrinkling and other defects, and ready to be finished with a finish plaster.

3.5 CLEANING

- .1 Progress cleaning: carry out cleaning in accordance with Section 01 74 00 - Cleaning.
- .2 Leave site clean at the end of each work day.
- .3 Final Cleaning: dispose of surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .4 Waste Management: sort waste for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .5 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

3.6 PROTECTION

- .1 Protect installed equipment and elements from any damage during work.
- .2 Repair damage caused by gypsum board installation to adjacent materials and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 All sections requiring painting work.

1.2 REFERENCES

- .1 Standards Council of Canada (CGSB)
 - .1 CAN / CGSB-85.100-93, Painting
 - .2 CAN / CGSB 1.100-99, Interior Flat Latex Paint
 - .3 CAN / CGSB-1.119-2000, Interior Latex Primer-Sealer
- .2 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2004.
 - .2 Master Painters Institute (MPI) Maintenance Repainting Manual 2004, including component identification, substrate evaluation, paint systems, preparatory work and the list of approved products.
- .3 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Content Compound of Consumer Products, Method 24, (for Surface Coatings).
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Society for Protective Coatings (SSPC)
 - .1 SSPC Manual, Volume Two, 8th Edition, Systems and Specifications Manual
- .6 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), (1999), c. 33.
- .7 National Fire Code of Canada - 1995.
- .8 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992, c. 34.

1.3 QUALITY ASSURANCE

- .1 Qualification
 - .1 Painting work must be performed by qualified workers in accordance with the regulations in force in the local jurisdiction.
 - .2 Apprentices may be hired on the condition that they work under the direct supervision of a qualified worker, in accordance with the regulations governing the trade.

- .2 Comply with the latest MPI requirements for interior work to refurbish paint coatings, including those for cleaning and surface preparation and the application of sealers and primers.
- .3 Products used, including primer or sealer products, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents and others, must appear on the latest version of the MPI Approved Products List, and all products forming the chosen paint system must come from the same manufacturer.
- .4 Paint products such as linseed oil, shellac, thinners and turpentine must be of very high quality and, as appropriate, compatible with other coating products used. They must come from an approved manufacturer listed in the MPI Maintenance Repainting Manual.
- .5 Keep purchase slips, invoices and other documents to establish, at the request of the Departmental Representative, the conformity of the work with the specified MPI requirements.
- .6 Quality standard: the surfaces must under final lighting condition meet the following requirements upon examination.
 - .1 Walls: no visible defect at less than 1000 mm, at a 90 degree angle to the surface being examined.
 - .2 Ceilings: no visible defect by an observer on the ground, at a 45 degree angle to the surface being examined.
 - .3 Colour and gloss of the top coat must be uniform over the entire surface being examined.
- .7 Mock-ups: Construct mock-ups of required work in accordance with Section 01 45 00 - Quality Control.
 - .1 Submit mock-ups of required work to Departmental Representative in accordance with Section 01 45 00 - Quality Control.
 - .2 Prepare substrates, parts or interior elements designated as mock-ups of repainting work according to the requirements of this section, apply the paint, the product or the coating prescribed according to the colour, gloss or luster, texture and performance specified in the MPI Maintenance Repainting Manual, and submit them for review and approval.
 - .3 Once accepted, the substrates, interior parts, or interior parts repainted as mock-ups of the work will be the standard for product quality and implementation for similar repainting work.

1.4 PERFORMANCE REQUIREMENTS

- .1 Environmental Performance Requirements
 - .1 Paint products used must comply with the requirements for obtaining the "Environmental Choice" E3 MPI, granted according to the content of volatile organic compounds (VOCs) determined according to method number 24 of the Environmental Protection Agency (EPA).
 - .2 If the air quality of the premises (presence of odor) is a problem, prescribe only products on the MPI list that have obtained at least one E3 mention.

1.5 SCHEDULE OF WORK

- .1 Submit schedule of the various stages of the painting work to Departmental Representative for approval. The schedule must be submitted at least 48 hours before the start of the planned work.
- .2 The approved schedule for painting the occupied facilities must be meticulously adhered to. This schedule must be pre-established to the satisfaction of the Departmental Representative and must provide sufficient drying and curing time before the occupants return.
- .3 Obtain written authorization from the Departmental Representative for any changes to the work schedule.
- .4 Schedule re-painting work so as not to be interrupted by sub trades, or by occupants and persons in or near the building.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit data sheets and manufacturer's instructions for the application of each paint product and coating in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit the manufacturer's Material Safety Data Sheets (MSDS) for each paint and coating product. The data sheets must include:
 - .1 Product features;
 - .2 Instructions and recommendations for the preparation of the surface;
 - .3 Primer requirements and finish specifications;
 - .4 Requirements and recommendations for storage and handling;
 - .5 Methods of application;
 - .6 Information on cleaning.
- .3 Submit required samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit samples of all available colours for review and selection, and specify when colour range is limited.
 - .2 Submit Material Safety Data Sheets (MSDS) required by the Workplace Hazardous Materials Information System (WHMIS) for all paint products and coatings used.
- .4 Closeout Submittals
 - .1 Provide required maintenance sheets and attach them to the manual referred to in section 01 78 00 - Closeout Submittals.
 - .2 Submit a file on all products used. Indicate all the products that make up each system, specifying the following information for each.
 - .1 The name, type and use of the product (ie materials and where they are applied).
 - .2 Manufacturer's product number.
 - .3 Colour code numbers.

- .4 Product designation according to the MPI Environmental Choice program classification.
- .5 Material Safety Data Sheets (MSDS) from each product's manufacturer.

1.7 ACCEPTABLE MATERIALS AND PRODUCTS

- .1 Where materials or products are prescribed by their brand, refer to "Instructions to Bidders" for instructions on how to apply for approval of materials or substitutes.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle paint products in accordance with Section 01 61 00 - Common Product Requirements and the following requirements.
 - .1 Deliver and store paint products in original containers, sealed and with labels intact.
 - .2 Labels must indicate:
 - .1 The name and address of the manufacturer;
 - .2 The type of paint or coating;
 - .3 Compliance with relevant standards or requirements;
 - .4 The colour number, according to the list of colours specified.
 - .3 Remove degraded, open or rejected products from the site.
 - .4 Handle and store products according to the manufacturer's recommendations.
 - .5 Store products in a safe, dry, well-ventilated area at temperatures between 7 and 30 degrees Celsius. Store products away from heat sources, and keep temperature-sensitive products above the minimum temperature recommended by the manufacturer.
 - .6 Keep areas used for storage, cleaning and preparation clean and tidy, to the satisfaction of the Departmental Representative, to prevent contamination or damage to coatings. Once work is completed, return these areas to their original state of cleanliness, to the satisfaction of the Departmental Representative.
 - .7 Remove from the storage area only the quantities of products that will be implemented on any given day.
 - .8 Comply with WHMIS requirements for the use, storage, handling and disposal of hazardous materials.
 - .9 Fire Safety Requirements
 - .1 Provide one (1) 9 kg chemical powder extinguisher and place near storage area.
 - .2 Place oily rags, garbage, empty containers and materials subject to spontaneous combustion in ULC-sealed containers and remove containers from site daily.
 - .3 Handle, store, use and dispose of flammable and combustible products and materials in accordance with the requirements of the National Fire Code of Canada.
- .2 Waste Management and Disposal
 - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .2 Paints, stains, wood preservatives and other related products (thinners and

- solvents) must be treated as hazardous materials, the disposal of which is subject to various regulations. Information on relevant legislation can be obtained from provincial departments responsible for the environment and government agencies in the region.
- .3 Products that cannot be reused should be treated as hazardous waste and disposed of properly.
 - .4 Place hazardous or toxic products and materials, including used tubes and containers of adhesive and sealant, in designated areas or containers for hazardous waste.
 - .5 To reduce contamination of soil and watercourses and sanitary and stormwater systems, comply rigorously with the following guidelines.
 - .1 Keep wash water for paints and other water-based products to allow filtration of various deposited materials. Used equipment or tools must never be cleaned without recovering the washing water.
 - .2 Store cleaning products, thinners, solvents and excess paint in designated containers and dispose of them properly.
 - .3 Store rags that have been soaked with oil and solvent during painting work to permit the recovery of contaminants and proper disposal or cleaning, as appropriate.
 - .4 Provide for the removal of contaminants in accordance with the Hazardous Waste Regulations.
 - .5 Allow empty paint containers to dry before disposal or recycling (in areas with appropriate facilities).
 - .6 Properly close and seal containers of partially used paint products, including adhesive and sealant containers, and store at moderate temperature in a well ventilated and fireproof area.
 - .6 Where there is a paint recycling service, collect excess paint, classify by product type and plan for shipment to a collection or recycling facility.

1.9 SITE-SPECIFIC CONDITIONS

- .1 Heating, ventilation and lighting
 - .1 Before starting the painting process, verify that adequate and continuous ventilation can be provided and that appropriate heating systems can be used to raise ambient air temperatures and substrate temperature to more than 10 degrees Celsius 24 hours before the start of work and maintain these temperatures throughout the duration and after completion of the work, until paint has properly cured.
 - .2 Ventilate enclosed areas. If required, provide continuous ventilation for seven (7) days after completion of the work.
 - .3 Coordinate use of existing ventilation system with the Departmental Representative and, if required, arrange for operation during and after completion of work.
 - .4 Supply and temporarily install necessary heating and ventilation devices if permanent systems can not be used; If the building's permanent systems do not meet the minimum requirements, provide and install the additional equipment required to meet the minimum requirements. Use of gas appliances for this purpose is not permitted.
 - .5 Before the start of the painting work, check that the level of illumination of the surfaces to be painted is at least 323 lux.

- .2 Ambient temperature, relative humidity and moisture content of the substrate
 - .1 Unless specifically authorized in advance by the Contracting Authority responsible for the specifications, the paint inspection body and the applied product's manufacturer, do not proceed with paint work under the following conditions:
 - .1 The ambient air temperature and the substrate temperature are less than 10 degrees Celsius;
 - .2 The substrate temperature is greater than 32 degrees Celsius, unless the paint to be applied is specifically formulated for high temperature application;
 - .3 The relative humidity in the work area is greater than 85%.
 - .2 Using a properly calibrated electronic moisture meter, perform tests to determine the moisture content of the substrates, except for already painted concrete floors whose moisture content can be evaluated by simple "control of the hiding power".
 - .3 Do not proceed with re-painting work if the maximum moisture content of the substrate is greater than the following values:
 - .4 12% for gypsum board and plaster.
 - .4 Perform tests on coated, concrete and masonry surfaces to determine alkalinity.
- .3 Surface Conditions
 - .1 Perform painting in areas where ambient air is free of suspended dust generated by construction work or particles blown by the ventilation system, which may alter finished surfaces. .
 - .2 Apply paint to properly prepared surfaces with moisture content within the range specified in this section.
 - .3 Apply paint when the previous coat is dry or sufficiently hardened, unless otherwise approved by the paint or coating manufacturer.
 - .4 All painting work in occupied buildings must be performed after closing hours in unused rooms or areas. The schedule of work must be approved by the Departmental Representative and must provide sufficient drying and curing time before occupants return.

1.10 MAINTENANCE

- .1 Provide replacement materials, tools and equipment required in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one (1) container of one (1) of each type and colour of finish. Identify the colour and type of product according to the colour list and specified paint system.

