

**PUBLIC WORKS AND SERVICES GOVERNMENT CANADA**

**TECHNICAL SPECIFICATIONS FOR ARCHITECTURE,  
STRUCTURE AND ELECTROMECHANICS**

**MARINE ENVIRONMENT DISCOVERY CENTRE**

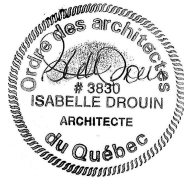
**Projet :        Building Enveloppe Restoration  
                 Saguenay-ST.-Lawrence Marine Park,  
                 41 rue des Pilotes, Les Escoumins (Québec)  
                 G0T 1K0**

**PWGSC Project Number:                    R.094002.001**

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                 For submissions**

**Architecture**

Isabelle Drouin  
Associate architect



**Mechanics**

Claude Létourneau  
Associate engineer



**Électricité**

Stéphanie Boudreau  
Associate engineer



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M300	Ventilation - basement plan - demolition and construction

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not used

### **1.02 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 Exterior works described in the contract documents comprises but are not limited to the following works: complete restoration of sloping roof except for the flat roof, window replacement, exterior deck repair, restoration of exterior wood siding, cold galvanizing of visible exterior steel structure and construction of a new screen.
- .2 Interior works described in the contract documents comprises but are not limited to the following works: demolition of partition walls for the construction of two new locker rooms (men and women), painting of concrete floor, ceiling replacement in work area, construction of new ceramic showers with dividing walls, installation of new lockers with bench, layout of a room with kitchenette, arrangement of a storage room, necessary electrical and mechanical layout to perform the works.
- .3 The works are located at 41 rue des Pilote, Les Escoumins (Qc), at the CDMM (Centre de découverte du milieu marin).

### **1.03 CONTRACT METHOD**

- .1 Construct Work under a single stipulated price contract

### **1.04 WORK BY OTHERS**

- .1 Refer to section 01 32 16.19 - Construction Progress Schedule – Bar Chart (GANTT chart).
- .2 Once the Centre's activities have resumed, in early June 2018, perform Work in stages to accommodate Owner's continued use of premises during construction.
- .3 Coordinate progress schedule with Owner's and public's occupancy during construction.
- .4 Respect the following sequence:
  - .1 Perform exterior works in order to provide free spaces for the public and Centre's activities.
  - .2 Perform interior works simultaneously with exterior works.
- .5 Maintenir l'accès aux fins de la lutte contre l'incendie; prévoir également les moyens de lutte contre l'incendie
- .6 Maintain fire access/control; plan for fire control measures

## **1.05 SITE INSPECTION**

- .1 In order to become familiar with specific project conditions and to gather all the information required to successfully execute the contract, carefully inspect the premises. Ignorance of site conditions will, in no case, be a valid reason to claim an additional payment

## **1.06 CONTRACTOR USE OF PREMISES**

- .1 Unrestricted use of site until the Centre's activities resume.
- .2 Limit use of premises basement to storage and construction works to allow:
  - .1 Parks Canada Agency occupancy of premises
  - .2 Public's partial occupancy of premises upon Centre's opening
- .3 Co-ordinate use of premises under direction of owner.
- .4 Obtain additional storage or work areas needed for operations under this contract. If necessary, communicate requirements to the Departmental Representative to facilitate completion of prescribed work.
- .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 which have been altered during construction operations to match existing or adjoining work, as directed by the Departmental Representative.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.
- .8 Refer to section 01 52 00 – Construction Facilities for use of sanitary facilities and parking.

## **1.07 PARTIAL OCCUPANCY OF PREMISES BY PARKS CANADA AGENCY**

- .1 Schedule and substantially complete designated portions of Work for Owner's occupancy prior to Substantial Performance of entire Work.
- .2 Parks Canada Agency, employees and the public will occupy areas designated for Centre's activities.
  - .1 Other exterior works performed in areas restricted to the public may be carried out after, while remaining within the contract period. Careful coordination of these works to occur between Contractor and Departmental Representative.
  - .2 Interior works in the basement must be completed by the opening of the diving centre.



- .3 Fulfill obligations relating to the issuing of the substantial performance certificate for each designated area prior to Parks Canada Agency occupancy:
  - .1 Safe access to premises for Parks Canada Agency's personnel and the public
  - .2 Unencumbered use of parking areas.

#### **1.08 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 Consultant to facilitate execution of work.
- .2 For material transportation and for work mainly performed in the basement, use only designated pedestrian doors and/or existing garage doors of the building.
  - .1 Protect, to the Departmental Representative's satisfaction, existing surfaces that must be preserved.
  - .2 Assume safety of equipment and responsibility for damage caused by Work and for overload imposed on existing equipment.

#### **1.09 EXISTING SERVICES**

- .1 Notify, Consultant and utility companies of intended interruption of services and obtain required permission.
- .2 Give the 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 Departmental Representative with minimum disturbance to pedestrian traffic and Centre's activities.
- .3 Provide alternative routes for personnel, pedestrian and vehicular traffic. Coordinate with the Departmental Representative.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Consultant of findings.
- .5 Submit schedule to and obtain approval from Consultant for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Consultant to maintain critical building and tenant systems.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10 Record locations of maintained, re-routed and abandoned service lines.

- .11 Construct barriers in accordance with Section 01 52 00 – Construction Facilities .

#### **1.10 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed and annotated 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 relevant documents.
  - .12

#### **1.11 WORK SCHEDULE**

- .1 Normal occupant hours are Monday to Friday from 8:30 am to 5:00 pm.
- .2 Comply with municipal bylaws regarding scheduling of work on site. Contain hours for noisy jobs only between 7:00 am and 6:00 pm Monday to Saturday to minimize impacts on the neighborhood.
- .3 Normal Parks Canada Agency employee hours are from 8:00 am to 5:00 pm.
- .4 Starting June 22, 2018, opening hours for public are from 9:00 am to 6:00 pm.
- .5 Peak ridership hours are from 12:00 pm to 3:30 pm.
- .6 The diving base will be open starting May 19, 2018

#### **1.12 ACCESS TO WORK SITE**

- .1 For exterior works, 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 regulations in force.
- .2 For interior works, comply with building access procedures.
  - .1 Duplicate of keys and access codes will be provided to the Contractor for access to the interior of the building affected by the Work.

#### **1.13 SPECIAL REQUIREMENTS**

- .1 Noisy and odorous works must be performed outside of peak visitor ridership
- .2 Submit work schedule in accordance with section 01 32 16.19 - Construction progress schedule – BAR (GANTT) Chart

- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress
- .5 Ensure materials are delivered off-peak hours, between 6:00 am and 11:00 am, unless otherwise directed by the Departmental Representative.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not used.

## **3 EXECUTION**

### **3.01 CONTENT OF SECTION**

- .1 Tests, mix designs and concrete curing
- .2 Mill Tests
- .3 Work mock-ups

### **3.02 INSPECTION**

- .1 Allow Departmental Representative or product technical representative access to Work. If part of Work is in preparation at locations other than Place of Work, 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 instructions, or law of Place of Work.
- .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.

### **3.03 INDEPENDENT INSPECTION AGENCIES**

- .1 Provide equipment required for executing inspection and testing by appointed agencies.
- .2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

- .3 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 the Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.

### **3.04 ACCESS TO WORK**

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Cooperate to provide reasonable facilities for such access.

### **3.05 PROCEDURES**

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order 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.

### **3.06 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 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative, it is 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 the Departmental Representative.

### **3.07 REPORTS**

- .1 Submit one (1) copy, in PDF format, of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested, to manufacturer, fabricator of material being inspected or tested.

### **3.08 TEST AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.
- .2 All costs pertaining to tests and mix designs called for in contract documents or required by municipal/local regulations relating will be covered by the Departmental

Representative.

### **3.09 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Departmental Representative The following list all Work mock-ups not indicated in technical sections.
  - .1 Acrylic coating on visible foundation
  - .2 Cleaning, surface preparation and staining of existing wood siding
  - .3 Cleaning, surface repair and staining of new wood siding.
  - .4 Cleaning of wood shingle surfaces.
  - .5 Bending aluminum around window frames.
  - .6 Preparation of concrete slab surfaces and epoxy coating.
  - .7 Surface preparation and application of cold galvanizing coating.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups 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.
- .5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

### **3.10 MILL TESTS**

- .1 Submit mill test certificates as required by specification Sections.

### **3.11 EQUIPMENT AND SYSTEMS**

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.
- .2 Refer to the relevant section for requirements pertaining to this question.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not used

### **1.02 ADMINISTRATIVE**

- .1 The Departmental Representative will prepare and distribute the meeting agenda.
- .2 Provide a room in the basement of the work site (agreed upon with the Departmental Representative) to hold meetings. Make the necessary arrangements for meetings. Provide a table and enough chairs to hold meetings.
- .3 Departmental Representative to chair project meetings.
- .4 The Departmental Representative will prepare the meetings minutes. He will take note of important questions and decisions, and specify the actions undertaken by the different parties.
- .5 Within five (5) working days of the meeting, the Departmental Representative will make copies of the minutes and distribute them to all parties concerned, even those absent from the meeting.
- .6 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

### **1.03 PRECONSTRUCTION MEETING**

- .1 Within seven (7) days of notification of acceptance of offer, the Departmental Representative will arrange a meeting with the parties to the contract to discuss administrative procedures and define responsibilities of each.
- .2 All of the following persons must attend this meeting: the Departmental Representative, the professionals responsible for supervising the work, the Contractor's Project Manager, the Superintendent in charge of the Contractor's site and the major Subcontractors deemed necessary by the Contractor.
- .3 The Departmental Representative will decide the time and location of the meeting and notify the parties concerned at least five (5) working days prior to the meeting.
- .4 Items to be included on the agenda
  - .1 Particularity of the site (CDMM) and public access.
  - .2 Designation of official representatives of the participants in the work.
  - .3 Schedule of work, as per section 01 32 16.19 - Construction Progress Schedules - Bar (Gantt) Charts, provided each meeting.
  - .4 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.
  - .5 Requirements for temporary facilities, site sign, offices, storage sheds, utilities,

- fences in accordance with Section 01 52 00 – Construction facilities.
- .6 Delivery schedule of specified materials and equipment with long lead time.
- .7 Notice of Proposed Amendments NPAs, amending permit, site instructions, procedures, approvals required, margin percentages allowed, time extensions, overtime and other administrative arrangements.
- .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, holdbacks
- .11 .13 Appointment of inspection and testing agencies or firms.
- .12 Insurances, transcript of policies.
- .13 CNESST.

#### 1.04 PROGRESS MEETINGS

- .1 In conjunction with the Contractor, the Departmental Representative will establish a schedule of meetings to be held every three (3) weeks over the course of the work and two (2) weeks prior to the completion of the work.
- .2 All project stakeholders, including the Departmental Representative, site supervisors of all professions, Contractor and major Subcontractors (depending on relevance and progress) are to be in attendance. The Owner's presence will be required when coordination needs are significant.
- .3 Notify parties at least five (5) working days prior to meetings.
- .4 Within five (5) business days of the meeting, the Departmental Representative will prepare the minutes and distribute them by e-mail to participants and interested parties absent from the 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, 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 CNESST.
  - .13 Environment.
  - .14 Miscellaneous.

## **2 PRODUCTS**

### **2.01 NOT USED**

.1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

.1 Not Used.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not Used

### **1.02 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 day 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.

### **1.03 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 Limit activity durations to maximum of approximately 10 working days, to allow for

progress reporting.

- .4 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 essence of this contract.

#### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within [5] working days of receipt of acceptance of Master Plan.

#### **1.05 PROJECT MILESTONES**

- .1 Project milestones form interim targets for Project Schedule.
  - .1 The basement finishing work and interior design, as well as the installation of electrical and mechanical equipment, must be completed no later than May 19, 2018, prior to the opening of the scuba diving center located in the basement.
  - .2 Work on the first floor related to documents must be completed no later than June 22, 2018, prior to the Centre's opening(CDMM)
  - .3 Exterior work that could disrupt the Centre's activities must be completed no later than June 22, 2018, prior to the Centre's opening
  - .4 If remaining work must be carried out beyond June 22, 2018, including the correction of defects, it must cause minimal disruption to the Centre's activities (CDMM).

#### **1.06 MASTER PLAN**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become the master plan and be used as baseline for the updates provided at every project meeting.

#### **1.07 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows: This list is provided to the contractor for reference only. This list is not exhaustive.
  - .1 Contract award.
  - .2 Shop drawings of elements requiring a long delivery time(example : windows, door

- and steel frame, garage door and furniture)..
  - .3 Other shop drawings and samples.
  - .4 Construction permit.
  - .5 Mobilization.
  - .6 Interior demolition work.
  - .7 Construction of new partitions including doors and frames.
  - .8 Gypsum and plastering.
  - .9 Ceiling installation.
  - .10 Ceramic installation.
  - .11 Installation of toilet partitions, shower, lockers and benches
  - .12 General painting
  - .13 Painting the basement floor.
  - .14 Signage and corner protector.
  - .15 Outdoor wallcovering.
  - .16 Exterior shingle covering
  - .17 Exterior fiber cement coating.
  - .18 Waterproofing the cover.
  - .19 Replacement of windows including finish.
  - .20 Garage doors.
  - .21 Rehabilitation of the terrace, construction of the screen.
  - .22 Acrylic plaster on foundation.
  - .23 Plumbing.
  - .24 Lighting
  - .25 Electrical
  - .26 Testing and commissioning
- .3 However, if the Contractor considers it would be beneficial to modify the schedule, these changes must be approved by the Departmental Representative.
- .4 If the Contractor considers it would be beneficial to modify the schedule, he will assume the costs of additional materials and protection that must be installed to protect some finished work from damage.
- .5 The site will be accessible near the completion of works planned. These will be prohibited outside the construction zones, except for minor works. These latter will be executed in coordination with the occupants, Parks Canada Agency and the Departmental Representative to minimize inconvenience.
- .6 The Contractor shall provide the skilled workforce in sufficient teams, in order to meet the project schedule.
- .7 A milestone is deemed to have been reached when all defects have been corrected and once the Departmental Representative has accepted the Work.

## 1.08 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on 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.

## **1.09 PROJECT MEETINGS**

- .1 Discuss Project Schedule at regular 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.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not applicable.

### **1.02 ADMINISTRATIVE**

- .1 Submit to the Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to avoid causing 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 is not produced in SI Metric units, converted values are acceptable.
- .5 Review submittals prior to submission to the Departmental Representative. This review done by the Contractor confirms 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 contractual documents. Submittals not stamped, signed, dated and identified as the specific project will be returned without being examined and considered rejected.
- .6 Notify the Departmental Representative, in writing at time of submission, of deviations from requirements of contractual documents, stating reasons for deviations.
- .7 Ascertain that field measurements and affected adjacent Work are coordinated.
- .8 The Contractor's responsibility for errors and omissions in submission is not relieved by the Departmental Representative's review of submittals.
- .9 Keep one reviewed copy of each submission on site.

### **1.03 SHOP DRAWINGS AND PRODUCT DATA**

- .1 The expression "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by a professional engineer, registered or licensed to practice in the Province of Québec.
- .3 Shop drawings must indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the

section under which such adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

- .4 Allow five (5) days for the Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by the Departmental Representative are not intended to change the contract price. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as the Departmental Representative may require, consistent with contractual documents. When resubmitting, notify in writing the Departmental Representative of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
  - .1 Date and revision dates.
  - .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 must 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 the Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with contractual documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication details and materials.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Characteristics such as power, flow or capacity.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
    - .11 Test reports.
- .9 The Contractor is responsible for distributing copies of shop drawings and product data sheets once the Departmental Representative has completed his review. The Contractor is also responsible for keeping a copy on the job site as well as the copies necessary to assemble end-of-project documents.
- .10 Submit one (1) electronic copy, in PDF format, of shop drawings for each requirement

requested in specification sections and as the Departmental Representative may reasonably request.

- .11 Submit (1) electronic copy, in PDF format, of product data sheets or brochures for requirements requested in specification sections and as requested by the Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit (1) electronic copy, in PDF format, of test reports for requirements requested in specification sections and as requested by the Departmental Representative.
  - .1 The report signed by the authorized official of testing laboratory must certify that the material, product or system identical to material, product or system to be provided has been tested in accordance with specified requirements.
  - .2 Testing must have been carried out within 3 years of the date at which the contract was awarded for the project.
- .13 Submit (1) electronic copy of certificates for requirements requested in specification sections and as requested by the 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 the award of project contract and indicate the project title and number.
- .14 Submit (1) electronic copy, in PDF format, of manufacturer's instructions for requirements requested in specification Sections and as requested by the Departmental Representative.
  - .1 Documents describing installation of product, system or material, including special notices and material safety data sheets concerning impedances, hazards and safety precautions.
  - .2 Submit a Hazardous Materials Management Plan, indicating the name of all hazardous materials, quantity, use, location, personal protective equipment required and the arrangements that were made for their disposal.
- .15 Submit (1) electronic copy of manufacturer's field reports for requirements requested in specification sections and as requested by the Departmental Representative.
- .16 Documentation of the testing and verification actions taken by the manufacturer's representative to confirm compliance with the manufacturer's standards or instructions.
- .17 Submit (1) electronic copy of operation and maintenance data for requirements requested in specification sections and as requested by the Departmental Representative.
- .18 Delete information not applicable to the project.
- .19 Supplement standard information to provide details applicable to the project.
- .20 If upon review by the Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, electronic documents will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, a noted copy will be returned and resubmission of corrected shop drawings, through the same

procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- .21 The review of shop drawings by the Departmental Representative is for the sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that the Departmental Representative approves the detailed design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and contractual documents.
  - .2 Without restricting generality of foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to the fabrication process or to techniques of construction and installation and for coordination of Work for sub-trades.
- .22 When the requirements of the specification sections require that documents be checked and calculated by an engineer, they must bear the seal and signature of an Engineer who is a member in good standing of the Ordre des ingénieurs du Québec and be able to validate this type of work.
- .23 Produce, maintain and update a calendar showing the processing of all shop drawings and technical data required by the contract, as prescribed in section 01 11 00 – Summary of works.
- .24 Submit all batches of shop drawings, data sheets and samples required within four (4) weeks of contract award.