Part 2 Products

2.1 MATERIALS

- .1 Paint products listed on the latest edition of the MPI Approved Products List may be used for this work.
- .2 Only approved products that have been awarded the MPI E3 Environmental Choice designation may be used for this work.

- .3 Paints, coatings, adhesives, solvents, cleaning products, lubricants and other products used must have the following characteristics:
 - .1 Products must not contain dichloromethane (methylene chloride), chlorinated hydrocarbons, toxic metallic pigments;
 - .2 Products must not contain any upper atmosphere ozone depleting compounds;
 - .3 Products must not contain any compounds that promote smog formation in the lower atmosphere;
 - .4 Products manufactured such that materials capable of generating a biochemical oxygen demand (BOD) in the undiluted effluent of a production plant, discharged to a natural watercourse or wastewater treatment facility where no secondary treatment is planned, do not exceed a concentration of 15 mg / L;
 - .5 Products manufactured such that total suspended solids (TSS) in the undiluted effluent of a production plant, discharged to a natural watercourse or sewage treatment facility where no secondary treatment is expected, does not exceed a concentration of 15mg / L.
- .4 Paint and coatings must not contain formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or any of their compounds.
- .5 Primers: When the manufacturer offers the choice of primers for a particular substrate, use the one classified as "best" by the manufacturer.

2.2 ACCESSORIES

- .1 Accessories for coating application:
 - .1 Provide all primers, sealers, cleaning agents, cleaning cloths, sanding and cleaning materials required according to the manufacturer's specifications.

2.3 COLOURS

- .1 The Departmental Representative will provide a colour list after contract award.
- .2 Provide two (2) colours for walls, one (1) colour for new handrail and one (1) colour for new door and frame assemblies.
- .3 Colors will be chosen from the full range of colours and shades offered by the manufacturers.
- .4 For the re-painting of two (2) coats paint systems, the first coat must be of a slightly lighter shade than the top coat to facilitate the visual identification of each coat.

2.4 MIXING AND COLOURING

- .1 The colouring of the products must be completed before product delivery to the work site.
- .2 Add thinner if necessary, without exceeding the manufacturer's recommendation. Kerosene or any other organic solvent of the same type should not be used to dilute water paints.
- .3 Dilute spray paint according to manufacturer's instructions. If the necessary instructions are not on the container, obtain written instructions from the manufacturer and send a copy to the Departmental Representative.

- .4 Before and during application, thoroughly mix the paint in its container to loosen agglutinated materials, to ensure complete dispersion of deposited pigments, and to ensure a uniform colour and gloss of the applied paint.
- .5 Epoxy paint:
 - .1 Thoroughly mix and homogenize each component of the epoxy paint before combining them together. Mix both components according to the manufacturer's written recommendations.
 - .2 Provide factory mixed coatings. Mix coatings to the correct consistency according to the manufacturer's instructions before application, if necessary. Do not reduce or dilute coatings or add materials to coatings unless such a procedure is specifically described in product instructions of the manufacturer.

2.5 PAINT SYSTEMS FOR WALLS

- .1 Cleaning of existing concrete block surfaces:
 - .1 Clean and degrease existing concrete block surfaces with a trisodium phosphate solution (PTS);
 - .2 Rinse well with clear water (pressurized);
 - .3 Lightly sand all existing surfaces to be painted by mechanical or manual sanding.
- .2 Cleaning of surfaces to be painted:
 - .1 Unless otherwise noted, use an all-purpose cleaner with active oxygen, and no phosphate or bleach, to clean the dust and dirt on all surfaces to be painted. Ensure the cleaning product is compatible with the materials and finishes of the existing surfaces.
- .3 Primer for gypsum board and concrete block surfaces:
 - .1 Primer-sealer: non-gloss, opaque, latex-based, primer-seal, to CAN / CGSB-1.119-2000 and having the following characteristics:
 - .1 Composition: water and binder based on Vinyl-Acrylic polymer emulsion;
 - .2 VOC: ASTM D3960-05: <150 g / l;
 - .3 Viscosity: Ready to use, 102 ± 5 Krebs units
 - .4 Density: 1.3 g / l;
 - .5 Solids by volume: 32%;
 - .6 Solids by weight: 49%.
- .4 Painting for gypsum walls and concrete blocks:
 - .1 100% acrylic high performance latex interior paint, 2 coats of paint, platinum finish, to CAN / CGSB - 1.100-99, and having the following characteristics:
 - .1 Composition: modified acrylic vinyl emulsion: latex, titanium dioxide, inert extenders, water, surfactants and others;
 - .2 VOC: ASTM D 3960-05: <100 g / l;
 - .3 Viscosity: Ready to use, 99 ± 5 Krebs units;
 - .4 Density: 1.3 g / l;
 - .5 Solids by volume: 37%;
 - .6 Solids by weight: 51%.

.7 Gloss (60 °): 10 to 20%

2.6 PAINT SYSTEMS FOR INTERIOR WOODWORK

- .1 Clean with a multipurpose cleaner with active oxygen.
- .2 Primer: one coat of alkyd emulsion sealer and stain remover.
- .3 Finish: at least two coats of 100% acrylic latex reinforced with urethane, satin finish.

2.7 PAINT SYSTEM FOR INTERIOR METAL SURFACES

- .1 Cleaning of metal surfaces
 - .1 Thoroughly clean and degrease with a trisodium phosphate solution (PTS) all metal surfaces to be painted, unless otherwise specified. Rinse well with clear water (pressurized) afterwards.
- .2 Primed or unfinished ferrous metal surface primer:
 - .1 One (1) coat of alkyd, urethane and silicone based rust and enamel based enamel primer formulated to retard rust on new or rusty ferrous metals, having the following characteristics:
 - .1 Composition:
 - .1 Thinner: hydrocarbons
 - .2 Binder: alkyd fortified with polyurethane
 - .2 VOC: ASTM D 3960-05: <400 g / L;
 - .3 Spreading rate per layer (3.78 L): 40 to 48m²
 - .4 Minimum film thickness:
 - .1 Wet: 3.2 mils
 - .2 Dry: 1.6 mil
 - .5 Solids by volume: 50%
- .3 Primer for hot-dip galvanized or galvanized metal surfaces:
 - .1 Ultra-adherent, ultra-hiding and ultra-resistant acrylic latex primer, specially formulated for galvanized metal surfaces and having the following characteristics:
 - .1 Composition:
 - .1 Solvent: water
 - .2 Binder: acrylic polymer emulsion
 - .2 VOC: ASTM D 3960-05: <100 g / l
 - .3 Spreading rate per coat (3.78 L): 40 to 48m²
 - .4 Minimum film thickness:
 - .1 Wet: 3.2 mils
 - .2 Dry: 1.2 mil
 - .5 Solids by volume: 37%
- .4 Finish for interior ferrous metal surfaces, primed or not, and for galvanized or hot-dip galvanized metal:
 - .1 Two (2) layers of 100% acrylic latex emulsion, having the following characteristics:
 - .1 Composition: 100% acrylic latex emulsion (binder), titanium dioxide, inert extenders (pigments), water, surfactants and others;

- .2 VOC: ASTM D 3960-05: <260 g / l;
- .3 Viscosity: Ready to use, 88 ± 10 Krebs units;
- .4 Density: 1.2 Kg / l;
- .5 Solids by volume: 33%;
- .6 Solids by weight: 44%
- .7 Brightness (60 °): 10 to 20%

2.8 PAINT SYSTEM FOR INTERIOR METAL SURFACES

- .1 Fast-drying, zinc rich paint epoxy –resin based containing pure zinc and aluminum pigments.
 - .1 Aspect: Mat
 - .2 Colour: Silver metallic

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written requirements, recommendations, and specifications, including technical bulletins, instructions for handling, storing, and applying products, and data sheets indications.

3.2 EXAMINATION

- .1 Interior surfaces to be re-painted must be inspected by the painting contractor who will notify the Departmental Representative in writing of any defect or problem prior to the start of re-painting work, or after the preparation surfaces if any deterioration of the substrates is discovered at that stage of the work.
- .2 Proceed with work only after conditions have been corrected and approved in writing by Departmental Representative.
- .3 Previously painted surfaces: Verify that existing painted surfaces do not contain lead-based paint and notify the Departmental Representative of any such paint immediately upon discovery.

3.3 EXAMINATION

- .1 Prepare interior surfaces and paint in accordance with the requirements of the MPI Maintenance Repainting Manual, unless otherwise specified.
- .2 Prepare surfaces and apply paint products in accordance with the manufacturer's written instructions.
- .3 Clean and prepare interior surfaces to be repainted in accordance with the requirements of the MPI Maintenance Repainting Manual. Refer to this document for specific requirements to be added to the instructions below.
 - .1 Remove dust, dirt and foreign matter by vacuuming and wiping surfaces with clean, dry cloths.
 - .2 Rinse thoroughly brushed surfaces with clean water until no foreign matter remains.

- .3 Allow surfaces to drain completely and dry thoroughly. Allow sufficient drying time and check the moisture content of the surfaces with an electronic moisture meter before starting work.
- .4 Use water-based cleaning products rather than organic solvents for surfaces re-painted with water-based paints.
- .5 Once dry, many water paints cannot be removed with water. However, the use of kerosene or other similar organic solvents for the removal of these paints must be minimized.
- .4 Prior to application of primer or sealer and prior to application of each subsequent coat, prevent cleaned surfaces from being contaminated by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents. Spot prime and seal, then apply primer or sealer or other pretreatment product, as soon as possible after cleaning, before surface deteriorates.
- .5 Do not apply paint until prepared surfaces are accepted by Departmental Representative.
- .6 Sand and remove dust from surfaces as needed between coats to ensure proper bonding of the next coat and to eliminate any visible defects within 1000 mm.

3.4 EXISTING CONDITIONS

- .1 Before start of painting work, review existing field conditions and existing interior substrates to be re-painted and report in writing to the Departmental Representative and General Contractor, if applicable, all substrate damage, defects, unsatisfactory or unfavourable conditions that could affect the execution of the work.
- .2 Do not start re-painting work until unsatisfactory conditions or defects have been corrected, and substrates deemed acceptable by the contractor and the painting inspection body.
- .3 Do not apply paint to wet or humid surfaces.
 - .1 Wait at least 30 days before application on new concrete, or follow the manufacturer's procedures to apply appropriate coatings before 30 days.
 - .2 Perform a test on new concrete for moisture content.
- .4 The degree of deterioration of the surface must be evaluated according to the criteria and using the MPI identification elements defined in the MPI Maintenance Repainting Manual.

3.5 PROTECTION

- .1 Protect interior surfaces of building, adjacent fixtures and furniture that are not to be painted from speckles, marks and other damage with non-soiled covers or caches. If the surfaces in question are damaged, clean and restore them as directed by the Departmental Representative.
- .2 Protect permanently attached items, for example, fire rating labels for doors and frames.
- .3 Protect factory-finished equipment and components.
- .4 Provide protection for the general public and building occupants in or near the building.
- .5 Before the start of painting work, remove cover plates from electrical equipment, lighting fixtures, exposed door hardware, bathroom accessories and all other accessories, fasteners and attached equipment. Store these items and put them down once painting is done.

- .6 If necessary, cover or move furniture and transportable items to facilitate painting. Restore these items and materials as work progresses.
- .7 As work progresses, place "FRESH PAINTING" signs in occupied areas, to the satisfaction of the Departmental Representative.

3.6 APPLICATION

- .1 Apply paint in a manner that is best suited for the condition of the substrate to be repainted by brush, roller or air spray gun. Apply products according to the manufacturer's instructions, unless otherwise specified. The chosen method of application must be approved by the Departmental Representative prior to the start of the work.
- .2 Brush, paintbrush and roller application
 - .1 Apply an even coat of paint with a brush, paintbrush and / or roller of appropriate type.
 - .2 Allow paint to penetrate cracks, crevices and corners of elements.
 - .3 Apply paint to surfaces and corners inaccessible with brush or paintbrush with spray gun, pad or sheepskin. Use a brush or paintbrush, pad or sheepskin when it is impossible to paint certain surfaces or corners with a roller.
 - .4 Remove sags and drips with a brush, paintbrush and / or roller, and smooth over marks left in this way. Roller-painted surfaces must be free from roller marks and excess paint unless approved by the Departmental Representative.
 - .5 Remove sags, drips and brush marks from finished surfaces and redo these surfaces.
- .3 Spray application
 - .1 Provide equipment designed for the desired result, which can properly spray the product and is equipped with appropriate pressure regulators and manometers. Keep this equipment in good condition.
 - .2 During paint application, ensure adequate mixing of ingredients in container by repeated intermittent agitation, as often as necessary.
 - .3 Apply a uniform coat of paint, overlapping the surface covered during the previous pass.
 - .4 Use roller on spray applied paint and immediately remove drips and sags with a paintbrush.
 - .5 Use paintbrushes or brushes to penetrate paint into cracks, crevices and other spots hard-to-reach with spray gun.
- .4 Use pad or sheepskin to paint surfaces difficult to reach, or soaking if necessary and with the express permission of the Departmental Representative.
- .5 Apply coats of paint continuously, and allow surfaces to dry and cure properly between each coat, waiting for the minimum time recommended by the manufacturer. The minimum dry film thickness of each coat must be no less than recommended by the manufacturer. Redo surfaces stripped or covered with a film that is too thin before applying the next coat.
- .6 Regardless of the number of coats specified, apply as many coats as necessary for complete coverage and a uniform appearance.
- .7 Sand and remove dust from surfaces between coats to eliminate visible defects.

- .8 Repaint surfaces above and below sight lines in accordance with requirements for adjacent surfaces, including areas such as cabinet or closet interior and projecting elements.

3.7 FIELD QUALITY CONTROL

- .1 Notify the Departmental Representative when surfaces and coating are ready for inspection. Do not apply the next coat until the previous coats has been approved.

3.8 CLEANING

- .1 Perform cleaning in accordance with Section 01 74 00 - Cleaning and instructions below.
 - .1 Remove dripping, splashes, paint drippings, as well as excess paint as work progresses, using materials and methods that will not damage the finish of the surfaces.
 - .2 Quickly clear work area of surplus materials and debris, as well as tools, materials and equipment that are no longer needed.
 - .3 Remove combustible waste and empty paint containers from site daily and dispose of them safely, in accordance with the requirements of competent authorities.
 - .4 Clean equipment and tools used. Subsequently, dispose of wash water from water-based products, as well as cleaning and protective materials (cloths, screens, tapes and other), paint products, paint removers and other stain removers, in accordance with the requirements of the competent safety authorities and the instructions set out in this section.
 - .5 Clean paint materials and equipment in watertight containers for deposition and subsequent collection of particulate matter. Residues collected at the end of the cleaning process must be recycled or disposed of in a manner acceptable to the competent authorities.
 - .6 Recycle unused paint and coatings during repainting as indicated.

3.9 RESTORATION OF THE PREMISES

- .1 Clean and reinstall hardware removed to facilitate painting.
- .2 Remove guards and warning signs as soon as possible after completion of work.
- .3 Remove splash on exposed refurbished surfaces. Remove drippings and speckles as work progresses with a compatible solvent.
- .4 Protect freshly painted surfaces from drips and dust to the satisfaction of the Departmental Representative and avoid scratching new coatings.
- .5 Restore the premises used for the storage, mixing and handling of paints and the cleaning of tools and equipment used to their original state of cleanliness, to the satisfaction of the Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section includes
 - .1 The present section specifies common requirements to divisions 21, 22, and 23.
- .2 Related sections
 - .1 01 33 00 – Submittal Procedures.
 - .2 01 45 00– Quality Control.
 - .3 01 61 00 –Common Product Requirements.
 - .4 01 74 19 – Waste Management and Disposal.
 - .5 01 78 00 – Closeout Submittals.
 - .6 09 91 23.01 – Interior Re-painting.

1.2 REFERENCES

- .1 *Code de Construction du Québec*, Chapter 1 – Building, and National Building Code of Canada – Canada 2010 (modified).
- .2 National Building Code of Canada, 2010 (modified).
- .3 *Code de sécurité du Québec*, Chapter VIII – Building, and National Fire Code of Canada 2010 (amended).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Before submitting shop drawings for review by Departmental Representative, the Contractor must:
 - .1 Number each page.
 - .2 Indicate all equipment and/or accessories shown on shop drawing.
 - .3 Check if shop drawings comply with plans and specifications with regard to quality, features and dimensions.
- .3 The Departmental Representative’s review of shop drawings submitted by the Contractor is for the sole purpose of verifying the equipment’s general layout. Review of these documents does not relieve the Contractor or the supplier of their responsibility to ensure documents are accurate and in compliance with Contract Documents and site conditions. Furthermore, comments by the Departmental Representative on the shop drawings are not meant to be restrictive.

- .4 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for including product characteristics, performance criteria, physical size, finish and limitations.
- .5 Shop drawings and product data
 - .1 Assembly details.
 - .2 Clearances needed for inspection doors and the proper operation and maintenance of equipment.
 - .3 Detailed drawings of bases, supports, and anchor bolts.
 - .4 Systems and equipment capacities.
 - .5 Relevant code compliance certificates.
 - .6 Acoustic power data for systems and equipment, as needed.
 - .7 Performance curves and operating points.
- .6 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
- .3 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .4 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .1 Description of actions to be taken in event of equipment failure.
 - .2 Valves schedule and flow diagram.
 - .3 Colour coding chart.
- .5 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.

- .6 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
- .7 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .8 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .9 Site records:
 - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .10 As-Built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right-hand corner in letters at least 12 mm high as follows: "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .11 Submit copies of as-built drawings for inclusion in final TAB report.

1.5 QUALITY CONTROL

- .1 Quality Control: as per Section 01 45 00 – Quality Control.

1.6 HEALTH AND SAFETY

- .1 Health and safety: take necessary precautions in terms of construction health and safety as per Section 01 35 29.06 – Health and Safety Requirements.
- .2 Perform work in accordance with the Occupational Health and Safety Act in effect (*Loi sur la santé et sécurité*, L.R.Q.)

1.7 REPLACEMENT MATERIALS/EQUIPMENT TO BE PROVIDED

- .1 Provide the following spare parts in accordance with section 01 78 00 – Clouseout Submittals:
 - .1 One (1) set of seals for each pump;
 - .2 One (1) housing gasket for each pump size;
 - .3 One (1) head gasket for each heat exchanger;
 - .4 One (1) glass tube for each level indicator;
 - .5 One (1) cartridge or set of filters for each filter or set of filters, in addition to those that will be installed before the final acceptance of the installation.
 - .6 Provide a kit of all special tools required to maintain the appliance/materials, as recommended by the manufacturers and in accordance with Section 01 78 00 - Documents/Elements to be provided upon completion of the work.
- .2 Provide one (1) commercial grade grease gun, grease and adapters suitable for all categories of grease and grease fittings used.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Packaging, delivery, handling and acceptance:
 - .1 Deliver, store and handle materials in accordance with manufacturer's written recommendations. Deliver materials to site in original factory packaging.
- .3 Storage and protection:
 - .1 Protect materials from adverse weather conditions and possible damage from person, material and vehicular traffic.
 - .2 Protect materials from damages.
 - .3 Store materials in accordance with manufacturer's instructions.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 – Waste Management and Disposal.
- .2 Place toxic or dangerous waste in designated containers.
- .3 Handle and eliminate hazardous materials in accordance with regional and municipal regulations.
- .4 Prior to their disposal, ensure empty containers are sealed and properly stored, out of children's reach.
- .5 Remove packaging from site and transport to appropriate recycling facilities.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not used

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 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 from Departmental Representative.

3.2 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with Section 09 91 23 - Interior Painting.
- .2 Apply at least one coat of corrosion-resistant primer on ferrous metal supports/suspensions and materials fabricated on site.
- .3 Prime and touch up marred finished paintwork to match original.
- .4 Restore to new condition, finishes which have been damaged.

3.3 SYSTEM CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.4 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

3.6 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.
- .2 Protect equipment from adverse weather conditions.

3.7 SEISMIC RESTRAINTS

- .1 Each Sub-Contractor in each speciality will be responsible for compliance of seismic restraint systems.
- .2 Refer to Section 23 05 48 –Vibration and Seismic Controls for HVAC.

3.8 FIREGUARD MATERIAL

- .1 General Contractor will be responsible for compliance and quality of fireguard material.
- .1 Refer to Section 07 84 00 – Firestop Fill Material.

END OF SECTION

DOCUMENTS REQUIRES FROM THE CONTRACTOR

Part 1 – Documents required at the beginning of the construction site

* These requirements must be completes before the first payment request.

		Date de transmission
1.1	General Contractor	
1.1.1	List of subcontractors and their contact details	
1.1.2	List of suppliers with addresses and relevant contact persons	
1.1.3	List of personnel assigned to the project and their contact information (foreman, estimator, project manager/project manager)	
1.1.4	Detailed breakdown of payment claims from trade contractors or subcontractors	
1.1.5	Proof of insurance	
1.2	Plumbing/Heating/Cooling	
1.2.1	Licences et qualifications	
1.2.2	List of subcontractors and their contact details	
1.2.3	List of suppliers with addresses and relevant contact persons	
1.2.4	List of personnel assigned to the project and their contact information (foreman, estimator, project manager/project manager)	
1.2.5	Detailed breakdown of payment claims from trade contractors or subcontractors	
1.2.6	Proof of insurance	
1.3	Ventilation	
1.3.1	Licences et qualifications	
1.3.2	List of subcontractors and their contact details	
1.3.3	List of suppliers with addresses and relevant contact persons	
1.3.4	List of personnel assigned to the project and their contact information (foreman, estimator, project manager/project manager)	
1.3.5	Detailed breakdown of payment claims from trade contractors or subcontractors	
1.3.6	Proof of insurance	
1.4	Insulation	
1.4.1	Licences et qualifications	
1.4.2	List of subcontractors and their contact details	
1.4.3	List of suppliers with addresses and relevant contact persons	
1.4.4	List of personnel assigned to the project and their contact information (foreman, estimator, project manager/project manager)	
1.4.5	Detailed breakdown of payment claims from trade contractors or subcontractors	

Part 2 Documents required during the construction phase until provisional acceptance*

* These requirements must be completed before the provisional acceptance request (prior to obtaining it) in order to receive the work with reserves.