#### **1.04 SAMPLES**

- .1 Submit samples for review, in duplicate, as requested in respective specification sections. Label samples with their origin and intended use.
- .2 Deliver samples prepaid to the Departmental Representative's business address.
- .3 Notify the Departmental Representative in writing, at time of submission, of deviations in samples from requirements of contractual documents.
- .4 Where color, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by the Departmental Representative are not intended to change the contract price. If adjustments affect the value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which the Departmental Representative may require, consistent with contractual documents.
- .7 Reviewed and accepted samples will become the standard of workmanship and material against which installed Work will be verified.
- .8 Produce, maintain and update a calendar showing the processing of all samples required by the contract, as prescribed in section 01 11 00 – Summary of works.



- .1 Submit all samples required following contract award.

#### **1.05 EASE OF OBTAINING PRODUCTS**

- .1 Immediately after signing the contract, consider the requirements for the delivery of products and provide for any delays. If delays in the delivery of products are predictable, notify the Departmental Representative so that measures can be taken to replace them with alternative products or make the necessary corrections, and to do sufficiently in advance to avoid delays.
- .2 If the Departmental Representative has not been notified of foreseeable delivery delays at the start of the work, and it seems likely that the performance of the work will be delayed, the Departmental Representative reserves the right to substitute products with comparable products that can be delivered quickly, and the price of the contract shall not be increased as a result.

#### **1.06 MOCK-UPS**

- .1 Erect mock-ups in accordance with section 01 45 00 – Quality Control.
- .2 Produce, maintain and update a tracking table and calendar showing the processing of all mock-ups required by the contract, as prescribed in section 01 11 00 – Summary of works.
  - .1 Submit all mock-ups required no later than 2 weeks prior to the start of Work.

#### **1.07 CERTIFICATES**

- .1 Immediately after the award of the contract, submit documents required by the committee on Health and Safety in the workplace.
- .2 Submit copies of insurance policies immediately after the award of the contract.

#### **1.08 OPERATION AND MAINTENANCE MANUAL**

- .1 Refer to section 01 78 00 – Closeout Submittals

### **2 PRODUCTS**

#### **2.01 NOT APPLICABLE**

- .1 Not Applicable.

### **3 EXECUTION**

#### **3.01 NOT APPLICABLE**

- .1 Not Applicable.

**END OF SECTION**

## **1 GENERAL**

### **1.01 GENERAL NOTE:**

- .1 In this section the term "site" includes all the facilities located at the site where the work is taking place (construction site, buildings, access, infrastructure, parkings, bays, etc.).

### **1.02 RELATED REQUIREMENTS**

- .1 Not used

### **1.03 REFERENCES**

- .1 Canada:
  - .2 Association canadienne de normalisation (CSA).
    - .1 Code canadien du travail, partie II, Règlement canadien sur la sécurité et la santé au travail
- .3 Province of Québec
  - .1 Loi sur la santé et la sécurité du travail L.R.Q., c. S-2.1 (Act respecting occupational health and safety).
  - .2 Code de sécurité pour les travaux de construction L.R.Q., c. S-2.1, r.4 (Safety code for the construction industry).

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental representative, and the CNESST the site-specific prevention program, as outlined in the article "GENERAL REQUIREMENTS", at least 10 days prior to the start of work.
- .3 Submit, no later than seven (7) calendar days after the date of service of the execution order and before mobilization of labor, a health and safety plan
  - .1 Site-specific safety risk / hazard evaluation results
  - .2 2 Results of health and safety risk or hazard analysis associated with each task and activity included in the work plan.
- .4 Submit, at the request of the Departmental Representative and the appropriate authority, copies of the health and safety inspection reports completed on the site by the authorized representative of the Contractor.
- .5 The Departmental Representative will review the Contractor's prevention program for the site and provide comments within 10 working days of receipt of this document. If necessary, the Contractor will review his prevention program and submit it again to the Departmental Representative no later than 5 days after receiving the observations of the Departmental Representative. The Departmental Representative reserves the right not to authorize the start of work on the site until the content of the prevention program is satisfactory. The Contractor must subsequently update its prevention program and submit it to the Departmental Representative if the scope of the work changes, if the

Contractor's methods of work differ from its initial forecasts or for any other new applicable condition

- .6 The Departmental Representative's review of the Contractor's Site Prevention Program shall not be construed as an endorsement of this program and in no way limits the Contractor's overall responsibility for health and safety. during construction work
- .7 Submit copies of directives or reports prepared by federal and provincial / territorial health and safety inspectors.
- .8 Submit copies of incident and accident reports.
- .9 Submit to Departmental representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by Federal, Provincial and Territorial health and safety inspectors.
- .10 Submit to Departmental representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard.  
The investigation report shall contain at least the following:
  1. date, time and place of accident;
  2. name of sub-contractor involved in the accident;
  3. number of persons involved and condition of wounded;
  4. witness identification;
  5. detailed description of tasks performed at the time of the accident;
  6. equipment being used to accomplish the tasks performed at the time of the accident;
  7. corrective measures taken immediately after the accident;
  8. causes of the accident;
  9. preventive measures that have been put in place to prevent a similar accident.
- .11 Submit to Departmental representative WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00. Contractor must also keep one copy of these documents on the construction site.
- .12 Medical Surveillance: where prescribed by legislation, regulation or prevention program, submit certification of medical surveillance for construction site personnel prior to commencement of Work, and submit additional certifications for any new construction site personnel to Departmental representative.
- .13 Emergency Response Plan: outline the procedures and procedures to be followed in the event of an emergency on the
- .14 Submit to Departmental representative copies of all training certificates required for the application of the prevention program, in particular (if applicable) for the following:
  - .1 first aid in the workplace and cardiopulmonary resuscitation;
  - .2 work likely to release asbestos dust (mandatory for all work where asbestos is present);
  - .3 work in confined spaces (mandatory for all work in confined spaces);

- .4 lockout-tagout procedures (mandatory for all work requiring lockout);
  - .5 safely operating forklift trucks (mandatory for all forklift usage);
  - .6 safely operating elevating work platforms (mandatory for the use of all elevating platforms);
  - .7 any other requirement of Regulations or the safety program.
  - .8 In addition, the certifications of the *Cours de santé et sécurité générale pour les chantiers*
- .15 Engineer's plans and certificates of compliance: Contractor must submit to the Departmental representative and to the *Commission des normes, de l'équité, de la santé et de la sécurité du travail* (CNESST) a copy signed and sealed by engineer of all plans and certificates of compliance required pursuant to the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry) or by any other legislation or regulation or by any other clause in the specifications or in the contract. The Contractor must also submit a certificate of conformity signed by an engineer once the facility for which these plans were prepared has been completed and before a person uses the facility. A copy of these documents must be available on site at all times.

#### 1.05 FILING OF NOTICE OF CONSTRUCTION SITE OPENING

- .1 Notice of construction site opening shall be submitted to the CNESST before work begins. A copy of such notice and acknowledgment of receipt from the CNESST shall be submitted to Departmental representative.  
  
At the completion of all the work, a notice of construction site closing shall be submitted to the CNESST, with a copy to Departmental representative.
- .2 The Contractor shall assume the role of being the Principal Contractor in the limits of the construction site and elsewhere where he must execute work within the framework of this project. The Contractor shall recognize the responsibility of being the Principal Contractor of the project and identify himself as such in the notice of the construction site opening he provides to the CNESST.
- .3 The Contractor shall accept to divide and identify the construction site adequately in order to define time and space at all times throughout the course of the project.
- .4 The Contractor must agree to divide and identify the site appropriately, to define the time and space at any time during the duration of the project.

#### 1.06 HAZARD ASSESSMENT

- .1 The contractor must perform construction site specific safety hazard assessment related to project.

#### 1.07 MEETINGS

- .1 The Contractor shall organize a health and safety meeting on the site with his subcontractors before the start of work, and provide direction

#### 1.08 REGULATORY REQUIREMENTS

- .1 Do the Work in accordance with Section 01 11 00 – Summary of Work.

- .2 Comply with all legislation, regulations and standards applicable to the construction site and its related activities.
- .3 Comply with specified standards and regulations to ensure safe operations on a site containing hazardous or toxic materials.
- .4 Always use the most recent version of the standards specified in the (S-2.1, r.4) Safety code for the construction industry, notwithstanding the date indicated in that *Code*.

#### 1.09 RISKS INHERENT TO THE WORKSITE

- .1 In addition to the risks related to the tasks to be carried out, personnel responsible for the execution of the work on the construction site will be exposed to the following risks, inherent to the area where the work will be executed.

At the worksite there is in particular the presence of the following:

- .1 Steep slopes in various locations.
- .2 Slopes near the building may limit the choice of lift systems available.

#### 1.10 GENERAL REQUIREMENTS

- .1 Before undertaking the work, prepare a site-specific prevention program based on the hazards identified according to the article "HAZARD ASSESSMENT" and the article "RISKS INHERENT TO THE WORKSITE" in this section. Apply this program in its totality from the start of the project until demobilization of all personnel from the construction site. The prevention program shall take into consideration the specific characteristics of the project and cover all the work to be executed on the construction site.
- .2 Departmental representative may respond in writing, where deficiencies or concerns are noted in the prevention program and may request resubmission with correction of deficiencies or concerns.

#### 1.11 RESPONSABILITIES

- .1 The Contractor must be responsible for health and safety of persons on construction site, safety of property on construction site and for the protection of persons adjacent to construction site and the environment to the extent that they may be affected by conduct of the work.
- .2 The Contractor must acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the *Loi sur la santé et la sécurité du travail* (L.R.Q., ch. S-2.1) (Act Respecting Occupational Health and Safety) and the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry).
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific prevention Plan.

#### 1.12 COMPLIANCE REQUIREMENTS

- .1 Comply with the *Loi sur la santé et la sécurité du travail* (L.R.Q., c. S-2.1) (Act Respecting Occupational Health and Safety) and the *Code de sécurité pour les travaux de construction* (S-2.1, r. 4.) (Safety code for the construction industry) in addition to respecting all the requirements of this specification manual.

### **1.13 UNFORESEEN HAZARDS**

- .1 Whenever a source of danger not defined in the specifications or identified in the preliminary construction site inspection arises as a result of or in the course of the work, the Contractor must immediately suspend work, notify the person responsible for health and safety on the construction site, take appropriate temporary measures to protect the workers and the public and notify Departmental representative, both verbally and in writing. Then the Contractor must do the necessary modifications to the prevention program or apply the security measures required in order to resume work.

### **1.14 PERSON IN CHARGE OF HEALTH AND SAFETY**

- .1 The health and safety coordinator must meet the following criteria
  - .1 Have practical experience on a site where activities related to this type of work are carried out.
  - .2 Have working knowledge of health and safety regulations in the workplace.
  - .3 Take responsibility for the Contractor's training sessions on health and safety at work and ensure that only those who have successfully completed the required training have access to the site to perform the work.
  - .4 Assume responsibility for the implementation, compliance in the detail menu and follow-up of the health and safety plan prepared for the site by the Contractor.
  - .5 Be present on the site during the execution of the work.

### **1.15 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on construction site in accordance with Acts and Regulations of the Province.

### **1.16 INSPECTION OF THE CONSTRUCTION SITE AND CORRECTION OF NON-COMPLIANCES**

- .1 Immediately take all necessary measures to correct any situations deemed non-compliant during the inspections mentioned in the previous paragraph or noticed by the authorities having jurisdiction or the Departmental representative or his agent.
- .2 Submit to Departmental representative written confirmation of all measures taken to correct the situation in case of non-compliance in matters pertaining to health and safety.
- .3 The Departmental representative or his agent may order cessation of work if the Contractor does not make the corrections needed to conditions deemed non-compliant in matters pertaining to health and safety. Without limiting the scope of the preceding articles, the Departmental representative may order cessation of work if, in his view, there is any hazard or threat to the safety or health of construction site personnel or the public or to the environment.

### **1.17 CARTRIDGE DEVICES**

- .1 Use cartridge devices only with the written permission of the Departmental Representative.
- .2 Every person who uses a nail gun shall hold a training certificate and meet all the requirements of Section 7 of the Safety Code for the Construction Industry (S-2.1, r.4).

- .3 Any other cartridge device shall be used in accordance with the manufacturer's instructions and applicable standards and regulations.

#### 1.18 FUNGAL CONTAMINATION

- .1 It is not anticipated that the work covered by the present specifications involves the manipulation of materials contaminated by mould; however, if the Contractor or the Departmental representative or his agent discover materials which are susceptible of being contaminated by mould, the Contractor must immediately stop the work and advise the Departmental representative. If more investigation demonstrates that the materials do contain mould, the Contractor shall comply with the following requirements.
- .2 Prior to starting any work where workers are likely to be in contact with materials contaminated by mould, the Contractor must:
  1. Provide a written procedure for the work which respects all the requirements of the *Code de la sécurité pour les travaux de construction* S-2.1, r- 4, (Safety code for the construction industry), as well as the requirements indicated in the document "*Mould Guidelines for the Canadian Construction Industry*" published by the Canadian Construction Association (<http://www.cca-acc.com/documents/electronic/cca82/cca82.pdf>).
  2. Demonstrate that he has all the material and equipment required on hand to respect the procedure and for safely conducting the work.

#### 1.19 RESPIRATORY PROTECTION

1. Contractor must ensure that all workers who must wear a respirator as part of their duties have received training for that purpose as well as fit testing of their respirator, in accordance with CSA Standard Z94.4 *Selection, use and care of respirators*. Submit the certificates of the fit testings to the Departmental representative on demand.

#### 1.20 FALL PROTECTION

- .1 Plan and organize work so as to eliminate the risk of fall at the 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.
- .2 Every person using an elevating platform (scissors, telescopic mast, articulated mast, rotative mast, etc.) must have a training regarding this equipment.
- .3 The use of a safety harness is mandatory for all elevating platforms with telescopic, articulate or rotative mast.
- .4 Define the limits of the danger zone around each elevating platform.
- .5 All openings in a floor or roof must be surrounded by a guardrail or provided with a cover fixed to the floor able to withstand the loads to which it could be exposed, regardless of the size of the opening and the height of the fall it represents.
- .6 Everyone who works within two metres from a fall hazard of three metres or more must use a safety harness in accordance with the requirements of the regulation, unless there is a guardrail or another device offering an equivalent safety.

- .7 Despite the requirements of the regulation, the Departmental representative may require the installation of a guardrail or the use of a safety harness for specific situations presenting a risk of fall less than three metres.

## 1.21 SCAFFOLDINGS

- .1 In addition to the requirements of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), the Contractor who uses scaffoldings must respect the following requirements:
- .2 **Foundation**
  - .1 Scaffoldings shall be installed on a solid foundation so that it does not slip or rock.
  - .2 Contractors wishing to install scaffoldings on a roof, overhang, canopy or awning shall submit their calculations and loads, as well as plans signed and sealed by an engineer to the Departmental representative and obtain his authorization before beginning installation.
- .3 **Assembly, bracing and mooring**
  - .1 All scaffoldings shall be assembled, braced and moored in accordance with the manufacturer's instructions and the provisions of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry).
  - .2 Where a situation requires the removal of part of the scaffoldings (e.g., crosspieces), the Contractor shall submit to the Departmental representative 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 scaffoldings where the span between two supports is greater than three metres, the Contractor shall provide the Departmental representative an assembly plan signed and sealed by an engineer.
- .4 **Protection against falls during assembly**
  - .1 Workers exposed to the risk of falling more than three metres shall be protected against falls at all times during assembly.
- .5 **Platforms**
  - .1 Scaffolding platforms shall be designed and installed in accordance with the provisions of the *Code de sécurité pour les travaux de construction* (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 *Code de sécurité pour les travaux de construction* (Safety code for the construction industry)
  - .3 Scaffoldings of four sections (or six metres) high or more shall have a full platform covering the entire surface between the putlogs every three metres high or fraction thereof, and the components of that platform shall not be moved at any time to create an intermediate landing.
- .6 **Guardrails**
  - .1 A guardrail shall be installed on every landing.



- .2 Cross braces shall not be considered as guardrails.
- .3 If the platforms are not covering the entire surface between the putlogs, the guardrail must be installed just above the edge of the platform so that there is no empty horizontal space between the platform and the guardrail.
- .4 Where scaffoldings has four sections (or six metres) high or more and full platforms are required, the guardrails shall be installed on each landing at the start of work and shall remain in place until the work is completed.
- .7 **Access**
  - .1 The Contractor shall ensure that access to the scaffoldings does not compromise worker safety.
  - .2 Where the platforms of the scaffoldings 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 *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), stairs shall be installed on all scaffoldings that have six or more rows of uprights or is six sections (or nine metres) high or higher.
- .8 **Protection of the public and occupants**
  - .1 When scaffoldings are installed in a zone accessible to the public, the Contractor shall take the necessary measures to prevent the public from having access to them and, if applicable, to the work or storage area located in the vicinity of these scaffolding.
  - .2 Contractor must install covered walkways, nets or other similar devices to protect workers, the public and the occupants against falling objects. The means of protection must be approved by the Departmental representative.
- .9 **Engineering plans**
  - .1 In addition to those required by the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), the Departmental representative reserves the right to require engineering plans for other types or configurations of scaffoldings.
  - .2 A plan signed and sealed by an engineer is required for all scaffoldings that will be covered with a canvas, a tarpaulin or any other material that has wind resistance.
  - .3 A certificate of conformity signed by an engineer is required in all cases where an engineering plan is required for the installation and this, before anybody uses the facility. A copy of these documents must be available on the construction site at all times.