		Date de transmission
2.1	General Contractor	
2.1.1	Detailed schedule for system start-up and cleaning, balancing work and commissioning	
2.1.2	Table describing the training planned as prescribed in section 21 05 01	
2.1.3	Proof of formation of fire seals as prescribed in section 21 05 01	
2.1.4	Technical data sheets for fire protection systems as prescribed in section 21 05 01	
2.1.5	MSDS sheets for sealants as prescribed in section 21 05 01	
2.1.6	Letter of compliance of fire seals as prescribed in section 21 05 01	
2.1.7	System verification and test certificates	
2.1.8	All engineer's visit reports initialed as being corrected when deficiencies have been reported	
2.2	Plumbing/Heating/Cooling	
	Shop drawings (complete)	
2.2.1	Seismic protection drawings and calculations stamped by an engineer as prescribed in section 23 05 48	
2.2.2	Compliance report for seismic installations stamped by an engineer as prescribed in section 23 05 48	
2.2.3	List of training courses given with date and signature of participants	
2.2.4	List of spare parts and proof of transmission thereof	
2.3	Ventilation	
	Shop drawings (complete)	
	Integration plan carried out under the direction of the ventilation contractor in coordination with all other trades as per instructions in section 21 05 01.01	
2.3.1	Sealing test reports for air ducts	
2.3.2	A complete verification and start-up report for each equipment	
2.3.3	Seismic protection drawings and calculations stamped by an engineer as prescribed in section 23 05 48	
2.3.4	Compliance report for seismic installations stamped by an engineer as prescribed in section 23 05 48	
2.3.5	List of spare parts and proof of transmission thereof	
2.4	Insulation	
	Shop drawings (complete)	

Part 3 Documents required for final acceptance of the work

*These requirements must be completed in order for the work to be finally accepted.

		Dates de transmission
3.1	General Contractor	
	<p>All deficiency lists of the specialized contractors completed and cross-checked by the project foreman.</p> <p><u>Important notes:</u></p> <p>A signature of the Project Authority and Foreman will be required to certify that the work has been completed.</p> <p>Once the general contractor has confirmed that the deficiencies are 100% complete, the engineer will carry out a final inspection of the work with the contractor and the owner. If further visits are required as a result of uncompleted corrections, the costs involved will be forwarded to the general contractor.</p>	
3.2	Plumbing/Heating/Cooling	
3.2.1	Deficiency list 100% completed and initialed by the project manager	
3.2.2	Letter of warranty	
3.2.3	Operations and maintenance manual completed and accepted by the engineer	
3.2.4	The certificate of conformity (Annex C) duly signed	
3.2.5	Drawings in accordance with execution	
3.3	Ventilation	
3.3.1	Deficiency list 100% completed and initialed by the project manager	
3.3.2	Letter of warranty	
3.3.3	Operations and maintenance manual completed and accepted by the engineer	
3.3.4	The certificate of conformity (Annex C) duly signed	
3.3.5	Drawings in accordance with execution	
3.4	Insulation	
3.4.1	Deficiency list 100% completed and initialed by the project manager	
3.4.2	Letter of warranty	
3.4.3	Operations and maintenance manual completed and accepted by the engineer	
3.4.4	The certificate of conformity (Annex C) duly signed	

This document is intended to be completed by computer and not by hand.



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Verification of compliance

Nature and scope of the audit

☐ Compliance with plans and specifications

☐ Other :

This verification is not in any way a detailed and complete verification of the design.

☐ No corrections reported

☐ Make the indicated corrections

☐ Correct and resubmit

☐ Rejected

Signature ☐ Engineer ☐ Other

Date

Name

OIQ number

The verification of this document is limited to the nature and scope indicated. It does not in any way release the person or company that prepared it from its obligations of any kind.

**CERTIFICATE OF COMPLIANCE
(END OF WORK)**

PROJECT : _____
PROJECT ADDRESS : _____
DISCIPLINE : _____
SPECIFICATION SECTIONS: _____

We certify that all materials and equipment used and all apparent or hidden work performed or caused to be performed by us are in full compliance with the plans, specifications, addenda, changes and documents prepared by the engineers.

DATED TO _____ THIS _____ DAY OF _____ 20 _____

CORPORATE NAME : _____
ADDRESS: _____
TELEPHONE: _____
SIGNATURE: _____
TITLE OF THE SIGNATORY: _____

STAMP

SHOP DRAWINGS REGISTER



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Sép-Îles Airport
TITLE Safety-Related Interventions for Asset Maintenance
PROJECT PWGSC: R.075196.001
PROJECT MANAGER Nathalie Boudreault
SITE SUPERVISOR

SHOP DRAWINGS REGISTER

VERIFICATION STATUS		
V: VERIFIED AS IS		
VA: VERIFIED WITH ANNOTATION		
R: REJECTED		
TR: TO RESUBMIT		

SUBMITTED PRODUCTS		
RP: REFERENCED PRODUCT		
EP: EQUIVALENT PRODUCT		
PS: SUBSTITUTION BY AN UNNAMED PRODUCT		

REFERENCE TO THE SPECIFICATIONS				RECEIVE			RETURN TO SUBCONTRACTORS		STATUS	COMMENTS
SECTION	DRAWING NUMBER	DESCRIPTION	DISCIPLINE	REV.	DATE	SUBMITTED PRODUCT	DATE	SENDING NUMBER		
23.33.16		Fire Dampers Compressed Air Tank	Ventilation Plumbing							

PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for piping, fittings, equipment used in compressed air systems.

1.2 REFERENCE STANDARDS

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME Boiler and Pressure Vessel Code Section VIII Pressure Vessels.
 - .1 BPVC-VIII B - 2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 1.
 - .2 BPVC-VIII-2 B - 2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 2 - Alternative Rules.
 - .3 BPVC-VIII-3 B - 2004, BPVC Section VIII - Rules for Construction of Pressure Vessels Division 3 - Alternative Rules High Press Vessels.
 - .2 ASME B16.5-03, Pipe Flanges and Flanged Fittings.
 - .3 ASME B16.11-01, Forged Fittings, Socket-Welding and Threaded.
- .2 ASTM International (ASTM)
 - .1 ASTM A53/A53M-04, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A181/A181M-01, Standard Specification for Carbon Steel Forgings for General Purpose Piping.
- .3 CSA Group (CSA)
 - .1 CSA B51-03, Boiler, Pressure Vessel, and Pressure Piping Code.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (SDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.
 - .2 Submit shop drawings to indicate project layout including layout, dimensions and extent of piping system.
 - .1 Vertical and horizontal piping locations and elevations and connections details.
 - .2 All other pertinent informations.
 - .3 Test reports: submit test reports issued by recognized independent laboratories, certifying that products, materials and equipment meet the physical characteristics and performance criteria requirements.

- .4 Certificates: submit documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .5 Instructions: submit manufacturer's installation instructions.
- .6 Documents/Elements to be provided upon completion of the work: submit, in the case of the following elements, the maintenance sheets and technical data, which will be incorporated into the manual prescribed in section 01 78 00 - Closeout Submittals.

1.4 QUALITY ASSURANCE

- .1 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart and Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM)].
 - .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 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Separate for recycling and place in designated containers Metal, Plastic and Steel waste in accordance with Waste Management Plan (WMP).
 - .4 Handle and dispose of hazardous materials in accordance with Regional and Municipal regulations.
 - .5 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

PART 2 PRODUCTS

2.1 AIR RECEIVER

- .1 1 702 mm diameter x 610 mm long vertical tank: to CSA B51, ASME Section VIII and provincial regulations, for working gauge pressure of 1 378 kPa. Capacity: 454 L.
- .2 Side inlet and outlet connections: NPS 50 NPT.
- .3 Top and bottom connections: NPS 25 NPT.

- .4 Accessories supplied with the tank: relief valve, automatic condensate drain with timer with 120 V power, 100 mm diameter gauge with working pressure range of 0 to 2,067 kPa.
- .5 Provincial inspector's certificate and label.
- .6 Finish: shop primed, ready for field painting.

2.2 PIPING

- .1 Piping: to ASTM A53/A53M, schedule 80 seamless black steel.
- .2 Fittings:
 - .1 NPS2 and smaller: to ASME B16.11, schedule 80 steel, socket welded.
 - .2 NPS2 1/2 and larger: to ASME B16.11, schedule 80 steel, butt or socket welded.
- .3 Couplings: to ASME B16.11, socket welded or threaded half coupling type.
- .4 Unions: 1000 kPa malleable iron with brass-to-iron ground seat.
- .5 Dissimilar metal junctions: use dielectric unions.
- .6 Flanges:
 - .1 NPS2 and smaller: to ASME B16.5, forged steel, raised face and socket welded.
 - .2 NPS2 1/2 and larger: to ASME B16.5, forged steel, raised face and slip-on or weld neck.
- .7 Joints:
 - .1 NPS2 and smaller: socket welded.
 - .2 NPS2 1/2 and larger: butt welded.

2.3 BALL VALVES

- .1 Three piece design or top entry for ease of in-line maintenance.
 - .1 To ASTM A181/A181M, Class 70, carbon steel body screwed or socket welded ends, carbon steel ball and associated trim suitable for compressed air application.
 - .2 To withstand 1034 kPa maximum pressure.

2.4 COUPLERS/CONNECTORS

- .1 Industrial interchange series, full-bore.
- .2 Maximum inlet pressure: 1700 kPa.
- .3 Valve seat: moulded nylon.
- .4 Body: zinc plated steel.
- .5 Threads: NPT.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 COMPRESSOR STATION

- .1 Install on vibration isolators on housekeeping pad as indicated.

3.3 REFRIGERATED AIR DRYER

- .1 Install on three-valve bypass.
- .2 Install tee connection after dryer for emergency connection to instrument control air system.

3.4 COMPRESSED AIR LINE FILTER

- .1 Install on discharge line from refrigerated air dryer.

3.5 MAIN AIR PRESSURE REGULATORS

- .1 Install at air compressor station.

3.6 COMPRESSED AIR PIPING CONNECTIONS AND INSTALLATION

- .1 Install flexible connection in accordance with Section 23 05 16 - Expansion Fittings and Loops for HVAC Piping.
- .2 Install shut-off valves at outlets, major branch lines and in locations as indicated.
- .3 Install quick-coupler chucks and pressure gauges on drop pipes.
- .4 Install unions to permit removal or replacement of equipment.
- .5 Install tees in lieu of elbows at changes in direction of piping. Install plug in open ends of tees.
- .6 Grade piping at 1% slope minimum.
- .7 Install compressed air trap and pressure equalizing pipe at moisture collecting points. Drain pipe to nearest floor drain.

3.7 FIELD QUALITY CONTROL

- .1 Site Tests/Inspection:
 - .1 Testing: pressure test in accordance with requirements of Section 23 08 16, for 4 hours minimum, to 1100 kPa, with outlets closed and with compressor isolated from system. Pressure drop not to exceed 10 kPa.
- .2 Manufacturer's Field Services:
 - .1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, protection and cleaning of its product, and submit written reports, in acceptable format, to verify compliance of work with Contract.
 - .2 Provide manufacturer's field services, consisting of product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer's instructions.
 - .3 Schedule site visits to review work at stages listed:
 - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
 - .2 Once during progress of work at 60% complete.

- .3 Upon completion of Work, after cleaning is carried out.
- .3 Obtain reports within 3 days of review and submit immediately to Departmental Representative.

3.8 CLEANING

- .1 Refer to Section 23 08 13 – Performance Verification HVAC Systems and Section 23 08 16 – Cleaning and Start-Up of HVAC Piping Systems.
- .2 Cleaning: blow out piping to clean interior thoroughly of oil and foreign matter.
- .3 Check entire installation is approved by authority having jurisdiction.
- .4 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Use of mechanical systems during construction.

1.2 USE OF SYSTEMS

- .1 Use of existing or new permanent ventilating or heating systems for supplying temporary heat or ventilation is not permitted
 - .1 Entire system is complete, pressure tested, cleaned, flushed out.
 - .2 Specified water treatment system has been commissioned, water treatment is being continuously monitored.
 - .3 Building has been closed in, areas to be heated/ventilated are clean and will not thereafter be subjected to dust-producing processes.
 - .4 There is no possibility of damage.
 - .5 Supply ventilation systems are protected by 60% filters, inspected daily, changed every 2 weeks or more frequently as required.
 - .6 Return systems have approved filters over openings, inlets, outlets.
 - .7 Systems will be:
 - .1 Operated as per manufacturer's recommendations and instructions.
 - .2 Operated by Contractor.
 - .3 Monitored continuously by Contractor.
 - .8 Warranties and guarantees are not relaxed.
 - .9 Regular preventive and other manufacturers recommended maintenance routines are performed by Contractor at own expense and under supervision of Departmental Representative.
 - .10 Refurbish entire system before static completion; clean internally and externally, restore to "as- new" condition, replace filters in air systems.
- .2 Filters specified in this Section are over and above those specified in other Sections of this project.
- .3 Exhaust systems are not included in approvals for temporary heating ventilation.

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 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A105/A105M-05, Standard Specification for Carbon Steel Forgings, for Piping Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .1 Manufacturer, model number, line contents, pressure and temperature rating.
 - .2 Movement handled, axial, lateral, angular and the amounts of each.
 - .3 Nominal size and dimensions including details of construction and assembly.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance and operation data in accordance with Section 01 78 00 - Closeout Submittals.
 - .1 Data to include:
 - .1 Servicing requirements, including special requirements, stuffing box packing, lubrication and recommended procedures.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 NOT USED

- .1 Not Used

PART 3 EXECUTION

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Do welding in accordance with section 23 05 17 - Pipe Welding.

3.3 PIPE CLEANING AND START-UP

- .1 In accordance with Section 23 08 16 - Cleaning and Start-up of HVAC Piping Systems.

3.4 PERFORMANCE VERIFICATION

- .1 In accordance with Section 23 08 13 - Performance Verification HVAC Systems.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1-2007, Power Piping.
 - .2 ANSI/ASME B31.3-2006, Process Piping.
 - .3 ANSI/ASME, Boiler and Pressure Vessel Code-2007:
 - .1 BPVC 2007 Section I: Power Boilers.
 - .2 BPVC 2007 Section V: Non Destructive Examination.
 - .3 BPVC 2007 Section IX: Welding and Brazing Qualifications.
- .2 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA C206-03, Field Welding of Steel Water Pipe.
- .3 American Welding Society (AWS)
 - .1 AWS C1.1M/C1.1-2000 (R2006), Recommended Practices for Resistance Welding.
 - .2 AWS Z49.1-2005, Safety in Welding, Cutting and Allied Process.
 - .3 AWS W1-2000, Welding Inspection Handbook.
- .4 CSA Group (CSA)
 - .1 CSA W47.2-M1987 (R2008), Certification of Companies for Fusion Welding of Aluminum.
 - .2 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.
 - .3 CSA B51-03 (R2007), Boiler, Pressure Vessel and Pressure Piping Code.
 - .4 CSA-W117.2-2006, Safety in Welding, Cutting and Allied Processes.
 - .5 CSA W178.1-2008, Certification of Welding Inspection Organizations.
 - .6 CSA W178.2-2008, Certification of Welding Inspectors.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Welders:
 - .1 Welding qualifications in accordance with CSA B51.
 - .2 Use qualified and licensed welders possessing certificate for each procedure performed from authority having jurisdiction.
 - .3 Submit welder's qualifications to Departmental Representative.

- .4 Each welder to possess identification symbol issued by authority having jurisdiction.
- .5 Certification of companies for fusion welding of aluminum in accordance with CSA W47.2.
- .2 Inspectors:
 - .1 Inspectors qualified to CSA W178.2.
- .3 Certifications:
 - .1 Registration of welding procedures in accordance with CSA B51.
 - .2 Copy of welding procedures available for inspection.
 - .3 Safety in welding, cutting and allied processes in accordance with CSA-W117.2.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse of packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 ELECTRODES

- .1 Electrodes: in accordance with CSA W48 Series.

PART 3 EXECUTION

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 QUALITY OF WORK

- .1 Welding: in accordance with ANSI/ASME B31.3, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX and ANSI/AWWA C206, using procedures conforming to AWS B3.0, AWS C1.1, applicable requirements of provincial authority having jurisdiction.

3.3 INSTALLATION REQUIREMENTS

- .1 Identify each weld with welder's identification symbol.
- .2 Backing rings:
 - .1 Where used, fit to minimize gaps between ring and pipe bore.

- .2 Do not install at orifice flanges.
- .3 Fittings:
 - .1 NPS 2 and smaller: install welding type sockets.
 - .2 Branch connections: install welding tees or forged branch outlet fittings.

3.4 INSPECTION AND TESTS - GENERAL REQUIREMENTS

- .1 Review weld quality requirements and defect limits of applicable codes and standards with Departmental Representative before work is started.
- .2 Formulate "Inspection and Test Plan" in co-operation with Departmental Representative.
- .3 Do not conceal welds until they have been inspected, tested and approved by inspector.
- .4 Provide for inspector to visually inspect welds during early stages of welding procedures in accordance with Welding Inspection Handbook. Repair or replace defects as required by codes and as specified.

3.5 SPECIALIST EXAMINATIONS AND TESTS

- .1 General:
 - .1 Perform examinations and tests by specialist qualified to CSA W178.1 and CSA W178.2 and approved by Departmental Representative.
 - .2 To ANSI/ASME Boiler and Pressure Vessels Code, Section V, CSA B51 and requirements of authority having jurisdiction.
- .2 Hydrostatically test welds to ANSI/ASME B31.1.
- .3 Visual examinations: include entire circumference of weld externally and wherever possible internally.
- .4 Failure of visual examinations:
 - .1 Upon failure of welds by visual examination, perform additional testing as directed by Departmental Representative total of up to Departmental Representative.

3.6 DEFECTS CAUSING REJECTION

- .1 As described in ANSI/ASME B31.1 and ANSI/ASME Boiler and Pressure Vessels Code.

3.7 REPAIR OF WELDS WHICH FAILED TESTS

- .1 Re-inspect and re-test repaired or re-worked welds at Contractor's expense.

3.8 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

- .1 Vibration isolation materials and components, seismic control measures and their installation.
- .2 All mechanical and electrical work must meet the requirements of the National Building Code of Canada 2015 (NBC) for earthquake protection.

To this end, each subcontractor in each specialty must retain the services of a specialist, an engineer who is a member of the Ordre des ingénieurs du Québec, to perform the calculations and specify the supports and their arrangement. At the end of the work, an inspection will be made by the contractor and a compliance report will be produced to the owner through the engineer.

1.2 REFERENCE STANDARDS

- .1 National Fire Protection Association (NFPA)
 - .1 NFPA 13-2002, Standard for the Installation of Sprinkler Systems.
- .2 National Research Council Canada (NRC)
 - .1 National Building Code of Canada 2015 (NBC).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Shop drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Province, Canada.
 - .2 Provide separate shop drawings for each isolated system complete with performance and product data.
 - .3 Provide detailed drawings of seismic control measures for equipment and piping.
- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .1 Departmental Representative will make available 1 copy of systems supplier's installation instructions.

- .3 Manufacturer's Field Reports: manufacturer's field reports specified.
- .4 In the event that seismic installations are not required, submit a document justifying this situation produced by a professional recognized by the Ordre des ingénieurs du Québec.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

PART 2 PRODUCTS

2.1 GENERAL

- .1 Size and shape of bases type and performance of vibration isolation as indicated.

2.2 SEISMIC PROTECTION DEVICES AND SYSTEMS

- .1 General information:
 - .1 Seismic protection devices and systems shall act in all directions.
 - .2 Fasteners and bonding points shall be able to withstand the same maximum loads as seismic devices and systems.
 - .3 The use of anchors and fasteners installed with a nail gun or in holes drilled for this purpose is prohibited.
 - .4 No device, associated support or stud shall fail until the framing fails.
 - .5 The use of cast iron or threaded pipe supports is prohibited.
 - .6 Seismic protection devices and systems shall not compromise the integrity of fire stops. Coordinate the requirements with those of section 07 84 00 - Fire Protection.
- .2 Static support equipment
 - .1 The equipment shall be secured to the brackets/suspensions, which shall be attached to the building framing.
 - .2 Seismic protection devices and systems
 - .1 Seismic protection devices and systems shall operate smoothly and continuously.
 - .2 They shall never be so compressed as to lose their effectiveness.

- .3 Elastic support equipment (vibration insulated)
 - .1 Seismic devices and systems shall not interfere in any way with the operation of acoustic and vibration systems. During normal operation, the clearance between the equipment and seismic devices should be 6 to 9 mm.
 - .2 Seismic devices shall be incorporated into anti-vibration systems to prevent complete unloading of the latter.
 - .3 As indicated.
- .4 Piping networks
 - .1 Fire protection networks: according to NFPA 13.
 - .2 All other piping systems: suspensions greater than 305 mm must be braced.
 - .3 Seismic protection devices and systems shall comply with the requirements for anchoring and guiding piping.
- .5 Methods and devices for bracing
 - .1 Methods approved by the Departmental Representative.
 - .2 Structural steel angles or profiles.
 - .3 Cable restraint systems including cable bushings, assembly lugs and other hardware to ensure alignment of seismic devices and prevent cable bending at attachment points; with neoprene elements incorporated in the connections to reduce impact overloads.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Seismic control measures to meet requirements of NBC.
- .2 Install vibration isolation equipment in accordance with manufacturer's instructions and adjust mountings to level equipment.
- .3 Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.
- .4 Unless indicated otherwise, support piping connected to isolated equipment with spring mounts or spring hangers with 25 mm minimum static deflection as follows:
 - .1 Up to NPS4: first 3 points of support. NPS5 to NPS8: first 4 points of support. NPS10 and over: first 6 points of support.
 - .2 First point of support: static deflection of twice deflection of isolated equipment, but not more than 50 mm.

- .5 Where isolation is bolted to floor use vibration isolation rubber washers.
- .6 Block and shim level bases so that ductwork and piping connections can be made to rigid system at operating level, before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Arrange with manufacturer's representative to review work of this Section and submit written reports to verify compliance with Contract Documents.
 - .2 Manufacturer's Field Services: consisting of product use recommendations and periodic site visits to review installation, scheduled as follows:
 - .1 After delivery and storage of Products.
 - .2 After preparatory work is complete but before installation commences.
 - .3 Once during the installation, at 60% completion stages.
 - .4 Upon completion of installation.
 - .3 Submit manufacturer's reports to Departmental Representative within 3 days of manufacturer representative's review.
 - .4 Make adjustments and corrections in accordance with written report.
- .2 Inspection and Certification:
 - .1 Experienced and competent sound and vibration testing professional engineer to take vibration measurement for HVAC system after start up.
 - .2 Provide Departmental Representative with notice 24 hours in advance of commencement of tests.
 - .3 Evaluate the performance of the vibration isolation equipment and systems used, the acceptability of noise levels in occupied areas and, if necessary, recommend corrective measures to be taken (including the establishment of sound level curves).
 - .4 Submit the complete report of test results, including sound level curves.
 - .5 Materials, Equipment and Resources.
 - .6 Collection and storage of recyclable materials and equipment.
 - .7 Construction Waste Management.
 - .8 Reusing/reuse of resources.
 - .9 Recycled Content.
 - .10 Local/Regional Materials and Equipments.
 - .11 Certified Wood Products.
 - .12 Low-Emission Materials and Equipment.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and requirements for the identification of piping systems, duct work, valves and controllers, including the installation and location of identification systems.
 - .2 Sustainable requirements for construction and verification.