## 1.22 ROOFING WORK

### .1 Protection against fall from heights

#### **Garde-corps:**

- .1 Installation of guardrails is mandatory at all times; however, the installation of a warning line is allowed to define the limits of the work zones provided that all the

requirements of the articles 2.9.4.0 and 2.9.4.1 of the *Code de sécurité pour les travaux de construction* (Safety code for the Construction Industry) are respected.

- .2 The guardrails must remain in place until the end of the project. The Departmental representative will authorize their dismantling when he can confirm that all the work, inspections and corrections have been made.
- .3 Workers installing guardrails must wear safety harnesses.
- .4 Workers installing and modifying guardrails or flashing shall wear safety harnesses in the event guardrails must be moved temporarily.
- .5 Workers shall wear safety harnesses when receiving material and giving directions to the crane operator next to a drop.
- .6 Safety harnesses shall be worn when carrying out work next to a drop where collective protection is not sufficiently safe.
- .7 The Contractor shall provide a fastening method and safety cable system compliant with section 2.10.12 of the *Code de sécurité pour les travaux de construction (L.R.Q., S-2.1, r.4)* (Safety code for the Construction Industry) for each construction site or location.

#### **Lifting of materials**

- .1 For all winch installations, the Contractor shall provide the Departmental representative 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.
- .2 The Contractor shall carefully inspect all of the slings and lifting accessories and make sure that those in poor condition are destroyed or scrapped.
- .3 Compressed-gas cylinders shall be lifted with a basket specially designed for this purpose.
- .4 In all cases where a crane or boom truck is used, the Contractor must respect the requirements of the paragraph Lifting Loads With Crane or Boom Truck, in this section.

#### **Material and waste management**

- .1 On the roof, light material and sheet material shall be kept in containers or be securely fastened. In the event this requirement is disregarded in the slightest way, the Departmental representative may disallow the storage of materials on the roof.
- .2 Waste shall be discarded as produced using a waste chute or appropriate containers. The Contractor shall provide the means to prevent waste from being carried away by the wind.
- .3 All waste must be removed from the roof at the end of shifts.
- .4 Unless otherwise authorized by the Departmental representative, all waste bins must be placed at least 3 m from any structure or building.

#### **Protection of occupants and the public**

- .1 Contractor must install covered passageways, nets or other devices above the entrances and the exits of the building to protect the workers, the public and the

occupants against falling object. The means of protection must be approved by the Departmental representative.

- .2 A safety perimeter on the ground must be placed under the work zone in order to protect the workers, the public and the occupants.
- .3 The ground construction site, material handling area and boiler area shall be clearly sealed off to prevent occupants or the public from accessing the construction site and areas.
- .4 Before installing any device that may emit gas or fumes, the Contractor shall receive authorization from the person in charge of the construction site, who shall make sure that there is no risk of gas or fumes infiltrating the building's ventilation system.

### **1.23 STOP WORK**

Provide for the health and safety of the public and site personnel, and for the protection of the environment, priority over issues related to cost and schedule of work

## **2.0 PRODUITS**

### **2.01 Not used**

## **3.0 EXÉCUTION**

### **3.01 Not used**

**FIN DE SECTION**

## 1 GENERAL

### 1.01 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. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other harmful pollutants.

### 1.02 RELATED REQUIREMENTS

- .1 Section 02 41 00.08 – Demolition for Minor Works

### 1.03 REFERENCE STANDARDS

- .1 Canadian Construction Documents Committee (CCDC)
  - .1 CCDC 2-2008 Stipulated Price Contract.

### 1.04 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 products that may generate an environmental risk. Include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 1 copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
  - .1 Name of person 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 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including 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 and EPA 832/R-92-005, Chapter 3.
- .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
  - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .8 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.
- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 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.
- .13 Waste Water Management Plan identifying methods and procedures for management [and] [or] 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.

## **1.05 FIRES**

- .1 Fires and burning of rubbish on site is not permitted.

## **1.06 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, EPA 832/R-92-005, Chapter 3.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

#### **1.07 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 Do not remove any tree or shrub without the approval of the Departmental Representative.
- .4 The Contractor must receive the Departmental Representative's approval before pruning.
- .5 Any plant that the Departmental Representative deems sufficiently damaged by the Contractor to question the plant's ability to survive must be replaced by the latter at the rate of 2 equivalent plants, identified by the Departmental Representative, for every damaged plant.
- .6 When plants should be moved using a transplantation bucket, the Contractor must wrap them in a burlap bag with enough soil to contain all the roots and provide them with adequate protection. Keep the earth damp at all times. Keep away from the sun. Replant once Work is complete, at origin point or at the place indicated by the Departmental Representative.

#### **1.08 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 in accordance with the Departmental Representative's instructions.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

#### **1.09 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.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Never bury rubbish and waste materials on site.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .6 Waste Management : separate waste materials in accordance with Section 01 74 19 – CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not used

### **1.02 CONTENT OF SECTION**

- .1 Tests, mix designs and concrete curing.
- .2 Mill Tests
- .3 Mock-ups.

### **1.03 INSPECTION**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, 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 instructions, or law of Place of Work.
- .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 will pay cost of examination and replacement.

### **1.04 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax 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 retesting and reinspection.



### **1.05 ACCESS TO WORK**

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

### **1.06 PROCEDURES**

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order 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.

### **1.07 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] [DCC Representative] [Consultant] as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of the Departmental Representative, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the Departmental Representative 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 the Departmental Representative.

### **1.08 REPORTS**

- .1 Submit one copy of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

### **1.09 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

### **1.10 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of

Sections required to provide mock-ups.

- .2 Construct mock-ups in different locations, as indicated by the Departmental Representative.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups 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.
- .5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

#### **1.11 MILL TESTS**

- .1 Submit mill test certificates as required of specification Sections.

#### **1.12 EQUIPMENT AND SYSTEMS**

- .1 Submit adjustment and balancing reports for mechanical, electrical and other building equipment systems.
- .2 Refer to the relevant Section for definitive requirements.

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

### **3 EXECUTION**

#### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 02 41 00.08- Demolition-minor works
- .2 Section 07 31 13- Asphalt shingles

### **1.02 REFERENCE STANDARDS**

- .1 Comply with applicable CGSB and CSA standards for site installations.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

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

### **1.04 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 fenced area and details of fence installation.
- .2 Contractor to provide the following facilities: construction trailer, garbage containers, material containers, construction toilets, access roads to fenced area.
- .3 Project meetings will be held in the basement of the building as mentioned in section 01 11 01 – Work General Information
- .4 Identify areas which have to be graveled to prevent tracking of mud.
- .5 Indicate use of supplemental or other staging area.
- .6 Provide construction facilities in order to execute work expeditiously.
- .7 Site installation presented in the plans is for informational purposes. The Contractor must agree with the Departmental Representative and Parks Canada officials on the location of various equipment to avoid interfering with the regular operation of the building and its activities. When the installation differs from the proposed plans or in the absence of information on the plans, the Contractor shall, at the request of the Owner, provide a sketch presenting the planned layout of the site and have it approved by the Departmental Representative.
- .8 Cover waste containers with tarp to prevent debris from being lifted and scattered by the wind.
- .9 Remove from site all such work after use.

### **1.05 SCAFFOLDING**

- .1 Scaffolding in accordance with CAN/CSA-S269.2.

- .2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms, temporary stairs and ensure maintenance.
- .3 Become aware of site constraints that may influence the type of equipment needed to perform the Work.

#### **1.06 HOISTING**

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

#### **1.07 SITE STORAGE/LOADING**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work. The Contractor must assume the cost of obtaining the approval of a Professional Engineer authorized to design frameworks and that is a member in good standing of the Order of Engineers of Québec. Such engineer must provide a signed and sealed notice to that effect and, if applicable, include the details of temporary reinforcement. Promptly give the engineer's notice to the Departmental Representative.

#### **1.08 CONSTRUCTION PARKING**

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 Provide temporary access to areas designated by the Departmental Representative, and remove snow (when required) throughout the period of Work. Snow removal must also be completed around the building to allow Work.
- .4 Parking for employees of Contractor and Subcontractors is represented for information purposes in the documents. The exact position will be agreed upon with the Departmental Representative.

#### **1.09 OFFICES**

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .4 Maintain in clean condition.

## **1.10 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.

## **1.11 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .3 When permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of [Departmental Representative] [DCC Representative] [Consultant].

## **1.12 CONSTRUCTION SIGNAGE**

- .1 Provide, in PDF format, a reduction of the signboard for approval by the Departmental Representative prior to signage production.
- .2 Provide and erect project sign, within 10 days of signing Contract, in a location designated by Departmental Representative.
- .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.
- .5 Provide project identification site sign comprising base framing, and one 1200 x 2400 mm signboard as detailed and as described below.
  - .1 Foundations: 15 MPa concrete to CSA-A23.1 minimum 200 mm x 900 mm deep.
  - .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
  - .3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
  - .4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.
  - .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
  - .6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by Departmental Representative.
- .6 Locate project identification sign where indicated as directed by Departmental Representative and construct as follows:
  - .1 Build concrete foundation, erect framework, and attach signboard to framing.
  - .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
  - .3 Apply vinyl sign face overlay to painted signboard face in accordance with

installation instruction supplied.

- .7 Direct requests for approval to erect Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording in both official languages.
- .8 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .9 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier.

### **1.13 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 Protect travelling public from damage to person and property.
- .4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .6 Construct access and haul roads necessary.
- .7 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .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] [DCC Representative] [Consultant].
- .11 Provide snow removal during period of Work.

### **1.14 TEMPORARY WATER SUPPLY**

- .1 Ensure continuous supply of drinking water necessary to the carrying out of Work.
- .2 Make the necessary arrangements to connect to water network and assume all costs of installation, maintenance and removal.
- .3 Contractor will bear the costs of repairing the existing installations in case of breakage.

### **1.15 TEMPORARY HEATING AND VENTING**

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel to maintain a minimum comfortable temperature of 18 degrees Celsius, and compliant with the minimum recommended for materials installation.
- .2 Construction heaters used inside building must be vented to outside or be flameless type. Solid fuel salamanders are not permitted.
- .3 Provide adequate room control (heating and ventilation) of the work areas
- .4 Ensure rigorous monitoring of the operation of heating and ventilation equipment to maintain adequate ventilation and minimum heating at all times.

### **1.16 TEMPORARY POWER AND LIGHTING**

- .1 Parks Canada will provide power supply necessary for the lighting and operation of mechanical tools during Work.
- .2 Arrange for connection with appropriate utility company. Assume costs of installation, maintenance and removal.
- .3 Provide temporary lighting for the duration of Work and ensure maintenance of the network. Lighting appliances must provide a minimum of 162 lx illuminance to the floors.

### **1.17 WORKSITE TELECOMMUNICATIONS**

- .1 Contractor must provide a telecommunications system, including cell phones, fax machines, computers and equipment necessary for his own use and for the use of the Departmental Representative and other stakeholders. Contractor must ensure the connection of these facilities to the main networks and assume the costs of all these services.

### **1.18 FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction, applicable codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.
- .3 Maintain functional fire extinguishers on site in sufficient numbers.

### **1.19 CLEAN-UP**

- .1 Remove construction debris, waste materials, 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.

## **2 PRODUCTS**

### **2.01 NOT USED**

.1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

.1 Not Used

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not use

### **1.02 REFERENCE STANDARDS**

- .1 Within text of each specifications section, reference may be made to reference standards.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications. Conform to the latest date of issue of referenced standards in effect on the date of submission of bid.
- .3 If there is question as to whether products or systems are in conformance 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 borne by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

### **1.03 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.

### **1.04 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.

#### **1.05 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 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.

#### **1.06 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work, even where transportation by plane is required, in order to meet the requirements and the project's target end dates.
- .2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

#### **1.07 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 with products.

Obtain written instructions directly from manufacturers.

- .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.

#### **1.08 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. Departmental Representative reserves right to require dismissal from site, 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.

#### **1.09 COORDINATION**

- .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.

#### **1.10 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.

#### **1.11 REMEDIAL WORK**

- .1 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.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

#### **1.12 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.

### **1.13 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.

### **1.14 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.

### **1.15 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.

### **1.16 MATERIALS COMPATIBILITY**

- .1 It is essential for the components of assemblies and adjacent materials to be compatible with one another. Provide the Departmental Representative with a written statement certifying that the materials and components of assemblies are compatible.
- .2 It is the responsibility of everyone involved in the various sections to ensure their products and assemblies are compatible with the products and assemblies of other sections.

### **1.17 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 and the Centre's activities.
- .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.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
  - .1 Structural integrity of elements of project.
  - .2 Integrity of weather-exposed or moisture-resistant elements.
  - .3 Efficiency, maintenance, or safety of operational elements.
  - .4 Visual qualities of sight-exposed elements.
  - .5 Work of 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.

### **1.02 MATERIALS**

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

### **1.03 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. Provide operation methods approved by a professional engineer, authorized to design structures, who is a member in good standing of the Ordre des ingénieurs du Québec and is qualified to practice in the Province of Quebec. If applicable, the latter will need to provide the construction details of the supports, signed and sealed.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

#### 1.04 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work and provide patching to restore to pre-project conditions.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance full thickness of the construction element.
- .13 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .14 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

## **1.05 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not use.

### **1.02 PROJECT CLEANLINESS**

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .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.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only. Remove from site to allow the work to be performed.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 19 - Waste Management and Disposal.
- .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 the 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.

### **1.03 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 products and debris including that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 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.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors as well as from all existing elements and surfaces.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .16 Sweep and wash clean paved areas.
- .17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .18 Clean roofs, downspouts, and drainage systems.
- .19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .20 Remove snow and ice from access to building.

#### **1.04 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

#### **2 PRODUCTS**

##### **2.01 NOT USED**

- .1 Not Used.

#### **3 EXECUTION**

##### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

- .1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill.
- .2 Prior to commencement of work, meet with Departmental Representative to review waste management objectives as well as Contractor's proposed waste reduction plan for construction, restoration and other demolition waste.

### **1.02 RELATED REQUIREMENTS**

- .1 Section 02 41 00.08 – Demolition for Minor Works
- .2 Section 07 31 13 – Asphalt Shingles

### **1.03 DEFINITIONS**

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction and demolition operations.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
  - .1 Solvents in paints and other coatings;
  - .2 Wood preservatives; strippers and household cleaners;
  - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
  - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- .18 Construction Waste Management Plan: A project related plan for the collection, transportation, and disposal of the waste generated at the construction site; the purpose of the plan is to ultimately reduce the amount of material being landfilled.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.
- .2 Pre-work meeting: Prior to commencement of contract work, hold a meeting in accordance with Section 01 31 19 - Project Meetings involving Parks Canada personnel, the Contractor and the Departmental Representative. Discuss the construction waste management plan with the Contractor and agree on a coherent waste sorting procedure.

#### **1.05 SUBMITTALS**

- .1 Provide required information in accordance with Section 01 33 00 - Submittal Procedures.
- .2 The principal contractor must provide the following submittals: Receipts , weigh bills, consignment notes and/or disposal of waste's receipts showing the quantity and the type of material reused, recycled or eliminated.

#### **1.06 QUALITY ASSURANCE**

- .1 Comply with prescribed waste sorting program.

## **1.07 DELIVERY, STORAGE AND HANDLING**

- .1 Storage requirements: Implement a sorting program that includes the separate collection of waste generated by the project. The program will also build on recycling and reuse programs available in the region where the project is located.
- .2 Handling requirements: Ensure that the various types of waste going to landfill are not mixed with each other:
  - .1 Arrange for collection by or delivery to the appropriate recycling or reuse facility. Contractor must provide the name and address of waste processing site.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 (CWM PLAN) IMPLEMENTATION**

- .1 Manager: Contractor is responsible for designating an on site party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor and other site personnel as required to maintain [CWM Plan].
- .3 Instructions: Provide subcontractor with on-site instructions on the appropriate method for sorting construction waste at each stage of the project.

- .4 Sorting facilities: Identify and develop an area to facilitate the sorting of materials.
  - .1 Les conteneurs à déchets doivent être clairement identifiés afin d'éviter la contamination des matériaux.
  - .2 Waste containers must be clearly identified to prevent contamination of materials.
  - .3 Separate the following materials:
    - .1 Wood
    - .2 Glass
    - .3 Metal (steel and aluminum)
    - .4 Bituminous materials such as roofing shingles
    - .5 Other miscellaneous materials
  - .4 Hazardous waste must be sorted, stored and disposed of in accordance with local regulations.

### **3.02 SUBCONTRACTOR'S RESPONSIBILITY**

- .1 Subcontractor's shall cooperate fully with the Contractor to implement the CWM Plan.
- .2 Failure to cooperate may result in the Owner not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor's.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not used.