1.2 REFERENCE STANDARDS

- .1 Canadian Gas Association (CGA)
 - .1 CSA/CGA B149.1-05, Natural Gas and Propane Installation Code.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.60-97, Interior Alkyd Gloss Enamel.
 - .2 CAN/CGSB-24.3-92, Identification of Piping Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
- .2 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Product data to include paint colour chips, other products specified in this section.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Samples to include nameplates, labels, tags, lists of proposed legends.

1.4 QUALITY ASSURANCE

- .1 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

- .2 Waste Management and Disposal:
 - .1 Waste Management and Disposal: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .2 Dispose of unused coating or paint material at official hazardous material collections site approved by Departmental Representative.
 - .3 Do not dispose of unused coating or paint material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

PART 2 PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

- .1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.
- .2 Lettering and numbers raised or recessed.
- .3 Information to include, as appropriate:
 - .1 Equipment: manufacturer's name, model, size, serial number, capacity.
 - .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

- .1 Colours:
 - .1 Hazardous: red letters, white background.
 - .2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).
- .2 Construction:
 - .1 3 mm thick white anodized aluminum, matte finish, with square corners, letters accurately aligned and machine engraved into core.
- .3 Sizes:
 - .1 Conform to following table:

Size # mm	Sizes (mm)	No. of Lines	Height of Letters (mm)
1	10 x 50	1	3
2	13 x 75	1	5
3	13 x 75	2	3
4	20 x 100	1	8
5	20 x 100	2	5
6	20 x 200	1	8
7	25 x 125	1	12
8	25 x 125	2	8
9	35 x 200	1	20
 - .2 Use maximum of 25 letters/numbers per line.

- .4 Locations:
 - .1 Terminal cabinets, control panels: use size # 5.
 - .2 Equipment in Mechanical Rooms: use size # 9.
- .5 Identification for PSPC Preventive Maintenance Support System (PMSS):
 - .1 Use arrangement of Main identifier, Source identifier, Destination identifier.
 - .2 Equipment in Mechanical Room:
 - .1 Main identifier: size #9.
 - .2 Source and Destination identifiers: size #6.
 - .3 Terminal cabinets, control panels: size #5.
 - .3 Equipment elsewhere: sizes as appropriate.

2.3 EXISTING IDENTIFICATION SYSTEMS

- .1 Apply existing identification system to new work.
- .2 Where existing identification system does not cover for new work, use identification system specified this section.
- .3 Before starting work, obtain written approval of identification system from Departmental Representative.

2.4 IDENTIFICATION OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.
- .2 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.
- .3 Extent of background colour marking:
 - .1 To full circumference of pipe or insulation.
 - .2 Length to accommodate pictogram, full length of legend and arrows.
- .4 Materials for background colour marking, legend, arrows:
 - .1 Pipes and tubing 20 mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.
 - .2 Other pipes: pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.
- .5 Colours and Legends:
 - .1 Where not listed, obtain direction from Departmental Representative.
 - .2 Colours for legends, arrows: to following table:

Background colour:	Legend, arrows:
Yellow	BLACK
Green	WHITE

Background colour:	Legend, arrows:
Red	WHITE

.3 Background colour marking and legends for piping systems:

Contents	Background colour marking	Legend
Compressed air (<700kPa)	Green	COMP. AIR []
Compressed air (700kPa)	Yellow	COMP. AIR []

2.5 IDENTIFICATION DUCTWORK SYSTEMS

- .1 50 mm high stencilled letters and directional arrows 150 mm long x 50 mm high.
- .2 Colours: back, or co-ordinated with base colour to ensure strong contrast.

2.6 VALVES, CONTROLLERS

- .1 Brass tags with 12 mm stamped identification data filled with black paint.
- .2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.

2.7 LANGUAGE

- .1 Identification in French and in English.
- .2 Use one nameplate and label for each language.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 TIMING

- .1 Provide identification only after painting specified Section 09 91 23 - Interior Painting has been completed.

3.3 INSTALLATION

- .1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.
- .2 Identify systems, equipment to conform to PWGSC PMSS.

3.4 NAMEPLATES

- .1 Locations:
 - .1 In conspicuous location to facilitate easy reading and identification from operating floor.

- .2 Standoffs:
 - .1 Provide for nameplates on hot and/or insulated surfaces.
- .3 Protection:
 - .1 Do not paint, insulate or cover.

3.5 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: at not more than 17 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
- .2 Adjacent to each change in direction.
- .3 At least once in each small room through which piping or ductwork passes.
- .4 On both sides of visual obstruction and where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.
- .6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.
- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.
- .9 Identification easily and accurately readable from usual operating areas and from access points.
 - .1 Position of identification approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.6 VALVES, CONTROLLERS

- .1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.
- .2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by Departmental Representative. Provide one copy (reduced in size if required) in each operating and maintenance manual.
- .3 Number valves in each system consecutively.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 CLEANING AND START-UP OF MECHANICAL PIPING SYSTEMS

- .1 In accordance with Section 23 08 16 - Cleaning and Start-up of HVAC Piping Systems.

1.2 INDUSTRIAL COMPRESSED AIR SYSTEMS

- .1 Verify the operation of automatic condensate drainers.
- .2 Discharge a specified amount of compressed air from the tank.
- .3 Calculate the compressor recharging time. Carry out the test over a long period of time.

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 REFERENCE STANDARDS

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
 - .1 ANSI/ASHRAE/IESNA 90.1-04, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 ASTM International (ASTM)
 - .1 ASTM B209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
 - .2 ASTM C335-05ae1, Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .3 ASTM C411-05, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
 - .4 ASTM C449/C449M-00, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
 - .5 ASTM C547-07e1, Standard Specification for Mineral Fiber Pipe Insulation.
 - .6 ASTM C553-02e1, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .7 ASTM C612-04e1, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
 - .8 ASTM C795-03, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - .9 ASTM C921-03a, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-52Ma-89, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .4 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.
 - .2 Rating System Addenda for New Construction and Major Renovations LEED Canada-NC Version 1.0-Addendum 2007.
 - .3 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .5 Green Seal Environmental Standards (GSES)
 - .1 Standard GS-36-00 , Commercial Adhesives.

- .6 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.
- .7 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (2005).
- .8 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.2 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - means "not concealed" as previously defined.
 - .3 Insulation systems - insulation material, fasteners, jackets, and other accessories.
- .2 TIAC Codes:
 - .1 CRD: Code Round Ductwork,
 - .2 CRF: Code Rectangular Finish.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for duct insulation, and include product characteristics, performance criteria, physical size, finish and limitations.
 - .1 Description of equipment giving manufacturer's name, type, model, year and capacity.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Territory, Canada.
- .4 Manufacturers' Instructions:
 - .1 Provide manufacture's written duct insulation jointing recommendations, special handling criteria, installation sequence and cleaning procedures.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer : specialist in performing work of this section, and have a successful experience in this size and type of project, qualified to TIAC standards. .

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00- Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address and ULC markings.

PART 2 PRODUCTS

2.1 FIRE AND SMOKE RATING

- .1 To CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

- .1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335.
- .3 TIAC Code C-2: Mineral fibre blanket to ASTM C553 faced with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this section).
 - .1 Mineral fibre: to ASTM C553.
 - .2 Jacket: to CGSB 51-GP-52Ma.
 - .3 Maximum "k" factor: to ASTM C553.

2.3 JACKETS

- .1 Canvas:
 - .1 220 gm/m²cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
- .2 Lagging adhesive: compatible with insulation.

2.4 ACCESSORIES

- .1 Vapour retarder lap adhesive:
 - .1 Water based, fire retardant type, compatible with insulation.
- .2 ULC Listed Canvas Jacket:
 - .1 220 gm/m²cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
- .3 Canvas adhesive: washable.
- .4 Tie wire: 1.5 mm stainless steel.
- .5 Fasteners: 4 mm diameter pins with 35 mm square clips, length to suit thickness of insulation.

PART 3 EXECUTION

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PRE-INSTALLATION REQUIREMENTS

- .1 Pressure test ductwork systems complete, witness and certify.
- .2 Ensure surfaces are clean, dry, free from foreign material.

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturers instructions and as indicated.
- .3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Ensure hangers, and supports are outside vapour retarder jacket.
- .5 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side.

3.4 DUCTWORK INSULATION SCHEDULE

- .1 Insulation types and thicknesses: conform to following table:

TIAC Code	Vapour Retarder	Thickness (mm)	
Rectangular cold and dual temperature supply air ducts	C-1	yes	50
Round cold and dual temperature supply air ducts	C-2	yes	50
Rectangular warm air ducts	C-1	no	25
Round warm air ducts	C-1	no	25
Outside air ducts to mixing plenum	C-1	yes	25
Mixing plenums	C-1	yes	25
Exhaust duct between dampers and louvres	C-1	no	25

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Procedures and cleaning solutions for cleaning mechanical piping systems.

1.2 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM E202-00, Standard Test Methods for Analysis of Ethylene Glycols and Propylene Glycols.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (SDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
- .2 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Instructions: submit manufacturer's installation instructions.
 - .1 Departmental Representative will make available 1 copy of systems supplier's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Waste Management and Disposal: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 CLEANING SOLUTIONS

- .1 Tri-sodium phosphate: 0.40 kg per 100 L water in system.
- .2 Sodium carbonate: 0.40 kg per 100 L water in system.
- .3 Low-foaming detergent: 0.01 kg per 100 L water in system.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- .2 ASTM International (ASTM)
 - .1 ASTM A480/A480M-12, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
 - .2 ASTM A635/A635M-09b, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements for.
 - .3 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- .3 National Fire Protection Agency Association (NFPA)
 - .1 NFPA 90A-12, Standard for the Installation of Air-Conditioning and Ventilating Systems.
 - .2 NFPA 90B-12, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
 - .3 NFPA 96-11, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
- .4 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
 - .1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2005.
 - .2 SMACNA HVAC Air Duct Leakage Test Manual, 2012.
 - .3 IAQ Guideline for Occupied Buildings Under Construction 2007.

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 metal ducts and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common 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, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

- .2 Store and protect metal ducts from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 SEAL CLASSIFICATION

- .1 Classification as follows:

Maximum Pressure Pa	SMACNA Seal Class
500	C
250	C
125	C
125	Unsealed

- .2 Seal classification:
 - .1 Class C: transverse joints and connections made air tight with tape. Longitudinal seams unsealed.
 - .2 Unsealed seams and joints.

2.2 TAPE

- .1 Tape: polyvinyl treated, open weave fiberglass tape, 50 mm wide.

2.3 DUCT LEAKAGE

- .1 In accordance with SMACNA HVAC Air Duct Leakage Test Manual.

2.4 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Transitions:
 - .1 Diverging: 20 degrees maximum included angle.
 - .2 Converging: 30 degrees maximum included angle.