### **1.02 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection: Contractor must inspect the Work, identify deficiencies and defects, and repair as required to conform to 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's 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 Utility companies: submitted.
    - .5 Operation of systems: demonstrated to Owner's personnel.
    - .6 Commissioning of mechanical systems: completed in accordance with Departmental Representative.
    - .7 Work: complete and ready for final inspection.
  - .4 Final Inspection:
    - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
    - .2 When Work incomplete according to Departmental Representative, the Contract, 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 Refer to the contract terms and conditions when Work deemed incomplete by the Departmental Representative, complete outstanding items and request re-inspection.
- .8 Payment of the holdback amount: Following the issuing of the Certificate of Substantial Performance, submit a request for the payment of the holdback amount in accordance with the terms of the contractual agreement.

### 1.03 DEMONTRATION AND TRAINING

- .1 Demonstrate scheduled operation and maintenance of devices, equipment and systems installed to Parks Canada Agency two weeks prior to the substantial completion of Work.
- .2 Parks Canada Agency will provide list of personnel to receive training and will coordinate attendance at agreed-upon times.
- .3 **Preparation Works**
  - .1 Ensure conditions for demonstration of devices, equipment, and systems operation, as well as training sessions, comply with requirements.
  - .2 Ensure designated personnel are present
  - .3 Ensure equipment has been inspected and put into successful operation, in accordance with section 01 77 00 – Closeout Procedures.
  - .4 Ensure testing, adjusting, and balancing has been performed, and devices, equipment and systems are fully operational.
- .4 **Demonstration and Training**
  - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment, at the agreed upon times and designated location.
  - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
  - .3 Review content of manuals in detail to explain all aspects of operation and maintenance.
  - .4 If applicable, gather additional data necessary to training and insert in operations and maintenance manuals.

### 1.04 DOCUMENT SUBMITTALS

- .1 Submit two (2) weeks prior to designated dates, for approval by the Departmental Representative's and other parties involved, a schedule indicating the proposed time and date at which the operation demonstration of each device, item of equipment and system will take place.

- .2 Provide full copies of operation and maintenance manuals for use in demonstrations of devices, equipment, and systems operation, in accordance with section 01 78 00 – Closeout Submittals.

#### **1.05 FINAL CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: remove rubbish from job site in accordance with section 01 74 19 – Waste Management and Disposal

### **2 PRODUCTS**

#### **2.01 NOT USED**

- .1 Not Used.

### **3 EXECUTION**

#### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Not Used

### **1.02 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-warranty Meeting:
  - .1 Convene meeting one 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 The principal contractor will establish and submit for approbation a communication procedures to follow, in accordance to the Departmental Representative's expectations for the following cases:
    - .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.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit a PDF version and a hard copy of the operations and maintenance manual, consistent with the terms and conditions, to the Departmental Representative.
- .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.

### **1.04 FORMAT**

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm 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 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content following the section numbers and the sequence in which they appear in the Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide drawings with reinforcing strips and add to binder.

#### **1.05 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.

#### **1.06 AS -BUILT DOCUMENTS AND SAMPLES**

- .1 Maintain, in addition to requirements in General Conditions, at 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.

#### **1.07 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 colors 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 Referenced Standards 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, field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

#### **1.08 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 manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed color coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.
- .15 Additional requirements: as specified in individual specification sections.

## **1.09 MATERIALS AND FINISHES**

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and color and texture designations.
  - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

- .4 Additional requirements: as specified in individual specifications sections.

#### **1.10 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 special tools to the work site, store in the area designated by Parks Canada's employees.
  - .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 the work site in the area designated by Parks Canada's employees.
  - .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 the work site in the area designated by Parks Canada's employees.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative
    - .2 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, 2 weeks before planned pre-warranty conference, to

Departmental Representative for 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, executed in duplicate by subcontractors, suppliers, and manufacturers, within [ten] 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 until time specified for submittal.
- .7 Include information contained 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 roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, sprinkler systems, lightning protection systems.
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .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 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 continue 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 Contractor's plans for attendance post-construction warranty inspections.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty or safety reasons.
- .8 Respond in timely manner to oral or written notification of required construction warranty repair work.

### **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.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **1 GENERAL**

### **1.01 SUMMARY**

1. This Section includes the following (non-exhaustive list):
  - .1 Demolition and removal of interior partitions made of gypsum and / or covered with ceramic.
  - .2 Demolition and removal of gypsum false ceiling and suspended ceiling (tiles and tees).
  - .3 Demolition and removal of integrated furniture and fixtures.
  - .4 Demolition and removal of concrete base (shower base).
  - .5 Demolition and removal of concrete slab on the ground, for mechanical purposes.

### **1.02 REFERENCE STANDARDS**

1. CSA Group (CSA)
  - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
2. Department of Justice Canada (Jus)
  - .1 Canadian Environmental Assessment Act (CEAA), 2012
  - .2 Canadian Environmental Protection Act (CEPA), 2012
    - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
    - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations
    - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34
    - .4 Motor Vehicle Safety Act (MVSA), 1995
    - .5 Hazardous Materials Information Review Act, 1985
3. National Fire Protection Association (NFPA)
  - .1 NFPA 241 - 96, Standard for Safeguarding Construction, Alteration, and Demolition Operations
4. National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).
  - .2 National Fire Code of Canada 2015 (NFC).
5. Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S660-08, Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids
  - .2 ULC/ORD-C58.15-1992, Overfill Protection Devices for Flammable Liquid Storage Tanks
  - .3 ULC/ORD-C58.19-1992, Spill Containment Devices for Underground Flammable Liquid Storage Tanks
6. U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles
  - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles

- .3 EPA 832/R-92-005, Storm Water Management for Construction Activities:  
Developing Pollution Prevention Plans and Best Management Practices.

### 1.03 DEFINITIONS

1. Demolition: rapid destruction of building following removal of hazardous materials.
2. Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly.
3. Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
4. Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Construction Waste Management and Disposal.
5. Construction Waste Management Report (CWM Report): Written report identifying actual materials that formed CWM Plan for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Construction Waste Management and Disposal

### 1.04 ADMINISTRATIVE REQUIREMENTS

1. Coordination: Coordinate with Representative for the material ownership including but not limited to:
  - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Representative's property, demolished materials shall become Contractor's property and shall be removed from Project site.
  - .2 Historical items, relics, and similar objects include, but are not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Parks Canada, which may be encountered during the work of this section, remain the Park Canada's property
2. Pre-Demolition Meetings:
  - .1 Convene pre-installation meeting 1 week prior to beginning work of this Section, with Contractor and Representative in accordance with Section 01 31 19 - Project Meetings.
3. Scheduling:
  - .1 Employ necessary means to meet project time lines without compromising.

### 1.05 ACTION AND INFORMATIONAL SUBMITTALS

1. Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Shop Drawings: Submit drawings stamped and signed by professional engineer registered or licensed in Quebec as follows:

2. Informational Submittals: Provide the following submittals when requested by the Consultant:
  - .1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of Consultants and Representative, for work of similar complexity and extent.

## **1.06 QUALITY ASSURANCE**

1. Regulatory Requirements: Ensure Work is performed in compliance with LEPA and applicable regulations.
2. Comply with hauling and disposal regulations of Authority Having Jurisdiction.

## **1.07 SITE CONDITIONS**

1. Review "Designated Substance Report" and take precautions to protect environment.
2. If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately
3. Proceed only after receipt of written instructions have been received from Departmental Representative.
4. Notify Departmental Representative before disrupting building access.
5. Environmental protection:
  - .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

## **1.08 EXISTING CONDITIONS**

1. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

## **2 PRODUCTS**

### **2.01 Not used**

## **3 EXECUTION**

### **3.01 EXAMINATION**

1. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.
2. Review Project Record Documents of existing construction provided by Representative.

3. The Departmental Representative doesn't warrant that existing conditions and the conditions showed in the project file are the same.
4. Inventory and record the condition of items being removed and salvaged.
5. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.
6. Promptly submit a written report to Consultant.
7. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition operations.
8. Verify that hazardous materials have been remediated before proceeding with demolition operations.

### **3.02 PREPARATION**

Detailed list of pre-construction work

1. Floor structural support work:
  - .1 Provide shoring and bracing of floor structures when demolishing columns.
2. Protection of external works (Wall fresco):
  - .1 Prior to starting Work, take necessary measures to protect the wall mural identified at elevations.
3. General protection of Work
  - .1 Minimize dust and noise generated by Work, as well as inconvenience to occupants.
  - .2 Protect equipment, systems, building's mechanical and electrical installations as well as utility lines.
  - .3 Provide dust screens, tarps, railings, support elements and other necessary protective devices.
  - .4 Perform work in accordance with Section 01 35 29.06 - HEALTH AND SAFETY REQUIREMENTS.
4. Demolition / Removal work
  - .1 Demolish structural elements as specified.
  - .2 Remove parts of existing building to permit new construction
  - .3 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.
  - .4 At the end of each working day, ensure that the Work is safe and stable.
  - .5 Protect at all times internal surfaces of parts that will not be demolished against external elements.
  - .6 Carry out demolition work to raise as little dust as possible. Keep wet materials as directed by the Departmental Representative.

### **3.03 SITE RESTORATION & REPAIRS**

1. Site leveling: Perform rough and uniform grading of the demolition area to obtain a smooth and even surface.
2. Ensure gradual transition between existing and new adjacent surfaces.
3. General: Immediately repair damage caused to adjacent construction by demolition work.
4. Patch existing surfaces requiring repair to prepare them for new material.
5. Restore exposed finishes of patched areas. Extend restoration to adjacent construction to remove traces of patching and repairs.

### **3.04 CLEANING**

1. Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
3. Refer to demolition drawings and specifications for items to be salvaged for reuse.
  - .1 Remove bins and recycling bins from site and dispose of materials at the appropriate facilities.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 07 92 00 - Produits d'étanchéité pour Joints
- .2 Section 09 30 13 – Ceramic tiling
- .3 Section 09 91 23 – Interior painting

### **1.02 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI)
  - .1 ANSI/ASME 18.6.1 1981 (R2012) Wood Screws (Inch Series).
  - .2 ANSI/BHMA A156.9-2010, Cabinet Hardware.
  - .3 ANSI/BHMA A156.11-2014, Cabinet Locks.
  - .4 ANSI/BHMA A156.16-2013, Auxiliary Hardware.
  - .5 ANSI/BHMA A156.18-2012, Materials and Finishes.
  - .6 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.
  - .7 ANSI A208.1-09, Particleboard.
  - .8 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
  - .9 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  - .1 Architectural Woodwork Standards (AWMAC AWS), 2014.
- .3 ASTM International
  - .1 ASTM A 153/A 153M-16, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - .2 ASTM E 1333-14, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
  - .3 ASTM F 1667-13 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-11.3-M87, Hardboard.
  - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
  - .3 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
- .5 CSA International
  - .1 CSA O112-M Series 1977 (R2006) Standards for Wood Adhesives.
  - .2 CSA O121-08(R2013), Douglas Fir Plywood.
  - .3 CSA O141-05 (R2014), Softwood Lumber.
  - .4 CSA O151-14, Canadian Softwood Plywood.
  - .5 CSA O153-M1980 (R2014), Poplar Plywood.
  - .6 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.
- .6 Health Canada – Workplace Hazardous Materials Information System (WHMIS)

- .1 Safety data sheet (SDS).
- .7 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates .
- .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

### 1.03 PRE-INSTALLATION MEETING

- .1 Prior to enclosing framing, convene a meeting of contractor, casework fabricator, casework installer, framing subcontractor and Consultant.
  - .1 Review locations of backing required for casework installation of a plywood back as shown on shop drawings and as necessary for installation.
  - .2 Review method of attachment for backing to wall system.
  - .3 Review coordination with other affected sections.
  - .4 Ensure reinforcement is strong enough to support weight of furniture and equipment installed.

### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

- .1 Product Data:
  - .1 Prepare and submit material list in accordance with AWMAC AWS, cross-referenced to specifications.
  - .2 Include manufacturer's instructions, printed product literature, data sheets and catalogue pages for all materials and products to be incorporated into architectural wood casework and include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
  - .3 Submit one copie of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
- .2 Hardware List:
  - .1 Submit hardware list cross-referenced to specifications.
  - .2 Include manufacturer's specification sheets indicating name, model, material, function, finish, BHMA designations and other pertinent information.
- .3 Shop Drawings:
  - .1 Prepare and submit shop drawings in accordance with AWMAC AWS and as follows.
  - .2 Submit one set of shop drawings for initial review in accordance with requirements of Division 01. Revise as directed, submit 3 copies for final acceptance and distribution.
  - .3 Indicate details of construction, profiles, jointing, fastening and other related details.
  - .4 Scaling: Drawings shall be on a scale large enough to understand furniture manufacture and assembly.
  - .5 Indicate materials, thicknesses, finishes and hardware.



- .6 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
- .7 Show location on casework elevations of backing required in supporting structure for attachment of casework.
- .8 Indicate AWMAC AWS quality grade where different from predominant grade specified.
- .9 Include color schedule of all casework items, including all countertop, exposed, and semi-exposed cabinet finishes, finish material manufacturer, pattern, and color.
- .4 Samples:
  - .1 Prepare and submit samples in accordance with AWMAC AWS and as follows.
  - .2 Apply sample finishes to specified substrate or core material minimum 300 x 300 mm. For veneers with transparent finish submit three samples to illustrate range and color of grain expected.
  - .3 Shop applied coatings:
    - .1 For transparent finish, submit triplicate samples of each species and cut of wood to be used, finished to match project sample as specified.
    - .2 For opaque finish, submit triplicate samples for each color selection, finished to match project sample as specified.
  - .4 Submit duplicate samples of laminated plastic for each specified color selection.
  - .5 Submit duplicate samples of laminated plastic joints, edging, cutouts and post-formed profiles.
  - .6 Furnish three samples of each lumber and composite panel material to Contractor for preparation of field applied finish samples in accordance with Section 09 91 23 Interior Painting.
  - .7 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .8 Submit statement of experience and qualifications of architectural wood casework fabricator.

## 1.05 QUALITY ASSURANCE

- .1 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
  - .2 Shop prepare one base cabinet unit and wall cabinet, complete with hardware and shop applied finishes, and install where directed by Departmental Representative
  - .3 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with Work.
  - .4 When accepted, mock-up will demonstrate minimum standard for Work.
  - .5 Do not proceed with work prior to receipt of written acceptance of mock-up by Departmental Representative.
  - .6 Accepted mock-up may remain as part of finished work.

## 1.06 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 Deliver wood casework only when area of work is enclosed, plaster and concrete work is dry, and area is broom clean and site environmental conditions are acceptable for installation.
- .3 Protect millwork against dampness and damage during and after delivery.
- .4 Store millwork in ventilated areas, protected from extreme changes of temperature and humidity, and within range recommended by AWMAC AWS for location of project.
- .5 Store materials indoors in clean, dry, well-ventilated area.
- .6 Protect architectural woodwork and hardware from nicks, scratches, and blemishes.
- .7 Replace defective or damaged materials with new.
- .8 Waste Management: for packaging and materials, in accordance with Section 01 74 19 - Waste Management and Disposal.

## **2 PRODUCTS**

### **2.01 SUSTAINABILITY CHARACTERISTICS**

- .1 Composite wood products: formaldehyde emissions within the following limits when tested in accordance with ASTM E 1333.
  - .1 Hardwood plywood with veneer core (HWPW-VC): 0.05 ppm.
  - .2 Hardwood plywood with composite core (HWPW-CC): 0.05 ppm.
  - .3 Particleboard (PB): 0.09 ppm.
  - .4 Medium density fibreboard (MDF): 0.11 ppm.
  - .5 Thin (less than 8 mm) medium density fibreboard (MDF): 0.13 ppm.
- .2 Adhesives: compliant with section 07 92 00 – Joint Sealants.
- .3 Coatings
  - .1 Clear Wood Finishes: VOC-Free
  - .2 Paints: VOC-Free.

### **2.02 QUALITY GRADE**

- .1 Provide all materials and perform all fabrication in accordance with AWMAC AWS Custom Grade and as follows, except where specified otherwise:
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.

### **2.03 LUMBER**

- .1 Softwood and Hardwood Lumber: Sound lumber to specified AWMAC AWS quality grade requirements, kiln-dried to moisture content recommended by AWMAC AWS for location of the Work.
- .2 Machine stress-rated lumber is acceptable for all purposes.

- .3 Face framing, pulls, trims, molding, edge-banding, species, in profiles indicated.

## 2.04 PANEL MATERIALS

- .1 Interior mat-formed wood particleboard: to ANSI/NPA A208.1, industrial grade M-2 or M-3, medium density (640-800 kg/m<sup>3</sup>), thickness 19 mm unless indicated otherwise.
- .2 MDF (medium density fibreboard) core: to ANSI A208.2, density 769 kg/m<sup>3</sup>, 19 mm thick unless indicated otherwise
- .3 Use moisture resistant MR grade for countertops and splash-backs to receive plumbing fixtures.
- .4 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .5 Hardwood plywood: to CHPA grading rules and ANSI/HPVA HP-1.
- .6 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .7 Poplar plywood (PP): to CSA O153, standard construction.
- .8 Hardboard: To CAN/CGSB-11.3.

## 2.05 LAMINATED PLASTIC MATERIALS

- .1 Laminates for vertical surfaces: as per NEMA LD3
  - .1 Laminate for flat surfaces (tall cabinets) kitchen S-14
    - .1 Nevamar range, distributed by Panolam
    - .2 Color S7024 Chalk White
    - .3 Finish : Velvet, code VE.
  - .2 Laminate for flat surfaces (low cabinets) kitchen S-14:
    - .1 Nevamar range, distributed by Panolam
    - .2 Color WZ0080 Zebrano White
    - .3 Finish : Timberline, code TL.
- .2 Thermally Fused laminate for horizontal flat surfaces (counter), locker rooms S-04 and S-11:
  - .1 Laminates for flat surfaces: as per NEDA LD3.
    - .1 Waterproof Compact Grade Laminate, manufactured by Formica
    - .2 Quality: Ordinary
    - .3 Type: HGS
    - .4 Color: 928 Mouse gray
    - .5 Finish : Matte, code 58.
    - .6 Nose Finish: at 45 degrees, see architectural plan.
    - .7 Black laminate.
  - .2 Laminate for flat surfaces (counter and dado) kitchen S-14:
    - .1 Nevamar range, distributed by Panolam
    - .2 Color MXT003 Silver Alu Metalx
    - .3 Finish: ARP, code T.
- .3 Core Material: MDF Board.

- .1 Worktops with plumbing fixtures: Water resistant MDF board.
- .4 Backsplashes: as indicated on the drawings and 100 mm high.
- .5 Front Edges: as shown on the plans.
- .6 When both sides of the panels are visible, they must be both coated. When only one side is coated, the other side must have a non-decorative (white) back sheet.
- .7 Plywood Adhesive: As per manufacturer's recommendations

## **2.06 CASEWORK FABRICATION - GENERAL**

- .1 Fabricate casework of specified core and surface finish materials to specified AWMAC AWS quality grade.
  - .1 Construction type: frameless
  - .2 Door-cabinet interface: flush overlay.
- .2 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .3 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .4 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .5 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .6 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .7 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

## **2.07 LAMINATED PLASTIC CASEWORK FABRICATION**

- .1 Do laminated plastic fabrication in compliance with NEMA LD3, Annex A and specified AWMAC AWS quality grade.
- .2 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .3 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.
- .4 Form shaped profiles and bends as indicated, using post-forming grade laminate to laminate manufacturer's instructions.
- .5 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

- .6 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .7 Apply laminated plastic liner sheet to interior of cabinetry where indicated.
- .8 Drawer Construction:
  - .1 Sides:
    - .1 Custom grade: LPDL (melamine).
  - .2 Joinery: Meeting requirements of AWMAC for Grade specified.
    - .2 .1 Sides, front and back: Doweled and paste
  - .3 Drawer bottoms held in place with drawer hardware to sides and mechanically fastened to back and sub front
- .9 Construction of shelves inside units:
  - .1 Regular grade: low-pressure decorative white laminate (melamine).

## **2.08 CONSTRUCTION OF PLYWOOD SHELVES**

- .1 300mm deep shelf, made of B.C. Fir 19mm plywood, room S-13, refer to plan for length.
  - .1 Finish: painted on site on all sides, refer to section 09 91 23 Paintings

## **2.09 CONSTRUCTION OF WOOD BENCHES IN LOCKER ROOMS**

- .1 Hardwood bench in locker rooms S-04 and S-11.
  - .1 Bench wood essence, visible moldings and transoms: factory varnished maple.
  - .2 Thickness: See detail
  - .3 Sanding: normal sanding
  - .4 Wood grain orientation: Horizontal.
  - .5 Hardwood sleepers on either side of removable bench in locker room S-11: 38mm x 75mm, same finish as bench. See details.
  - .6 Finish: Apply 3 coats of latex / urethane interior varnish for glossy finish floor and woodwork. Brightness (60%): 80 to 100%.
  - .7 Existing surface must be completely smooth, light sandblasting between layers.
  - .8 B.C. Fir 16mm plywood, finished side for base of benches in locker rooms S-04 and S-11.

## **2.10 CONSTRUCTION OF WATER ENTRY PANEL, LOCKER ROOM S-11**

- .1 Water Entry Panel, Locker Room S-11
  - .1 B.C. Fir 16mm laminated plywood, solid color same as walls.

## **2.11 CABINET HARDWARE**

- .1 Cabinet hardware: to AWMAC AWS quality grade specified and to ANSI/BHMA A156.9, designated by letter B and numeral identifiers as listed below.
- .2 Furniture door hinges:
  - .1 Built-in hinge with 107degree opening (except 90degrees when perpendicular to a wall or other obstacle
- .3 Other hinges: Removable bench section hardware in locker room S-11 and water entry panel in locker room S-11: full length, stainless steel piano hinge.

- .4 Latch for water entry panel in locker room S-11: Double Roller Catch with Diamond Strike.
- .5 S-14 Cabinet and Kitchen Drawer Handles and S-11 Cloakroom Entrance Panel: rear-mounted, Reference product: model 240175 from Richelieu, brushed chrome finish.
- .6 Inside tall and low cabinets: U-shaped steel pilaster for recessed mounting Reference product: model 2552GXX from Richelieu.
- .7 Inside tall and low cabinets: Steel Pilaster Shelf Clip, compatible with rack system, Reference product: #CP2562G, Zinc finish from Richelieu.
- .8 Shelf Supports and Racks in Room S-13:
  - .1 Heavy-Duty Double Standard Rack, White color.
  - .2 Heavy-Duty Bracket for adjustable shelf.
  - .3 Rack and support in sufficient quantity to support a heavy load.
- .9 Drawer Slides:
  - .1 Type of Slides: Full-extension runner system, Concealed roller carriage mechanism with permanently lubricated synthetic rollers
  - .2 Locking devices provide automatic latching, easy release for drawer removal, and tool-free height adjustment
  - .3 Force-guided right side and approximately 1/16" left side tolerance compensation
  - .4 66 lb. (30 kg) dynamic load rating
  - .5 Extension and capacity: Full extension meeting the requirements of the AWMAC AWS quality grade for drawer type and size of.
- .10 Swing Panel and Drawer Pad :
  - .1 Clear polyurethane self-adhesive pad with superior adhesion and absorption of shock and vibration.
  - .2 Yellowing resistant. Must not split.

## **2.12 ACCESSORIES**

- .1 Wood screws: type and size to suit application.
- .2 Nails and staples: to CSA B111 and ASTM F 1667.
- .3 Splines: not used.
- .4 Sealant: in accordance with Section 07 92 00 - Joint Sealants

## **2.13 WARRANTY**

- .1 Submit a written document stating that the work under this section is warranted against warping and delamination for a period of two (2) years from the date of completion.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other

Sections or Contracts are acceptable for architectural woodwork installation in accordance with manufacturer's 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.

### **3.02 COMPONENTS PROVIDED BY THE CABINETMAKER**

- .1 In addition to components mentioned in the present section, all piece of hardwood must be provided and installed by the cabinetmaker (wooden benches, visible wooden crossbeams, wooden finish trims, plywood at the base of the locker room's benches).

### **3.03 INSTALLATION**

- .1 Install architectural wood casework in accordance with AWMAC AWS grade for respective items.
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.
- .3 Install prefinished millwork at locations shown on drawings.
  - .1 Position accurately, level, plumb straight.
- .4 Fasten and anchor millwork securely.
  - .1 Supply and install heavy duty fixture attachments for wall mounted cabinets.
  - .2 Countersink mechanical fasteners at exposed and semi-exposed surfaces, excluding installation attachment screws and screws securing cabinets end to end.
- .5 Use draw bolts in countertop joints.
- .6 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .7 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant in accordance with Section 07 92 00 - Joint Sealants.
- .8 Apply moisture barrier between wood framing members and masonry or cementitious construction.
- .9 Fit hardware accurately and securely in accordance with manufacturer's written instructions.
- .10 Make cutouts for inset equipment and fixtures using templates provided.

### **3.04 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Clean millwork and cabinet work inside cupboards and drawers and outside surfaces.
  - .2 Remove excess glue, pencil and ink marks from surfaces.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

### **3.05 PROTECTION**

- .1 Protect millwork and cabinet work from damage until final inspection.
- .2 Protect installed products and components from damage during construction.
- .3 Repair damage to adjacent materials caused by architectural woodwork installation.
- .4 Leave work to be site finished ready for finishing by Section 09 91 23.

### **3.06 LISTS**

- .1 Kitchen furniture S-14;
- .2 Shelves in the storage room S-13;
- .3 Dismantling and reinstallation of the furniture with glass shelves R-07;
- .4 Locker room's counters and benches (S-04 and S-11);
- .5 Water inlet panel of the locker room S-11;
- .6 Every other cabinet-making component depicted on the plans.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 08 50 00- Hybrid windows (aluminum and wood).

### **1.02 REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.4-[M89], Fibrated, Cutback Asphalt, Lap Cement for Asphalt Roofing.
  - .2 CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.
  - .3 CAN/CGSB-51.32-[M77], Sheathing, Membrane, Breather Type.
  - .4 CAN/CGSB-51.34-[M86], Vapour Barrier Polyethylene Sheet, for Use in Building Construction.
- .2 Canadian Roofing Contractors' Association (CRCA)
  - .1 CRCA Roofing Specification Manual - 1997.
- .3 CSA International
  - .1 CSA A123.1/A123.5-05(R2010), Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules.
  - .2 CAN/CSA-A123.2-03(R2008), Asphalt-Coated Roofing Sheets.
  - .3 CSA A123.3-05(2010), Asphalt Saturated Organic Roofing Felt.
  - .4 CAN3-A123.51-M85(R2006), Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
  - .5 CAN3-A123.52-M85(R2006), Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.
  - .6 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 National Research Council Canada (NRC) - Canadian Construction Materials Centre (CCMC)
  - .1 CCMC Registry of Product Evaluations.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for asphalt shingles and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit proof of manufacturer's CCMC listing and listing number.
- .2 Samples:
  - .1 Submit duplicate samples of full size specified shingles.

#### **1.04 QUALITY ASSURANCE**

- .1 Make 1 mock up of valley waterproofing work.
- .2 Communicate with the Departmental Representative prior to commencing work.
- .3 Once accepted, the sample will become the minimum standard for the Work.
- .4 Approved mock up may be incorporated in finished Work.
- .5 All products installed under this section must be from the same manufacturer.

#### **1.05 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 and equipment so that they do not lie on the ground and remain in a clean, dry, well-ventilated area, as recommended by the manufacturer.
  - .2 Remove only in quantities required for same day use.
  - .3 Store and protect asphalt shingles from nicks, scratches, and blemishes.
  - .4 Replace defective or damaged materials with new.

#### **1.06 EXTRA STOCK MATERIALS**

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 All unused shingles remain property of Parc Canada.

### **2 PRODUCTS**

#### **2.01 MATERIALS**

- .1 **Asphalt Shingle:** This shingle conforms to requirements of CSA A123.5, ASTM D3018, ASTM E108 Class A, ASTM D3462, ASTM D3161 Class F, and ASTM D7158 Class H.
  - .1 Heavyweight, laminated shingle composed of a dimensionally stable non-woven glass fiber mat, which is thoroughly impregnated with stabilized waterproofing bitumen
  - .2 Product compliant with UL 2218 class 4, impact resistance test.
  - .3 Shakelook design, unique dual band shadow coloration.
  - .4 Colored, ceramic granules surface the top of both layers of this shingle to protect the asphalt from ultraviolet radiation.
  - .5 Each shingle has release tape and mineral powder applied to the underside, thus preventing any sticking in the bundle. Special algae-inhibiting granules have been added to provide long-lasting algae resistance.
  - .6 Asphalt shingles must meet the following requirements:

- Length: 1038 mm
- Width: 349 mm
- Color: Dual Gray
- Exposure: 149 mm
- Tear Strength: ASTM D1922
- Heat Resistance: 90°C
- Stabilized Bitumen Weight: ASTM D228
- Adhesion du granulat: ASTM D4977
- Fire Rating: ASTM E108
- Algae Resistance Warranty: 10 years

.2 **Underlayment Membrane:** compliant with ASTM D1970.

- .1 Superior self-adhesive membrane, protected by a silicone treated release sheet that's easily removed during application. Made of recycled components and manufactured in facilities that comply with the most stringent government environmental regulations.
- .2 Underlayment membrane must meet the following requirements:
  - Length: 20.3 m.
  - Width: 914 mm
  - Thickness: 1.0 mm (40 mils)
  - Selvage: 76 mm
  - Adhesion to plywood: kgf/30.5 cm (LBF/pi)
  - Tear Strength: compliant with ASTM D1970

.3 **Eave Protection Membrane:** compliant with ASTM D1970.

- .1 Resilient, non-woven glass fiber mat membrane, permeated and coated with SBS modified bitumen. This sheet is sanded on its top to provide a non-slip surface while a silicone treated release film, which is easily removed during application, protects its self-adhesive backing. Made of recycled components and manufactured in facilities that comply with the most stringent government environmental regulations.
- .2 Eave Protection Membrane must meet the following requirements:
  - Length: 19.8 m.
  - Width: 914 mm
  - Thickness: 1,8 mm (71 mils)
  - Selvage: 76 mm
  - Adhesion to plywood: kgf/30.5 cm (LBF/pi)
  - Tear Strength: compliant with ASTM D1970

.4 **Starter Strip Shingles :**

- .1 Starter Strip Shingles Made of recycled components and perforated right down the middle. Manufactured in facilities that comply with the most stringent government environmental regulations.
- .2 Starter Strip Shingles must meet the following requirements:

- Length: 1038 mm.
- Width: 200 mm
- Headlap: 50 mm
- Coverage per Bundle: 37 m. lin.
- 

.5 **Hip and ridge shingles:**

- .1 Perforated, three-piece, heavyweight shingle composed of a resilient, inorganic glass base that is coated and permeated with additional weather-resistant asphalt. Designed for hip and ridge. Surfaced with ceramic colored granules, which protect the asphalt from ultraviolet radiation. Special algae-inhibiting granules have been added to select colors to provide long-lasting algae resistance. Each shingle has release tape and mineral powder applied to the underside, thus preventing any sticking in the bundle. This shingle meets ASTM D3018, ASTM D3161, ASTM D3462, ASTM E108 Class A, ASTM D3161 and CSA A123.5. Made of recycled components and manufactured in facilities that comply with the most stringent government environmental regulations.
- .2 Hip and ridge shingles must meet the following requirements:
  - Length: 1000 mm.
  - Width: 336 mm
  - Headlap: 50 mm
  - Coverage per Bundle: 9 m. lin.
  - Exposure: 143 mm
  - Tear Strength: ASTM D1922
  - Granule Retention: ASTM D4977
  - Fire Rating: Class A, ASTM E108
  -

.6 **Aluminum frame:** 26 gauge painted aluminum bend, as detailed.

.7 **Metal Valley:** 26-gauge galvanized steel, width 610 mm.

.8 **Metal Flashings:** 26 gauge galvanized steel, as detailed.

.9 **Nailing:** Use galvanized roofing nails, 11- or 12-gauge, compliant with CSA B111, with at least 9.5 mm diameter heads, long enough to penetrate through plywood.

.10 **Screws:** Robertson type flat head wood screws (square) long enough to penetrate at least 25 mm into roof structure.

.11 **Plywood:** 13 mm thick spruce panel, standard exterior grade. Grade D refused. Refer to general notes for quantity to expect.

.12 **Plastic Cement:** product recommended by the company

.13 **Sloped Roof Ventilator:** Square base model, 460 mm x 460 mm with condensation control. must meet the following requirements: Attention, available on special order.

- .1 Net Free Evacuation: 324 in<sup>2</sup>
- .2 Deflector: 5
- .3 Compliances: CSA, CAN-3-A930M82, ASTM-527, Miami Dade , ICC-ES
- .4 Base Type: Detachable that can be adjusted to roof slope

- .5 Standard gauge: 24 galvanized steel
- .6 Wire Mesh: Built-in galvanized wire mesh screen
- .7 Finish: Interior and exterior powder coated polyester baked paint with UV protection
- .8 Colour: Stone Gray (QC-8305)

.14 Vent: Refer to mechanical document

### 3 EXECUTION

#### 3.01 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt shingles 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.
- .4 Support panel must be smooth, firm, dry and securely nailed. Remove loose or protruding nails, and sweep surface clean
- .5 Never apply asphalt shingles to roof slopes less than 2:12

#### 3.02 REMOVAL OF EXISTING ROOFING

- .1 Remove existing roofing, flashings and underlay, and expose sheathing or shingle lath of roof.
- .2 Withdraw existing shingle and flashing nails, set those which break off. Leave surfaces free from dirt and loose material.
- .3 Departmental Representative to inspect roof sheathing.
- .4 Remove portion of sheathing affected by fungal or insect attack as directed by Departmental Representative.
- .5 Replace cut out portions of sheathing or lath with sheathing of equal sectional dimensions, and specified grade. Seat each end on rafter, with 25 mm bearing, and secure to rafter.

#### 3.03 APPLICATION

- .1 Asphalt shingles: in accordance with CAN3-A123.51, CAN3-A123.52 and Specifications, Roofing, of CRCA (Canadian Roofing Contractors Association).
- .2 **Underlayment Membrane:** Apply underlayment on entire roof surface according to instructions printed on each wrapper. Lay parallel to the eaves, with 50 mm horizontal laps and 100 mm end laps. Apply metal drip edges on top of any underlay along rake edges and directly to the deck along eaves.
- .3 **Eave Protection Membrane:** Apply eave protection as per building code requirements, overhanging eaves by a nominal 1/4" minimum and extending up the roof at least 24" beyond the interior

wall line. Ice & Water Protector is recommended for best performance, applied according to instructions printed on each wrapper.

.4 **Starter strip shingles:** Take one of the separated starter strips 1,000 mm x 168 mm and remove approximately 500 mm. Install this starter strip on the lower left corner of the roof deck, granule side up, with the factory installed sealant adjacent to the eaves. The starter strip should overhang the rake edge and eaves by at least 6 mm. Fasten the starter strip to the roof deck with nails located 75 mm to 100 mm from the eave edge and 25 mm in from each end.