2.5 FIRE STOPPING

- .1 Retaining angles around duct, on both sides of fire separation in accordance with Section 07 84 00- Fire Stopping.
- .2 Coordinate with 07 84 00- Fire Stopping to ensure fire stopping materials and installation does not distort duct.

2.6 GALVANIZED STEEL

- .1 Lock forming quality: to ASTM A653/A653M, Z90 zinc coating.
- .2 Thickness, fabrication and reinforcement: to SMACNA.
- .3 Joints: to SMACNA. Proprietary manufactured flanged duct joint to be considered to be a class A seal.

2.7 HANGERS AND SUPPORTS

- .1 Hangers and Supports: made of the same material as the one used for the duct, but with a thickness immediately greater than that of the duct.
 - .1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct.
 - .1 Maximum size duct supported by strap hanger: 500.
 - .2 Hanger configuration: to SMACNA.
 - .3 Hangers: galvanized steel angle with galvanized steel rods to following table:

Duct Size (mm)	Angle Size (mm)	Rod Size (mm)
up to 750	25 x 25 x 3	6
751 to 1050	40 x 40 x 3	6
1051 to 1500	40 x 40 x 3	10
1501 to 2100	50 x 50 x 3	10
2101 to 2400	50 x 50 x 5	10
2401 and over	50 x 50 x 6	10
- .2 Upper hanger attachments:
 - .1 For concrete: manufactured concrete inserts.
 - .2 For steel joist: steel plate washer.
 - .3 For steel beams: manufactured beam clamps:

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 metal duct 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 from Departmental Representative.

3.2 GENERAL

- .1 Do work ASHRAE in accordance with SMACNA.
- .2 Install breakaway joints in ductwork on sides of fire separation.
- .3 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.

3.3 HANGERS

- .1 Strap hangers: install in accordance with SMACNA.

- .2 Angle hangers: complete with locking nuts and washers.
- .3 Hanger spacing: in accordance with as follows.

Duct Size	Spacing
(mm)	(mm)
to 1500	3000
1501 and over	2500

3.4 SEALING AND TAPING

- .1 Apply sealant in accordance with to manufacturer's recommendations.
- .2 Bed tape in sealant and recoat with minimum of 1 coat of sealant to manufacturers recommendations.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- .1 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
 - .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible, 2005.

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 air duct accessories and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Indicate:
 - .1 Flexible connections.
 - .2 Duct access doors.
 - .3 Turning vanes.
 - .4 Instrument test ports.

1.3 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 indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect air duct accessories from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 GENERAL

- .1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 ACCESS DOORS IN DUCTS

- .1 Non-Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame.

- .2 Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.
- .3 Gaskets: neoprene.
- .4 Hardware:
 - .1 Up to 300 x 300 mm: two sash locks complete with safety chain.
 - .2 301 to 450 mm: four sash locks complete with safety chain.
 - .3 451 to 1000 mm: piano hinge and minimum two sash locks.

2.3 INSTRUMENT TEST

- .1 1.6 mm thick steel zinc plated after manufacture.
- .2 Cam lock handles with neoprene expansion plug and handle chain.
- .3 28 mm minimum inside diameter. Length to suit insulation thickness.
- .4 Neoprene mounting gasket.

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 air duct accessories 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 from Departmental Representative.

3.2 INSTALLATION

- .1 Access Doors and Viewing Panels:
 - .1 Size:
 - .1 As indicated.
 - .2 Locations:
 - .1 Fire and smoke dampers.
 - .2 Control dampers.
 - .3 Devices requiring maintenance.
 - .4 Required by code.
 - .5 Reheat coils.
 - .6 Elsewhere as indicated.

- .2 Instrument Test Ports:
 - .1 General:
 - .1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
 - .2 Locations:
 - .1 Where required to provide access to smoke evacuation dampers and fire dampers.
 - .2 Where required to provide access to air flow adjustment dampers.
 - .3 Where required to provide access to devices requiring periodic maintenance.
 - .4 Where required, as per code requirements.
 - .5 Where required to allow access to the heating coils.
 - .6 At other indicated locations.
- .3 Bosses and connections for receiving test instruments
 - .1 General
 - .1 Install components in accordance with SMACNA recommendations and manufacturer's instructions.
 - .2 Arrange them in such a way as to facilitate the handling of the instruments.
 - .3 Install insulation penetrations if necessary.
 - .4 Location
 - .1 Air flow measurement
 - .1 Inlet face of wall or roof mounted exhaust fans.
 - .2 Intake and discharge side of other fans.
 - .3 On main ducts and main branches.
 - .4 At the indicated locations.
 - .5 Install in accordance with recommendations of SMACNA and as indicated.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCE STANDARDS

- .1 National Fire Protection Association (NFPA)
 - .1 NFPA 90A-12, Standard for the Installation of Air Conditioning and Ventilating Systems.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S112-10, Standard Test Method of Fire Test of Fire Damper Assemblies.
 - .2 CAN/ULC-S112.2-07, Standard Method of Fire Test of Ceiling Fire Stop Flap Assemblies.
 - .3 ULC-S505-1974, Standard for Fusible Links for Fire Protection Service.

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 fire and smoke dampers and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Indicate the following:
 - .1 Fire dampers.
 - .2 Smoke dampers.
 - .3 Fusible links.
 - .4 Rupture joints (design details).
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for fire and smoke dampers for incorporation into manual.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Materials:
 - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide:
 - .1 6 fusible links of each type.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common 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 fire and smoke dampers from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 FIRE DAMPERS

- .1 Fire dampers: arrangement Type B, bear label of ULC/UL, meet requirements of authorities having jurisdiction and NFPA 90A. Fire damper assemblies' fire tested in accordance with CAN/ULC-S112.
- .2 Mild steel, factory fabricated for fire rating requirement to maintain integrity of fire wall and/or fire separation.
 - .1 Fire dampers: 1-1/2 hour fire rated unless otherwise indicated.
 - .2 Fire dampers: automatic operating type and have dynamic rating suitable for maximum air velocity and pressure differential to which it will be subjected.
- .3 Fusible link actuated, weighted to close and lock in closed position when released or having negator-spring-closing operator for multi-leaf type or roll door type in horizontal position with vertical air flow.
- .4 40 x 40 x 3 mm retaining angle iron frame, on full perimeter of fire damper, on both sides of fire separation being pierced.
- .5 Equip fire dampers with steel sleeve or frame installed disruption ductwork or impair damper operation.
- .6 Equip sleeves or frames with perimeter mounting angles attached on both sides of wall or floor opening. Construct ductwork in fire-rated floor-ceiling or roof-ceiling assembly systems with air ducts that pierce ceiling to conform to ULC.
- .7 Design and construct dampers to not reduce duct or air transfer opening cross-sectional area.
- .8 Dampers shall be installed so that the centerline of the damper depth or thickness is located in the centerline of the wall, partition of floor slab depth or thickness.
- .9 Unless otherwise indicated, the installation details given in SMACNA Install Fire Damp HVAC and in manufacturer's instructions for fire dampers shall be followed.

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 fire and smoke damper 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 from Departmental Representative.

3.2 INSTALLATION

- .1 Install in accordance with NFPA 90A and in accordance with conditions of ULC listing.
- .2 Maintain integrity of fire separation.
- .3 After completion and prior to concealment obtain approvals of complete installation from authority having jurisdiction.
- .4 Install access door adjacent to each damper. See Section 23 33 00 - Air Duct Accessories.
- .5 Coordinate installation of fire stopping with Section 07 84 00 - Fire Stopping.
- .6 Ensure access doors/panels, fusible links, damper operators are easily observed and accessible.
- .7 Install break-away joints of approved design on each side of fire separation.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections of Divisions 26 and 28.

1.2 REFERENCE STANDARDS

- .1 CSA Group
 - .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
 - .2 CAN3-C235-83 (R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.3 DEFINITIONS

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

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 the fire alarm.
- .3 Shop drawings:
 - .1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .4 If changes are required, notify Departmental Representative of these changes before they are made.

.4 Certificates

- .1 Provide CSA certified material.
 - .2 Where CSA certified material is not available, submit such material to authority having jurisdiction for approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of contract.
 - .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .5 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 CLOUSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for the fire alarm.
 - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.

1.6 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, indoors, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.

- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification labels for control items in French.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide material in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Material to be CSA certified. Where CSA certified material is not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

2.3 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.4 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with labels as follows:
 - .1 3 mm thick lamicoid plastic engraving plates, with black melamine face and white core, mechanically fixed by means of tapping screws, with correctly aligned lettering, engraved to the core of the plate.

- .2 Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
 - .3 Wording on labels to be approved by Departmental Representative prior to manufacture.
 - .4 Allow for minimum of twenty-five (25) letters per label.
 - .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
 - .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.

- .7 Terminal cabinets and pull boxes: indicate system and voltage.
- .8 Transformers: indicate capacity, primary and secondary voltages.

2.5 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.6 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

Type	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: before installation.
 - .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 from Departmental Representative

3.2 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

3.3 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.4 FIELD QUALITY CONTROL

- .1 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
 - .1 Systems: fire alarm.
- .2 Carry out tests in presence of Departmental Representative.
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .4 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.5 SYSTEM STARTUP

- .1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .1 Remove recycling bins and bins from the site and dispose of materials at appropriate facilities.

END OF SECTION

DOCUMENTS REQUIRES FROM THE CONTRACTOR

Part 1 – Documents required at the beginning of the construction site

* These requirements must be completes before the first payment request.

		Transmission date
1.1	General Contractor	
1.1.1	List of subcontractors and their contact details	
1.1.2	List of suppliers with addresses and relevant contact persons	
1.1.3	List of personnel assigned to the project and their contact information (foreman, estimator, project manager/project manager)	
1.1.4	Detailed breakdown of payment claims from trade contractors or subcontractors	
1.1.5	Proof of insurance	
1.2	Electrical	
1.2.1	Licenses et qualifications	
1.2.2	List of subcontractors and their contact details	
1.2.3	List of suppliers with addresses and relevant contact persons	
1.2.4	List of personnel assigned to the project and their contact information (foreman, estimator, project manager/project manager)	
1.2.5	Delivery times for equipment to be supplied	
1.2.6	Proof of insurance	

Part 2 – Documents required during the construction phase until provisional acceptance *

* These requirements must be completed before the provisional acceptance request (prior to obtaining it) in order to receive the work with reserves.

		Transmission date
2.1	General Contractor	
2.1.1	Detailed schedule for start-up and commissioning	
2.1.2	Describing table for the training courses planned as prescribed in section 26 05 00	
2.1.3	System verification and test certificates	
2.1.4	All engineer's visit reports initialled as corrected when deficiencies have been reported	
2.2	Electrical	
	Workshop drawings (complete)	
2.2.1	Training programs as prescribed in section 26 05 00.	
2.2.2	Complete verification and start-up report for each equipment	
2.2.3	A summary table of the tests to be carried out as part of the project	
2.2.4	Table of Contents of Operations and Maintenance Manuals	
2.2.5	Complete report on the verification and start-up of new fire alarm systems.	
2.2.6	Certificates from the building management (RBQ)	
2.2.7	Certificates signed by the contractor for all tests	

Part 3 – Documents required for final acceptance of the work

*These requirements must be completed in order for the work to be finally accepted.