.5 **Hip and ridge shingles:** Cut hip and ridge shingles into thirds, using the perforation marks as a cutting guide. These shingles are designed for a 143 mm exposure. Bend each piece over the hip or ridge, and nail 156 mm above the butt edge 25 mm in from each edge, exposing each piece 143 mm. Apply hip pieces starting at the lower end of the hip, working up toward the ridge. On hip roofs, apply ridge pieces starting at each end, meeting in the middle. On gable roofs, apply ridge pieces starting at the end opposite to the prevailing wind direction and continue to the other end. Apply hip and ridge shingles double thickness by stacking 2 pieces on top of one another the lower piece extending about 19 mm further than the top piece. The final shingle should be set in cement, and the exposed nail heads of the final shingle should be covered with cement. Prior to application in cold weather, storing the shingles in a heated area will allow for easier bending.

.6 **Flashings on base of slopes:** Base flashing should be in place before shingles are applied. Sealed with asphalt plastic cement. Flashings shall conform to the requirements of applicable building codes and good roofing practice.

.7 **Flashings on straight slopes:** Install flashings above underlayment and/or eave protection. Sealed with asphalt plastic cement. Flashings shall conform to the requirements of applicable building codes and good roofing practice.

.8 **Nailing:** Use 6 nails per shingle, placed in the nailing strip 187 mm under the above edge, approximately 25 to 330 mm from each edge. Drive nails straight so that nail head is flush with, but not cutting into shingle surface. Ensure that no nail is within 50 mm of a joint/cutout of the underlying shingle. Seal down each shingle at time of application with three 25 mm diameter spots of asphalt plastic cement (approximately the size of a quarter) placed under the shingle 50 mm above the bottom edge and equally spaced along the shingle. Apply plastic cement in moderation since excessive amounts may cause blistering.

.9 Install plywood along eaves by forming a 12 mm overhang and a rim extending at least 50 mm on the roof deck.

.1 Nail plywood panels to roof trusses at 400 mm centers.

.10 .At the meeting points of vertical surfaces, install the lowest step flashing (base flashing) between shingles.

.11 Install asphalt shingles on roofs with a slope of 1: 4 or steeper, in accordance with CAN3-A123.51 or CAN3-A123.52 and the requirements of the manufacturer.

### **3.04 CLEANING**

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.2 Leave Work area clean at end of each day.

.3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.4 Waste Management: Sort waste in accordance with Section 01 74 19 - Waste Management and Disposal.

.5 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.05 PROTECTION**

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by asphalt shingles installation.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 06 40 00 – Architectural Woodwork
- .2 Section 08 11 00 – Metal Doors and Frames
- .3 Section 08 50 00 – Hybrid Windows (aluminum and wood)

### **1.02 REFERENCE STANDARDS**

- .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 (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
  - .2 CAN/CGSB-19.13-[M87], Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .3 CGSB 19-GP-14M-[1984], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
  - .4 CAN/CGSB-19.17-[M90], One-Component Acrylic Emulsion Base Sealing Compound.
  - .5 CAN/CGSB-19.24-[M90], Multi-component, Chemical Curing Sealing Compound.
- .3 General Services Administration (GSA) - Federal Specifications (FS)
  - .1 FS-SS-S-200-[E(2)1993], Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Technical data sheets from manufacturer must deal with the following products:
    - .1 Caulking compound.
    - .2 Primers.
    - .3 Cleaning products for joints.
  - .3 Submit 1 copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.



- .2 Samples:
  - .1 Submit 2 samples of each type of material and colour.
  - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.
- .3 Manufacturer's instructions
  - .1 Instructions submitted must be about each of the proposed products.

#### **1.04 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.

#### **1.05 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 indoors and off ground, in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

#### **1.06 SITE CONDITIONS**

- .1 Ambient Conditions:
- .2 Proceed with installation of joint sealants only when:
  - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
  - .2 Joint substrates are dry.
  - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 Joint-Width Conditions:
  - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
- .4 Joint-Substrate Conditions:
  - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.
  - .2 Rinse seal surfaces from any undesirable material including dust, rust, oil, grease and other foreign substance that may affect the performance or efficiency of the Work.
  - .3 Do not apply sealants and other similar products to joint surfaces that have been treated with a pore filler, hardener, water repellent or any other type of coating,

unless prior testing has been completed and has confirmed the compatibility of these materials.

- .4 Verify that joint surfaces are dry and not frozen.
- .5 Prime surfaces in accordance with manufacturer's instructions.

## **1.07 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.
- .2 The Contractor shall ensure that the building ventilation system operates at maximum capacity while the Work is carried out

## **1.08 QUALITY ASSURANCE**

- .1 Construct Work mock ups in accordance with Section 01 45 00 - Quality Control.
- .2 Mock ups shall illustrate the location, dimensions, profile and depth of each type of joint, bottom joint, primer and sealants. Mock ups approved by the Departmental Representative may remain part of the finished work.
- .3 Construct at least one mock up for each of the prescribed sealants and substrates to which they must adhere.
- .4 Location of mock ups
  - .1 Surrounding of steel frame openings in concrete foundation
  - .2 Window opening edge (sealant in back wall and exterior finish)
  - .3 Interior finish sealant joint on edge of steel frames;
  - .4 Any other sealant seal specified on the plans;
- .5 The Contractor and the Departmental Representative have to agree on all locations to be mocked up prior to completion.
- .6 Adhesion tests to be carried out on site, on the Work mock ups, before commencement of work:
  - .1 SIX (6) days before starting sealant application, perform surface adhesion testing of all specified sealants, following manufacturer's proposed joint preparation procedures;
  - .2 Perform tests for each type of sealant and substrate in conjunction with the manufacturer's technical representative;
  - .3 Test Method: use manufacturer's standard adherence test methods, proposed primer test methods and preparation techniques required to achieve maximum adhesion of sealant to the substrate;
  - .4 Analyze test results on site and report;
  - .5 Use of joint preparation methods and application for which adhesion tests have not yielded the expected results will be prohibited.
- .7 Compatibility of sealants with each other:
  - .1 Use prescribed sealants from a single manufacturer to ensure compatibility

- between products
- .2 The manufacturer shall inform the applicator of the procedures to be followed in the event of a different product intersection
- .3 Due to bitumen air / vapor barrier membranes being incompatible with a large number of sealants, avoid contact of membrane with sealants other than those specifically used for membranes and recommended by the manufacturer. Use a self-adhesive tape to cover these as needed.
- .4 Wait 48 hours before starting waterproofing work to allow the Technical Representative to inspect the work mock ups and provide written approval, if applicable.

### 1.09 CERTIFICATE SUBMITTAL

- .1 Submit, prior commencement of the Work, a certificate signed by the manufacturer of sealants establishing the following:
  - .1 Requirements for the preparation of surfaces;
  - .2 Required primers and methods of application
  - .3 Certification that adequate bottom materials have been selected
  - .4 Certification that sealants to be used have been selected from those specified
  - .5 Certification that sealants selected are suitable for their intended use and seal design;
  - .6 Certification that sealants are compatible with other materials and products with which they come in contact. Samples of the materials to be provided to Adfast Corp for approval.
  - .7 Certification that sealants will not stain substrates. Samples of the materials to be provided to Adfast Corp for approval. A period of 6 weeks is required for obtaining this approval from the date of receipt of materials.
  - .8 Certification that sealants are adequate for temperature, humidity and atmospheric conditions at the time of application.

### 1.10 WARRANTY

- .1 For work under this section, the caulking company must be notified by the Contractor, within reasonable time at the beginning of the project, in order to determine the procedures and adhesion tests before the start of Work. Some relevant information must be detailed below prior to installation on site. The company must provide written approval of the compatibility of the materials to be glued or sealed and the design of the joints. It is the responsibility of the Contractor and / or its specialized subcontractor to apply for this warranty directly to the company.
- .2 The company reserves the right to carry out inspections and site visits as required.
- .3 Provide a written document from the signed applicator, issued in the name of the Owner, certifying the performance of the products and the non-alteration of properties of such products, that may affect their appearance or performance for a period of one (1) year.
  - .1 That all sealants prescribed in this section will be free from leaks, cohesion and adhesion, cracking, crumbling, contraction, sagging, and will not cause adjacent surfaces or substrates to get dirty.
  - .2 The start date of the warranty is that of the Certificate of Substantial Completion.
  - .3 Contractor (name and address):

.4 Departmental Representative:

.5 Applicator:

.6 Project:

.7 Products used :

## 2 PRODUCTS

### 2.01 SEALANT MATERIALS

#### .1 Sealant type 1:

.1 Single component, Non-sag, silicone joint sealant. Compliant with CAN/ONGC 19.13-M87 and ASTM C920 S type, NS grade. Color at discretion of Departmental Representative.

Typical Applications: Joints in exterior insulation and finish systems, with vertical and horizontal surfaces not subject to traffic, such as joints around perimeter openings in the wall cavity and exterior finish, between different exterior materials identified in the drawings.

.3 Internal sealing joints on vertical and horizontal surfaces not subject to traffic, such as joints between subframes and openings.

.4 Joints between concrete structures

.5 Joints between metal flashing.

.6 Various joints required by drawings, but not covered by other sections.

#### .2 Sealant type 2:

.1 Non-sag, moisture-curing thixotropic silicone sealant in accordance with CAN / CGSB 19.13-M87 and ASTM C920, Type S, Grade NS, white or gray color at discretion of the Departmental Representative.

.2 Total adhesion: 14 to 30 days, depending on the temperature

.3 Hardness (ASTM D-2240): 37 to 43 Durometer

.4 Peel strength (ASTM C-794): 34 lbs / in.

.5 Elongation tensile strength (ASTM C-1135): 88 lbs / in<sup>2</sup>

.6 Tensile Strength (ASTM C-1135): 168 lbs / in.

Typical applications:

.7 Structural gaskets of laminated glass panels, gaskets to vertical and horizontal surfaces not subject to traffic, joints between external door frames and other metal elements, metal panels, masonry, ceramic, thresholds, spandrels, flashings, shelves and other external metal profiles and moldings.

#### .3 Sealant type 3:

- .1 Non-sagging, moisture-proof, one component silicone sealant compliant with CAN / CGSB 13-M87 Standard, ASTM 1166, ASTM C 920 S Type, NS Grade, ASTM E 662, SPMP 800-C, accredited by the Canadian Food Inspection Agency, AAMA 805.2-94 GROUP " A " and " C ", AAMA 802.3 TYPE " I " and " II ", color chosen by the Departmental Representative.  
Typical applications:
- .2 Typical applications: Interior finishing gaskets for bleaching rooms or food rooms, ventilation duct joints, vertical surfaces, and horizontal surfaces not subject to traffic, such as joints around door frames or windows. Cannot be painted.
- .4 **Sealant type 4:**
  - .1 One-component, non-sag, moisture-curing, silicone-based sealant compliant with CAN / CGSB-19.13-M87 standard, color as desired by Departmental Representative.  
Typical applications:
  - .2 Kitchen, bathroom and shower seals, applies to ceramic, glass, varnished surfaces, anti-fungal sealant. Cannot be applied on marble, limestone, lead, concrete, aquariums. Cannot be painted
- .5 **Sealant type 5:**
  - .1 Acrylic Latex Sealant, color at the discretion of the Departmental Representative.  
Typical applications:
  - .2 Interior finishing gasket to be painted, e.g. around steel door frames, around the wooden jambs of windows, between woodwork and gypsum as well as any other locations shown on drawings.

## 2.02 INSULATION PRODUCTS FOR OPENINGS

- .1 Single-component insulating polyurethane foam that can be applied down to -5 ° C with 70% to 80% closed cells, meets CAN / ULC S102 and ASTM E84, blue color.  
Typical applications:
  - .1 Joints concealed between gaps in the building envelope. Must be airtight as shown on drawings.
- .2 Single-component insulating polyurethane foam that can be applied at -25 ° C with 70% to 80% closed cells, meets CAN / ULC S102 and ASTM E84, champagne color product.  
Typical applications:
  - .1 Joints concealed between gaps in the building envelope. Must be airtight as shown on drawings.

## 2.03 SUPPORT MATERIALS

- .1 Preformed, compressible and non-compressible seam stock recommended by the manufacturer.
  - .1 Elements made of polyethylene foam, urethane, neoprene or vinyl.
    - .1 Extruded bi-cellular foam filling rods.
    - .2 Oversized elements and elements compressible by 25 to 50%.
  - .2 .3 Anti seize tape
    - .1 .4 Polyethylene tape that does not adhere to sealant

## **2.04 JOINT CLEANER**

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
  - .1 Product with rapid evaporation and no greasy residue.
  - .2 Color: clear
  - .3 Available format: 4, 18.9 or 200 liters

## **2.05 PRIMER**

- .1 Surface primer increases product adhesion and is compatible with silicone and hybrid sealants.
  - .1 Applies with a brush
  - .2 Penetrates porous surfaces
  - .3 Dries quickly
  - .4 Color: clear
  - .5 Available format: 500 ml can.

## **3 EXECUTION**

### **3.01 EMBLEMENTS - GÉNÉRALITÉS**

- .1 The fact that drawings do not indicate all areas to be sealed will not relieve the Contractor of his responsibility to seal all areas where such products are normally required to obtain a continuous barrier to air, water, moisture, sound, dust, smoke, or noxious gases. This article also applies to all other sections that refer to the present for the supply and / or installation of sealants and other similar products.

### **3.02 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 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 .

### **3.03 SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .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 coatings as required.

- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

### 3.04 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

### 3.05 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

### 3.06 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

### 3.07 APPLICATION

- .1 Sealant:
  - .1 Apply sealant in accordance with manufacturer's written instructions.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size 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. **Be Careful, use a soft soap as specified in the manufacturer's recommendations to avoid a reaction by causing a change of color to the surface.**
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.

### 3.08 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean adjacent surfaces immediately.
  - .3 Remove excess and droppings, using recommended cleaners as work progresses.

- .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.09 PROTECTION**

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

### **3.10 TESTING**

- .1 The sealants manufacturer will offer free adhesion testing or sealants-substrates compatibility testing prior to the commencement of Work.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

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

### **1.02 REFERENCE STANDARDS**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A 653/A 653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM B 29-03, Standard Specification for Refined Lead.
  - .3 ASTM B 749-03, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .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 CSA Group (CSA)
  - .1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .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-S701-[01], Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .2 CAN/ULC-S702-[97], Standard for Thermal Insulation, Mineral Fibre, for Buildings.
  - .3 CAN/ULC-S704-[03], Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  - .4 CAN4-S104-[M80], Standard Method for Fire Tests of Door Assemblies.
  - .5 CAN4-S105-[M85], Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

### 1.03 SYSTEM DESCRIPTION

- .1 Design Requirements:
  - .1 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
  - .2 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
  - .3 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E 152 or NFPA 252 and listed by nationally recognized agency having factory inspection services.

### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals and product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec.
  - .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvred, arrangement of hardware and fire rating and finishes.
  - .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, thermal breakage location of anchors and exposed fastenings finishes.
  - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit one 300 x 300 mm corner sample of each type of frame.
  - .1 Show butt cutout glazing stops 300 mm long removable mullion connection for each type snap-on trim with clips.

### 1.05 DELIVERY, STORAGE AND HANDLING

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

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.

- .2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.
- .3 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

## **2.02 DOOR CORE MATERIALS**

- .1 Honeycomb Core
  - .1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m<sup>3</sup> minimum. Sanded to required thickness and laminated to surface using UL/WHI approved polyurethane adhesive.
- .2 Door Core Types :
  - .1 Fiberglass: CAN/ULC-S702, semi-rigid board, density 24 kg/m<sup>3</sup>.
  - .2 Expanded polystyrene: CAN/ULC S701, density; 16 to 32 kg/m<sup>3</sup>.
  - .3 Polyurethane: Rigid, closed cell panels of modified polyisocyanurate. density 32 kg/m<sup>3</sup>. As per CGSB 51-GP-21M.
- .3 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250 degrees C during the period prescribed in the table. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E 152 and NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

## **2.03 ADHESIVES**

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

## **2.04 PRIMER**

- .1 Touch-up prime CAN/CGSB-1.181.

## **2.05 PAINT**

- .1 Field paint steel doors and frames in accordance with Section 09 91 23 - Painting.
- .2 The steel doors and frames shall be covered with a (1) primer coat and a (1) finishing coat in shop and a second finishing coat on site in accordance with section 09 91 23 - Painting, The finished surfaces must be free from scratches and other imperfections.

## **2.06 ACCESSORIES**

- .1 Door silencers: single stud rubber/neoprene type.

- .2 Exterior and interior top and bottom caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with appropriate screws.
- .4 Door bottom seal: in accordance with Section 08 71 00 - Door Hardware.
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal rivited.
- .7 Sealant: conform to section 07 92 00 - Joint Sealants
- .8 Glazing: fire resistant wired glass, conform to applicable standard.
- .9 Make provisions for glazing as indicated and provide necessary glazing stops.
  - .1 Provide removable stainless steel glazing beads for secured with countersunk stainless steel screws dry glazing of snap-on type.
  - .2 Design exterior glazing stops to be tamperproof.

## **2.07 FRAMES FABRICATION GENERAL**

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 16 gauge, 1.613 mm thick, welded by carrying out a continuous weld bead on the inside of the entire frame profile, thermally broken type construction.
- .4 Interior frames: 18 gauge, 1.311 mm thick, welded by carrying out a continuous weld bead on the inside of the entire frame profile.
- .5 Blank, reinforce, drill and tap frames for mortised, templated hardware, using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cut-outs with steel guard boxes when inserted in a masonry wall.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane or rock fiber insulation, in accordance with the details.

## **2.08 FRAME ANCHORAGE**

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing, embedded in concrete structures openings, not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm on centre maximum.

## **2.09 FRAMES: WELDED TYPE**

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile in continue.
- .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 floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

## **2.10 DOOR FABRICATION GENERAL**

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: isolated construction. Interior doors: honeycomb construction.
- .3 Fabricate doors with longitudinal edges welded. Seams: visible and grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.
- .4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E 330.
- .5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.
- .6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .7 Reinforce doors where required, for surface mounted hardware. Provide flush PVC top

caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.

- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .9 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in conformance with CAN4-S104 ASTM E 152 and NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .10 Manufacturer's nameplates on doors are not permitted.

## **2.11 DOORS: HONEYCOMB AND ISOLATED CORE CONSTRUCTION**

- .1 Form face sheets for exterior doors must be made from 16 gauge, 1.613 mm thick steel sheets with polyurethane core (RSI 2.0 or R 12.9, density; 54 kg per m<sup>3</sup> / 3.4 lb per ft<sup>3</sup>) laminated under pressure to door face sheets.
- .2 Form face sheets for interior doors must be made from 18 gauge, 1.311 mm thick steel sheets with kraft paper 'honeycomb' core, laminated to surface using UL/WHI approved polyurethane adhesive.
- .3 Reinforce doors with vertical stiffeners, securely welded to face sheets at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with polyurethane core.
- .5 Fill voids between stiffeners of interior doors with honeycomb core.

## **2.12 THERMALLY BROKEN DOORS AND FRAMES**

- .1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.
- .2 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate thermally broken frames separating exterior parts from interior parts with continuous interlocking thermal break.
- .4 Apply insulation.

## **3 EXECUTION**

### **3.01 MANUFACTURER'S INSTRUCTIONS**

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

### **3.02 INSTALLATION GENERAL**

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

### **3.03 FRAME INSTALLATION**

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air barrier and vapour retarder.

### **3.04 DOOR INSTALLATION**

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
  - .1 Hinge side: 1.0 mm.
  - .2 Latch side and head: 1.5 mm.
  - .3 Finished floor, noncombustible sill and/or thresholds: 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Upon completion of stabilization works, modify the base of doors to account for floor slab deformation and thus allow a free opening of 110 degrees.
- .5 Install louvres.

### **3.05 FINISH REPAIRS**

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections]with metallic paste filler and sand to a uniform smooth finish.

### **3.06 CLEANING**

- .1 Upon completion of work, perform clean up in accordance with section 01 75 00 – Cleaning.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 07 92 00 – 07 92 00 - Joint Sealants
- .2 Section 09 91 23 – Painting

### **1.02 REFERENCE STANDARDS**

- .1 Aluminum Association (AA)
  - .1 AA DAF 45OL-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International (ASTM)
  - .1 ASTM A 123/A 123M-15, Standard Specification for Zinc (Hot-Dip galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM E 1748-95(2009), Standard Test Method for Evaluating the Engagement Between Windows and Insect Screens as an Integral System.
- .3 CSA Group (CSA)
  - .1 AAMA/WDMA/CSA 101/I.S.2/A440-11(R2016), NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
  - .2 CSA A440S1-09, Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
  - .3 CAN/CSA-A440.2-14/A440.3-14, Fenestration energy performance/User guide to CSA A440.2, Fenestration energy performance.
  - .4 CAN/CSA-A440.4-07(R2016), Window, Door, and Skylight Installation
  - .5 CAN/CSA-Z91-02(R2013), Health and Safety Code for Suspended Equipment Operations.
  - .6 CAN/CSA-Z809-08, Sustainable Forest Management.
- .4 Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - current edition.
    - .1 MPI #79, Primer, Alkyd, Anti-Corrosive for Metal.
- .5 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1113-A2016, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants.
- .6 Screen Manufacturers Association (SMA)
  - .1 SMA 1201R-2012 Specification for Insect Screens for Windows, Sliding Doors and Swinging Doors.

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting 1 week prior to beginning work of this Section and on-site installation, with Contractor's Representative and Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:

- .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other construction subtrades.
  - .4 Review [manufacturer's] written installation instructions and warranty requirements.
- .2 Sequencing: sequence with other work in accordance with Section 01 32 16.19. Comply with manufacturer's written recommendations for sequencing construction operations.

#### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for windows and include product characteristics, performance criteria, physical size, finish, limitations and the finish of each component.
  - .2 Submit 1 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures.
- .2 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec.
  - .2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim and frame extensions and junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes fasteners, and caulking. No visible identification of the manufacturer will be accepted.
  - .3 Indicate locations, dimensions, openings and requirements of related work.
- .3 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Samples returned for inclusion into work.
  - .3 Submit a representative model of a complete, full-size sample window installation of a window juxtaposed to a high-density fibreboard and wood panel (F5 and F6 type).
  - .4 Include frame, sash, sill, glazing and weatherproofing method, insect screens, surface finish and hardware.
  - .5 Submit samples, 300 mm in length from a regular corner of a fixed window, showing the profile of these elements.

#### **1.05 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for windows for incorporation into manual.
- .3 Warranty Documentation: submit warranty documents specified.

## 1.06 QUALITY ASSURANCE

- .1 Test and Evaluation Reports:
- .2 Submit test reports from approved independent testing laboratories, certifying compliance with specifications.
- .3 Test reports that reference the NAFS include, on the first page, a summary of the results including, at minimum:
  - .1 Product manufacturer.
  - .2 Type of product.
  - .3 Model number/series number.
  - .4 Primary product designation.
  - .5 Secondary product designation.
    - .1 Positive design pressure.
    - .2 Negative design pressure.
    - .3 Water penetration resistance test pressure.
    - .4 Canadian air infiltration and exfiltration levels.
  - .6 Test completion date.
- .4 Report to contain the following information:
  - .1 Test dates.
  - .2 Report preparation dates.
  - .3 Test information retention period.
  - .4 Location of testing facilities.
  - .5 Full description of test samples, including:
    - .1 Finish and wood preservative.
    - .2 Condensation resistance.
    - .3 Safety drop - vertical sliding windows only.
    - .4 Block operation - sliding windows only.
    - .5 Sash strength and stiffness - operable casement.
    - .6 Sash pull-off - vinyl windows.
    - .7 Forced entry resistance.
    - .8 Mullian deflection - combination and composite windows.
  - .6 Complete description of amendments, as applicable.
  - .7 Conclusion.
  - .8 Drawings signed by the testing laboratory, if provided.
- .2 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-Up:
  - .1 Provide site mock-up for work of this Section indicating methods and materials, and procedures proposed to achieve final results in accordance with Section 01 45 00 - Quality Control, and to comply with following requirements, using materials indicated for completed work:
    - .1 Build mock-ups in location and of size as directed by Departmental Representative.
    - .2 Obtain Departmental Representative's acceptance of mock-ups before starting construction; mock-up used throughout construction period as standard of acceptance for subsequent work.
    - .3 Mock-up may form part of permanent structure when accepted by Departmental Representative. Repair or replace unacceptable mock-ups at no additional cost to Owner.

## 1.07 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 so that they do not lie on the ground (indoors), in a clean, dry and well-ventilated area, in accordance with the manufacturer's recommendations.
  - .2 Store and protect windows from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## 1.08 WARRANTY

- .1 Provide the warranty documents to the Departmental Representative. Those documents must be issued and dated on date of Work substantial acceptance, stating that the various components of the windows are warranted as follows:
  - .1 Aluminum extrusion: 20-year warranty v
  - .2 PVC extrusion: 20-year warranty
  - .3 Duranar XL paint finish system: 20 years against peeling, splitting, and cracking and 8 years against fading.
  - .4 Sealed thermos unit: 10 years.
- .2 This guarantee must be signed by an authorized representative of the company and issued in the name of the Owner.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Materials: to AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
- .2 Windows by same manufacturer.
- .3 **General Description of Window:** three-component hybrid fixed model: interior wood finish for paint, PVC core and extruded aluminum extrusion.
- .4 **Wood essence for interior:**
  - .1 Enclosure opening: natural jointed pine 19 mm thick depth 110 mm for all openings except for window F7 of room R-04, having a depth of 230 mm
  - .2 PVC core covering: maple interior wood cover, will consist of two (2) pieces: one (1) piece will cover the removable bead, and the other will cover the visible part of the frame inside. This interior wood cladding will have a minimum thickness of 8.5 mm, and will be installed by snap-in, screw-free, on the PVC retaining extrusions installed on the frame and on the bead.
  - .3 All surfaces shall be perfectly planed, free of spots or tool marks.
- .5 **PVC Extrusion:**

- .1 The fixed frame shall consist of a single extrusion of PVC GEON 6935 with a hardness of  $80 \pm 5$ , thickness of 1.70 mm on the outer walls and 1.20 mm on the inner walls.
  - .2 Miter joints to be heat welded and square welded.
  - .3 The structure will be suitable for the insertion of wood interior trim moldings.
  - .4 Installation brackets will be made of galvanized steel.
  - .5 The fixed frame shall be 77 mm thick by 116 mm wide.
  - .6 The fixed frame will accommodate a wide range of glazing types and thicknesses retained by a removable glazing bead.
  - .7 The sill part of the fixed frame shall be provided with water discharge holes.
  - .8 Modular construction reinforced of galvanized steel plates at assembly points.
- .6 **Aluminum extrusion :**
- .1 The outward face of the fixed frame, including the shutter-like part, will be encased with extruded aluminium made of 6063-T5 alloy whose flange is of 1.27mm thickness installed by means of an engagement pressure system.
  - .2 All the windows will be equipped with an exterior extruded aluminum extension, united to the frame, to have a depth of 146mm without regard to the finished wooden window frame.
  - .3 The extrusion must be coated with salt-water resistant paint.
- .7 **Thermos Glass:**
- .1 The double-sealed glass shall consist of two (2) clear transparent glass sheets of 4 mm, separated by a space filled with argon, obtained by means of a non-conductive interlayer with desiccant.
  - .2 Inner tempered glass for type F6, F7, F8 and F9 windows.
  - .3 The inner glass sheet of the unit sealed on face 3 shall be made of low-e glass.
  - .4 The gap between the glasses will be calculated to obtain sealed units that are 22.2 mm thick.
  - .5 Exterior glazing trim shall consist of a self-adhesive polyethylene cross-linked foam tape (closed cells) and coextruded lip soft vinyl frame; the interior trim of the glazing beads will consist of a coextruded lip made of soft vinyl.
  - .6 The sealed unit shall be installed in the fixed frame on hard Neoprene support blocks (80) of appropriate dimensions. These shims will be placed at approximately  $\frac{1}{4}$  of the width and at a rate of six (6) per glazing unit.
  - .7 A clearance of approximately 6 mm will be left at the perimeter of the sealed unit, providing the necessary clearance for water dripping.
- .8 **Windows Interior and Exterior Finish:**
- .1 Interior (wood): natural wood without varnish and painted on site as per section 09 91 23 - Painting.
  - .2 Exterior (aluminum): White Duranar XL paint, at the discretion of the Departmental Representative. This paint system must comply with a chromium phosphate pre-treatment followed by 3 coats and baking ( $450^{\circ}\text{F}$  /  $230^{\circ}\text{C}$ ): an anticorrosive primer will be followed by a coat of DURANAR colored paint and by a coat of XL satin varnish, providing long lasting protection.
- .9 **Sealants:** Clear silicone based, as per manufacturer's manufacturing procedures.

## 2.02 WINDOW TYPE AND CLASSIFICATION

- .1 Classification rating: to AAMA/WDMA/CSA 101/I.S.2/A440.
  - .1 Primary designation:
    - .1 Performance classes: CW.
    - .2 Performance categories: 30].
  - .2 Secondary designation:
    - .1 Positive design pressure: 1440 Pa.
    - .2 Negative design pressure: -1440 Pa.
    - .3 Water penetration resistance test pressure: 220 Pa.
    - .4 Canadian air infiltration and exfiltration levels: FIXED.
  - .3 Surface condensation control: compliant with standard CAN/CSA-A440.2/A440.3.
  - .4 Ancillary properties (Energy rating).
    - .1 Overall coefficient of heat transfer (U-factor) 1,64 W/(m<sup>2</sup>.K).
    - .2 Energy rating (ER) 31 (certification areas 1 and 2).

## 2.03 FABRICATION

- .1 Fabricate in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
- .2 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less, and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
- .3 Face dimensions detailed maximum permissible sizes.
- .4 Brace frames to maintain squareness and rigidity during shipment and installation.
- .5 Finish steel clips and reinforcement with shop coat primer to MPI #79 and ASTM A 123/A 123M.
- .6 Fixed frames joints shall be accurately pressed, welded and machined so that they are sturdy, watertight, precise, and present clean lines.
- .7 These windows will be designed to accommodate double or triple sealed units, as indicated in the glass composition part of this section.
- .8 These sealed units will be held in place by a removable glazing bead, snap-fastened, without visible screws and with a soft vinyl profile to facilitate the change of glazing units, if required.
- .9 Protected openings will be made in the correct locations to allow water drainage, thus satisfying the rain screen principle.
- .10 A 3-degree slope at the window sill will ensure discharge of accumulated water to the outside of the building envelope.
- .11 Windows will be built with precision and squarely, with a maximum tolerance of more or less 1.5 mm for windows measuring 1.8 m or less diagonally and more or less 3 mm for windows measuring more than 1.8 m.

- .12 Each window shall be wrapped in a clear protective membrane and the corners shall be protected by thermoformed polystyrene parts, secured to the frame.

## **2.04 ISOLATION COATING**

- .1 Isolate aluminum from following components, by means of isolation coating:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar and masonry.
  - .3 Wood.

## **2.05 GLAZING**

- .1 Glazing shall be installed in accordance with AAMA / WDMA / CSA 101 / I.S.2 / A440 and meet the requirements of part 2.01 - Materials of this section.

## **2.06 AIR BARRIER AND VAPOUR RETARDER**

- .1 False window frames shall be provided with a vapor barrier membrane installed on the existing structure to provide air tightness and seal the vapor barrier to the building as follows:
  - .1 Material: self-adhesive vapor barrier membrane consisting of an SBS rubberized bitumen compound integrally laminated with a blue cross-laminated film having the following characteristics:
    - .1 Color: Blue
    - .2 Thickness: 1.0 mm
    - .3 Application temperature: -12 to 5 degrees C.
  - .2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.

## **3 EXECUTION**

### **3.01 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts acceptable for product 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.

### **3.02 INSTALLATION**

- .1 Window installation:
  - .1 Install windows in accordance with AAMA / WDMA / CSA 101 / I.S.2 / A440 most recent issue and as per manufacturer's instructions.
- .2 Sill installation:
  - .1 Install supports in accordance with manufacturer's and applicable standards so that they recede from framing to allow continuity of seams and sealants. Use

- plywood supports of the appropriate dimension.
  - .2 Secure window supports with stainless steel anchors.
- .3 Caulking:
  - .1 Caulk joints between windows and supports with sealant as indicated on drawings. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
  - .2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Departmental Representative.

### **3.03 FIELD QUALITY CONTROL**

- .1 The installing contractor shall arrange for the products to be installed in accordance with manufacturer requirements specified under this section. He will review the work related to handling, installation, protection, and cleaning.
- .2 Manufacturer's field services: 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.

### **3.04 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials 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.

### **3.05 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by window installation.

**END OF SECTION**



## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 08 11 00 – Metal Doors and Frames
- .2 Section 09 91 23 - Painting

### **1.02 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
  - .1 ANSI/BHMA A156.1-2000, American National Standard for Butts and Hinges.
  - .2 ANSI/BHMA A156.2-2003, Bored and Preassembled Locks and Latches.
  - .3 ANSI/BHMA A156.3-2001, Exit Devices.
  - .4 ANSI/BHMA A156.4-2000, Door Controls - Closers.
  - .5 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
  - .6 ANSI/BHMA A156.6-2005, Architectural Door Trim.
  - .7 ANSI/BHMA A156.8-2005, Door Controls - Overhead Stops and Holders.
  - .8 ANSI/BHMA A156.10-1999, Power Operated Pedestrian Doors.
  - .9 ANSI/BHMA A156.12-2005, Interconnected Locks and Latches.
  - .10 ANSI/BHMA A156.13-2002, Mortise Locks and Latches Series 1000.
  - .11 ANSI/BHMA A156.14-2002, Sliding and Folding Door Hardware.
  - .12 ANSI/BHMA A156.15-2006, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
  - .13 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
  - .14 ANSI/BHMA A156.17-2004, Self-closing Hinges and Pivots.
  - .15 ANSI/BHMA A156.18-2006, Materials and Finishes.
  - .16 ANSI/BHMA A156.19-2002, Power Assist and Low Energy Power - Operated Doors.
  - .17 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.
- .2 Canadian Steel Door and Frame Manufacturers' Association (CSDMA)
  - .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames - 2009.

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for door hardware and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Identify each sample by label indicating applicable specification paragraph

- number, brand name and number, finish and hardware package number.
- .3 After approval samples will be returned for incorporation in Work.
- .3 Hardware List:
  - .1 Submit contract hardware list.
  - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .4 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .5 Manufacturer's Instructions: submit manufacturer's installation instructions.