		Transmission date
3.1	General Contractor	
	<p>All deficiency lists of the specialized contractors completed and cross-checked by the project foreman.</p> <p><u>Important notes:</u></p> <p>A signature of the Project Authority and Foreman will be required to certify that the work has been completed.</p> <p>Once the general contractor has confirmed that the deficiencies are 100% complete, the engineer will carry out a final inspection of the work with the contractor and the owner. If further visits are required as a result of uncompleted corrections, the costs involved will be forwarded to the general contractor.</p>	
3.2	Electrical	
3.2.1	Deficiency list completed 100% and initialled by the project manager	
3.2.2	Waranty letter	
3.2.3	Operations and maintenance manual completed and accepted by the engineer	
3.2.4	The certificate of conformity (Appendix C) duly signed	
3.2.5	Drawings in accordance with execution	
3.2.6	List of spare parts and proof of transmission of these parts	
3.2.7	List of training courses given with date and signature of participants	
3.2.8	List of special tools	

SHOP DRAWINGS - PRESENTATION SHEET

This document is intended to be completed by computer and not by hand.

GENERAL CONTRACTOR OR PROJECT MANAGER:	
Person in charge :	
Telephone: ()	E-mail :

SPECIALIZED CONTRACTOR:	
Address :	
Person in charge:	
Telephone: ()	E-mail:


SPÉCIALITY (discipline) :	
Shop drawing n° :	Number of page:
Delivery time (after verification) :	
DESCRIPTION OF THE SHOP DRAWING:	
Drawing reference:	
Specification reference:	
Section :	Article :
Page :	

DISTRIBUTOR:	
Address :	
Person in charge:	
Telephone: ()	Fax: ()

SUBMITTED PRODUCT:	DRAWING ISSUED FOR:
<input type="checkbox"/> As is	<input type="checkbox"/> Verification <input type="checkbox"/> Information <input type="checkbox"/> Coordination <input type="checkbox"/> Other :

REVISION	DATE OF ISSUE

COMMENTS :	



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Verification of compliance

Nature and scope of the audit

☐ Compliance with plans and specifications

☐ Other :

This verification is not in any way a detailed and complete verification of the design.

☐ No corrections reported

☐ Make the indicated corrections

☐ Correct and resubmit

☐ Rejected

Signature ☐ Engineer ☐ Other

Date

Name

OIQ number

The verification of this document is limited to the nature and scope indicated. It does not in any way release the person or company that prepared it from its obligations of any kind.

**CERTIFICATE OF COMPLIANCE
(END OF WORK)**

PROJECT : _____
PROJECT ADDRESS : _____
DISCIPLINE : _____
SPECIFICATION SECTIONS: _____

We certify that all materials and equipment used and all apparent or hidden work performed or caused to be performed by us are in full compliance with the plans, specifications, addenda, changes and documents prepared by the engineers.

DATED TO _____ THIS _____ DAY OF _____ 20 _____.

CORPORATE NAME : _____
ADDRESS: _____
TELEPHONE: _____
SIGNATURE: _____
TITLE OF THE SIGNATORY: _____

STAMP

SHOP DRAWINGS REGISTER

SHOP DRAWINGS REGISTER

VERIFICATION STATUS		
V: VERIFIED AS IS		
VA: VERIFIED WITH ANNOTATION		
R: REJECTED		
TR: TO RESUBMIT		

SUBMITTED PRODUCTS		
RP: REFERENCED PRODUCT		
EP: EQUIVALENT PRODUCT		
PS: SUBSTITUTION BY AN UNNAMED PRODUCT		

REFERENCE TO THE SPECIFICATIONS											
SECTION	DRAWING NUMBER	DESCRIPTION		DISCIPLINE	REV.	RECEIVE		RETURN TO SUBCONTRACTORS		STATUS	COMMENTS
						DATE	SUBMITTED PRODUCT	SUBCONTRACTORS DATE	SENDING NUMBER		
28 31 00.01		Fire alarm heat detector		Electrical							
28 31 00.01		Fire alarm wiring		Electrical							
28 31 00.01		Batteries for fire alarm panel		Electrical							

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections of Divisions 26 and 28.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CAN/CSA-C22.2 No.18-98 (R2003), Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65-03 (R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
- .3 National Electrical Manufacturers Association (NEMA)

1.3 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 wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common 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, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for copper conductors.
 - .2 Clamp for copper conductors and bar.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper conductors.
 - .5 Sized for conductors as indicated.
- .4 Clamps or connectors for TECK cable, armoured cable, aluminum sheathed cable, and non-metallic sheathed cable, as required to: CAN/CSA-C22.2 No.18.

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 wire and box connectors 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 from Departmental Representative.

3.2 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and cables and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections of Divisions 26 and 28.

1.2 PRODUCT DATA

- .1 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 PRODUCTS

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 1000 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE, Jacketted.

2.2 FIRE ALARM WIRINGS

- .1 Fire alarm wiring:
 - .1 The twisted/shielded wires will be installed in "EMT" pipework without reinforcement and will have the following characteristics:
 - .2 Massive bare copper conductors.
 - .3 CPV insulation.
 - .4 Red CPV sheath.
 - .5 According to CSA FAS-105, 300 V, identified FT-4.
 - .6 Wire (2# 16 twisted/shielded) for all addressable networks for detection, monitoring, command and control. In the pipe, provide one (1) conductor #14 green for grounding all detection, monitoring, control and command devices and enclosures.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

3.2 GENERAL CABLE INSTALLATION

- .1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .2 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.

3.3 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

END OF SECTION

PART 1 GÉNÉRAL

1.1 RELATED REQUIREMENTS

- .1 Sections of divisions 26 and 28.

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

1.3 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 grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

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 indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 EQUIPMENT

- .1 Insulated grounding conductors: green, copper conductors, size as indicated.

- .2 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.

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 grounding equipment 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 from Departmental Representative.

3.2 INSTALLATION GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.

3.3 EQUIPMENT GROUNDING

- .1 Make the prescribed ground connections for all equipment.

3.4 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections of Divisions 26 and 28.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CSA C22.1-F12, Canadian Electrical Code, Part 1, 22th Edition.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 PRODUCTS

2.1 JUNCTION AND PULL BOXES

- .1 Construction: welded steel enclosure.
- .2 Covers Flush Mounted: 25 mm minimum extension all around.
- .3 Covers Surface Mounted: screw-on flat covers.

PART 3 EXECUTION

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.
- .3 Install terminal block as indicated in Type T cabinets.
- .4 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.2 IDENTIFICATION

- .1 Equipment Identification: to Section 26 05 00 - Common Work Results for Electrical.
- .2 Identification Labels: size 2 indicating voltage and phase or other information as indicated.

END OF SECTION

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Sections of Divisions 26 and 28.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA)
 - .1 CAN/CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981 (R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985 (R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984 (R2003), Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
- .3 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 CABLES AND REELS

- .1 Provide cables on reels.
 - .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.

- .2 Each coil or reel of cable to contain only one continuous cable without splices.
- .3 Identify cables for exclusively dc applications.

2.2 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45, aluminum threaded.
- .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

2.3 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
 - .1 Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.
Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

2.5 FISH CORD

- .1 Polypropylene.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in unfinished areas.
- .3 Use electrical metallic tubing (EMT) above 2.4 m not subject to mechanical injury.
- .4 Install fish cord in empty conduits.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Do not pass conduits through structural members except as indicated.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

- .1 Section includes
 - .1 This section covers the materials, equipment, installation methods and accessories required to modify the existing fire alarm supervision system.

1.2 SPECIALISED CONTRACTOR

- .1 Retain the services of Chubb Edwards for carrying out the work of this section.
- .2 The existing fire alarm system in the service building (maintenance garage) is a Chubb Edwards system. In order for the detector to be added to be compatible with the existing fire alarm panel on site, it must be of the same make, or: Chubb Edwards.

1.3 REFERENCES

- .1 Treasury Board of Canada, Occupational Safety and Health
 - .1 Fire Protection Standard – 10.
- .2 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524-06, Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S527-99, Standard for Control Units for Fire Alarm Systems.
 - .3 CAN/ULC-S528-05, Manual Pull Stations.
 - .4 CAN/ULC-S537, Verification of Fire Alarm System.

1.4 SUBMITTALS

- .1 Product data
 - .1 Submit manufacturer's printed product literature, specifications and datasheet with regard to equipment and accessories necessary for modifications to the multiplex fire alarm system. Product data to include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop drawings
 - .1 Include:
 - .1 Complete wiring diagram, including schematics of modules.
 - .2 Details on various devices.
 - .3 Details and performance specifications for the control system, annunciators and peripherals, with a system of cross-references between the specifications and each of the items for purposes of checking their compliance.
 - .4 Step-by-step sequence of operation, with reference to a logic diagram.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit operating and maintenance data for incorporation into O&E manual.

PART 2 PRODUCTS

2.1 WIRING

- .1 Copper stranded conductors, 300 V nominal voltage.
- .2 Alarm activation circuits: conductors, minimum size 18 AWG, and as per manufacturer's requirements.
- .3 Signalling circuits: conductors, 16 AWG minimum, per manufacturer's requirements.
- .4 Control circuits: conductors, 14 AWG minimum, per manufacturer's requirements.

2.2 END-OF-LINE RESISTORS

- .1 End-of-line resistors sized to ensure correct supervisory current.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verification of conditions: verify conditions of substrates previously installed under other sections or contracts are acceptable for fire alarm system installation in accordance with the manufacturer's written instructions.

3.2 INSTALLATION

- .1 Sprinkler system: wire alarm and supervisory switches and connect to control panel.
- .2 It is forbidden to make connections using splices.
- .3 Provide cables and wiring to make interconnections to the various components as per equipment manufacturer's requirements.
- .4 Prior to powering up system and turning over to Ministerial Representative, ensure that the wiring does not have any open circuits, short circuits or ground faults.
- .5 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical and CAN/ULC-S537.
- .2 Fire alarm system:
 - .1 Test all alarm devices and circuits to ensure devices for monitoring the sprinkler systems transmit an alarm signal to the control panel and trip the alarm.

- .2 Check the annunciator panels to ensure the zones are correctly indicated.
- .3 Simulate ground faults and opening of alarm and signalling circuits to ensure the system operates correctly.
- .4 Addressable circuits system style DCLA:
 - .1 Test each conductor on all DCLA addressable links for capability of providing three (3) or more subsequent alarm signals on each side of single open-circuit fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the three (3) signals. Correct imposed fault after completion of each series of tests.
 - .2 Test each conductor on all DCLA addressable links for capability of providing three (3) or more subsequent alarm signals during ground-fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the three (3) signals. Correct imposed fault after completion of each series of tests.
- .5 Addressable circuits system style DCLB
 - .1 Test each conductor on all DCLB addressable links for capability of providing three (3) or more subsequent alarm signals on line side of single open-circuit fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after reception of each of the three (3) signals. Correct imposed fault after completion of each series of tests.
 - .2 Test each conductor on all DCLB addressable links for capability of providing three (3) or more subsequent alarm signals during ground-fault condition imposed near electrically most remote device on each link. Operate Acknowledge/Silence switch after reception of each of the three (3) signals. Correct imposed fault after completion of each series of tests.
- .3 Provide final PROM program re-burn for system to Departmental Representative incorporating program changes made during system installation.

3.4 PROTECTION

- .1 Protect equipment and elements from damage during construction work.
- .2 Repair damage caused to materials and adjacent surfaces caused by the installation of the fire alarm system.

3.5 WORK COMPLETION ACTIVITIES

Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

END OF SECTION