#### **1.04 CLOSEOUT SUBMITTALS**

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

#### **1.05 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra Stock Materials:
- .2 Supply maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .3 Tools:
  - .1 Supply 2 sets of wrenches for each lockset.

#### **1.06 QUALITY ASSURANCE**

- .1 Regulatory Requirements:
  - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.07 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 Package items of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .4 Storage and Handling Requirements:
  - .1 Store materials off ground indoors] in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect door hardware from nicks, scratches, and blemishes.

- .3 Protect prefinished surfaces with wrapping or strippable coating.
- .4 Replace defective or damaged materials with new.

## 2 PRODUCTS

### 2.01 HARDWARE ITEMS

- .1 Use one manufacturer's products only for similar items.

### 2.02 DOOR HARDWARE

#### GROUP 01:

QTY	DESCRIPTION	FINISH	MANUFACTURER
1	EXISTING HARDWARE TO REUSE OR REPLACE		
1	ALUMINUM THRESHOLD # CT-410 X CT-40S X L.R.	628	KNC
1	WEATHER STRIPPING # W-50S X L.R.	628	KNC
1	DOOR SWEEP # W-35-1	628	KNC

#### GROUP 02:

QTY	DESCRIPTION	FINISH	MANUFACTURER
1	CONTINUOUS HINGE FM300 X H.R.	630	MARKAR
1	OFFICE ENTRY FUNCTION LOCKSET # AU 4607LN x S/C	630	YALE
1	CORE INTEGRATED INTO EXISTING KEY SYSTEM	626	
1	DOOR CLOSER # CLP7500	689	NORTON
1	KICK PLATE # K0050-300 X L.R.	630	TRIMCO
1	ALUMINUM THRESHOLD # CT-410 X CT-40S X L.R.	628	KNC
1	WEATHER STRIPPING # W-50S X L.R.	628	KNC
1	DOOR SWEEP # W-35-1	628	KNC

#### GROUP 03:

QTY	DESCRIPTION	FINISH	MANUFACTURER
3	HINGES TA2714-114 X 100	652	McKINNEY
1	PASSAGE FUNCTION LOCKSET AU4601LN	626	YALE
1	DOOR CLOSER # 8501	689	NORTON
1	KICK PLATE # K0050-300 X L.R.	630	TRIMCO
1	DOOR STOP # 1277	626	TRIMCO

#### GROUP 04:

QTY	DESCRIPTION	FINISH	MANUFACTURER
3	HINGES TA2714-114 X 100	652	McKINNEY
1	PULL PLATE # 1017-3B	630	TRIMCO

1	<b>PUSH PLATE # 1001-3</b>	630	TRIMCO
1	<b>DOOR CLOSER # 7500H-DA</b>	689	NORTON
1	<b>KICK PLATE # K0050-300 X L.R.</b>	630	TRIMCO
1	<b>DOOR STOP # 1277</b>	626	TRIMCO

**GROUP 05:**

QTY	DESCRIPTION	FINISH	MANUFACTURER
3	<b>HINGES TA2714-114 X 100</b>	652	McKINNEY
1	<b>OFFICE ENTRY FUNCTION LOCKSET AU 4608LN x S/C</b>	626	YALE
1	<b>CORE INTEGRATED INTO EXISTING KEY SYSTEM</b>	626	
1	<b>DOOR CLOSER # 8501</b>	689	NORTON
1	<b>KICK PLATE # K0050-300 X L.R.</b>	630	TRIMCO
1	<b>DOOR STOP # 1277</b>	626	TRIMCO
1	<b>SMOKE GASKET # PK55BL X L.R.</b>	Black	PEMKO

**GROUP 06:**

QTY	DESCRIPTION	FINISH	MANUFACTURER
3	<b>HINGES TA2714-114 X 100</b>	652	McKINNEY
1	<b>STOREROOM FUNCTION LOCKSET 4605LN x S/C</b>	626	YALE
1	<b>CORE INTEGRATED INTO EXISTING KEY SYSTEM</b>	626	
1	<b>DOOR CLOSER # CLP8501</b>	689	NORTON
1	<b>KICK PLATE # K0050-300 X L.R.</b>	630	TRIMCO
1	<b>SMOKE GASKET # PK55BL X L.R.</b>	Black	PEMKO

**GROUP 07:**

QTY	DESCRIPTION	FINISH	MANUFACTURER
3	<b>HINGES TA2714-114 X 100</b>	652	McKINNEY
1	<b>OFFICE ENTRY FUNCTION LOCKSET AU 4608LN x S/C</b>	626	YALE
1	<b>CORE INTEGRATED INTO EXISTING KEY SYSTEM</b>	626	
1	<b>KICK PLATE # K0050-300 X L.R.</b>	630	TRIMCO
1	<b>DOOR STOP # 1277</b>	626	TRIMCO

**2.03 FASTENINGS**

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.

- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

## **2.04 KEYING**

- .1 Door locks to be master keyed, grand master keyed, great grand master keyed in accordance with the hardware schedule and the needs of Parks Canada. The Contractor must prepare a detailed keying schedule in conjunction with the contracting authority.
- .2 Supply keys in duplicate for every lock in this Contract.
- .3 Supply 3 master keys for each master key or grand master key group.
- .4 Stamp keying code numbers on keys and cylinders.
- .5 Supply construction cores.
- .6 Hand over permanent cores and keys to Parks Canada.

## **3 EXECUTION**

### **3.01 INSTALLATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Supply metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Supply manufacturers' instructions for proper installation of each hardware component.
- .4 Install hardware to standard hardware location dimensions in accordance with CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction).
- .5 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .6 Use only manufacturer's supplied fasteners.
  - .1 Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .7 Remove construction cores when directed by Parks Canada.
  - .1 Install permanent cores and ensure locks operate correctly.

### **3.02 ADJUSTING**

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating

condition, safety and for weather tight closure.

- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to ensure tight fit at contact points with frames.

### **3.03 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
  - .3 Remove protective material from hardware items where present.
  - .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.04 DEMONSTRATION**

- .1 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

### **3.05 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by door hardware installation.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 06 40 00 – Architectural Woodwork
- .2 Section 07 92 00 – Joint Sealants
- .3 Section 09 91 23 - Painting

### **1.02 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
  - .1 ANSI A108.1-[99], Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
  - .2 CTI A118.3-[92], Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
  - .3 CTI A118.4-[92], Specification for Latex Cement Mortar (included in ANSI A108.1).
  - .4 CTI A118.5-[92], Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
  - .5 CTI A118.6-[92], Specification for Ceramic Tile Grouts (included in ANSI A108.1).
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C 144-[04], Specification for Aggregate for Masonry Mortar.
  - .2 ASTM C 207-[06], Specification for Hydrated Lime for Masonry Purposes.
  - .3 ASTM C 847-[06], Specification for Metal Lath.
  - .4 ASTM C 979-[05], Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2 CGSB 71-GP-22M-[78(AMEND.)], Adhesive, Organic, for Installation of Ceramic Wall Tile.
  - .3 CAN/CGSB-75.1-[M88], Tile, Ceramic.
  - .4 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
- .4 CSA Group (CSA)
  - .1 CSA A123.3-[05], Asphalt Saturated Organic Roofing Felt.
  - .2 CAN/CSA-A3000-[03(R2006)], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .5 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1168-[05], Adhesives and Sealants Applications.
- .6 Terrazzo Tile and Marble Association of Canada (TTMAC)
  - .1 Tile Specification Guide 09 30 00 [2006/2007], Tile Installation Manual.
  - .2 Tile Maintenance Guide [2000].

### **1.03 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Provide product data in accordance with Section [01 33 00 - Submittal Procedures].
  - .1 Include manufacturer's information on:
    - .1 Ceramic tile, marked to show each type, size, and shape required.
    - .2 Finishing molding
    - .3 Reinforcing tape.
    - .4 Latex cement mortar and grout. .
    - .5 Waterproofing isolation membrane.
  - .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
    - .1 Base tile: submit duplicate, 300 x 300] mm sample panels of each colour, texture, size, and pattern of tile.
    - .2 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.

### **1.04 QUALITY ASSURANCE**

- .1 Quality Assurance Submittals:
- .2 Manufacturer's Instructions: manufacturer's installation instructions.

### **1.05 DELIVERY, STORAGE AND HANDLING**

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

### **1.06 AMBIENT CONDITIONS**

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.
- .2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

### **1.07 MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide minimum 5% of each type and colour of tile required for project for maintenance use. Store where directed.
  - .3 Maintenance material same production run as installed material.



## 2 PRODUCTS

### 2.01 SHOWER AREA TILING

- .1 Cement Gray Matte Finish porcelain tiles, low V1 shade and nonslip surface.  
Characteristics:
  - .1 Dimension: 305 mm x 305 mm with a maximum gap of 1.2%
  - .2 Thickness: 7 mm thickness with a maximum gap of 10%
  - .3 Water absorption: 0.5 %
  - .4 Flexural strength: Min 35 N/mm<sup>2</sup>
  - .5 Abrasion resistance: Max. 175 mm<sup>3</sup>
  - .6 Slip resistance
  - .7 Frost resistant
  - .8 Color: at the discretion of the Departmental Representative, within the full range of the manufacturer.

### 2.02 WALL TILING

- .1 **Tiles of type 1:** Solid, Agua green Matte Finish porcelain tiles. Characteristics:
  - .1 Dimension: 203 mm x 508 mm
  - .2 Thickness: 9 mm thickness with a maximum gap of 10%
  - .3 Breaking Weight: 448 (N)
  - .4 Breaking Strength: 1076 (N)
  - .5 Breaking Module: 24.9 (N/mm<sup>2</sup>)
  - .6 Flexural strength: > 600 (N)
  - .7 Slip resistance: < 0.6
  - .8 Compliant with Canadian Standards: CAN/cgsb-75.1 et M88 type 5, MR-4
  - .9 Color: at the discretion of the Departmental Representative, within the full range of the manufacturer.
- .2 **Tiles of type 1 accent color:** Agua Blue Matte Finish porcelain tiles. Characteristics:
  - .1 Dimension: 203 mm x 508 mm
  - .2 Thickness: 9 mm thickness with a maximum gap of 10%
  - .3 Breaking Weight: 448 (N)
  - .4 Breaking Strength: 1076 (N)
  - .5 Breaking Module: 24.9 (N/mm<sup>2</sup>)
  - .6 Flexural strength: > 600 (N)
  - .7 Slip resistance: < 0.6
  - .8 Compliant with Canadian Standards: CAN/cgsb-75.1 et M88 type 5, MR-4
  - .9 Color: at the discretion of the Departmental Representative, within the full range of the manufacturer

### 2.03 BASEBOARD MOULDING

- .1 **Tiles of type 1:** Solid, Agua green Matte Finish porcelain tiles. Characteristics:
  - .1 Dimension: 203 mm x 508 mm
  - .2 Baseboard Height: 100 mm
  - .3 Thickness: 9 mm thickness with a maximum gap of 10%
  - .4 Breaking Weight: 448 (N)
  - .5 Breaking Strength: 1076 (N)

- .6 Breaking Module: 24.9 (N/mm<sup>2</sup>)
- .7 Flexural Strength: > 600 (N)
- .8 Slip Resistance: < 0.6
- .9 Compliant with Canadian Standards:: CAN/cgsb-75.1 et M88 type 5, MR-4
- .10 Color: at the discretion of the Departmental Representative, within the full range of the manufacturer

## 2.04 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .4 Aluminum trims: Aluminum extrusion, finishing profile to protect the shutters and end the ceramic slices.
  - .1 Rounded edge elements for outside corners and edge of overflow ledge: finishing and edge-protection profile for tiled edges and outside corners of tiled surfaces. Features a trapezoid-perforated anchoring leg that is secured in the mortar bond coat beneath the tile and a reveal that forms a symmetrically rounded outer corner with 1/4" (6 mm) radius along the surface edge.
  - .2 Straight edge elements for vertical and top end of ceramic baseboards having the following characteristics: Designed to provide edging for tile coverings. The profile features a trapezoid perforated anchoring leg, which is secured in the mortar bond coat beneath the tile, and an 87° sloped vertical wall section that transfers point loads to the substrate and surface covering while protecting tile edges from damage.

## 2.05 BOND COAT

- .1 Dry set cement mortar: to ANSI A108.1.
- .2 Shock-resistant and chemical-resistant adhesive mortar presenting the following physical characteristics;
  - .1 Two-component adhesive mortar
  - .2 Extended lifetime once open
  - .3 Quick setting (completion of joints after 4 to 6 hours)
  - .4 High adhesion
  - .5 Turnaround to return to service in P4S premises: 12 hours at + 23 ° C.
  - .6 Designed to be applied over waterproofing membranes.
  - .7 Must be from same manufacturer as waterproofing membrane and grout.
  - .8 Colour: gray / white
  - .9 Density (kg / m3): 1600
  - .10 PH: higher 12
  - .11 Resistance to temperature: -30 degrees Celsius and + 90 degrees Celsius

## **2.06 GROUT**

- .1 Slip-resistant grout, resistant to chemical agents. Extra strength, 100% solid epoxy product that cleans with water and has the following characteristics:
  - .1 Compliant with standards: ANSI A118.3 and ISO 13007: R2 / RG classification
  - .2 Resistant to chemical agents and stains
  - .3 No sealing required
  - .4 Colored grouts are not accepted on site
  - .5 Adhesive and grout must be supplied by the same manufacturer.

## **2.07 WATERPROOFING MEMBRANE**

- .1 Premixed liquid rubber waterproofing membrane, extremely fast drying, for installation under floor ceramic tile and shower walls. Characteristics:
  - .1 Compliant with standards: ANSI A118.10 et ANSI A118.12.
  - .2 Blue color on application and green color when dried.
  - .3 Dries in 30 to 50 minutes
  - .4 Odorless.
  - .5 Combine with reinforcing fabric installed at panel junctions, in and out corners and at the base of walls and floor.

## **2.08 MIXES**

- .1 Adhesive mortar(dry mortal with liquid additive): dosed according to manufacturer's instructions.
- .2 Grout: dosed according to manufacturer's instructions

## **2.09 CLEANING COMPOUNDS**

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.

## **3 EXECUTION**

### **3.01 MANUFACTURER'S INSTRUCTIONS**

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

### **3.02 WORKMANSHIP**

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile or backing coats to clean and sound surfaces.

- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make uniform joints of smaller width (follow manufacturer's recommendations for epoxy product) so tiles are plumb, square, aligned and all in same plane. Ensure different tiles are not distinguishable once work is complete. Align the patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Make internal angles square, external angles rounded, bullnosed.
- .9 Use round, bullnose edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .10 Install divider strips at junction of tile flooring and dissimilar materials.

### **3.03 WALL TILE**

- .1 Install in accordance with TTMAC detail and according to the equipment presented in documents.

### **3.04 FLOOR TILE**

- .1 Install in accordance with TTMAC detail .

### **3.05 BASE TILE**

- .1 Install in accordance with TTMAC detail.

### **3.06 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
- .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.

### **3.07 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Section 06 40 00 – Cabinet making
- .2 Section 08 11 00 – Metal doors and frame
- .3 Section 08 50 00 – Hybride windows (aluminum and wood)

### **1.02 REFERENCE STANDARDS**

- .1 Environmental Protection Agency (EPA)
  - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, EPA Method 24 - Surface Coatings.
  - .2 SW-846, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 Master Painters Institute (MPI)
  - .1 The Master Painters Institute (MPI)/Architectural Painting Specification Manual (ASM) - current edition.
  - .2 Standard GPS-1-12, MPI Green Performance Standard.
  - .3 Standard GPS-2-12, MPI Green Performance Standard.
- .4 National Research Council Canada (NRC)
  - .1 National Fire Code of Canada 2015 (NFC).
- .5 Society for Protective Coatings (SSPC)
  - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

### **1.03 ADMINISTRATIVE REQUIREMENTS**

- .1 Scheduling:
- .2 Submit work schedule for various stages of painting to Departmental Representative for review. Provide schedule minimum of 48 hours in advance of proposed operations.
- .3 Obtain written authorization from Departmental Representative for changes in work schedule.

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .1 Product Data:
  - .1 Provide manufacturer's instructions, printed product literature and data sheets for paint and paint products and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 1 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

- .3 Confirm products to be used are in MPI's approved product list.
- .2 Upon completion, provide records of products used. List products in relation to finish system and include the following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour numbers.
  - .4 MPI Environmentally Friendly classification system rating.
  - .5 Manufacturer's Material Safety Data Sheets (MSDS).
- .3 Samples:
  - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
  - .2 Submit duplicate 200 x 200 mm sample panels of each paint, stain and finish product with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
    - .1 3 mm plate steel for finishes over metal surfaces.
    - .2 13 mm birch plywood for finishes over wood surfaces.
    - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
    - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
  - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: Provide certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties. MPI Gateway #.
- .5 Manufacturer's Instructions:
  - .1 Provide manufacturer's installation and application instructions.

#### **1.05 CLOSEOUT SUBMITTALS**

- .1 Provide in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Provide operation and maintenance data for painting materials for incorporation into manual.
- .3 Include:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour numbers.
  - .4 MPI Environmentally Friendly classification system rating.

#### **1.06 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra Stock Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Submit 1 four liter can of each type and colour of primer, stain or finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

## 1.07 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
  - .2 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
  - .3 Conform to latest MPI requirements for exterior painting work including preparation and priming.
  - .4 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
  - .5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Departmental Representative.
  - .6 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
    - .1 Provide mock-up at the request of the Departmental Representative. Prepare and paint designated surface, area, room or item to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, and textures.
    - .2 Mock-up will be used:
      - .1 To judge quality of work, substrate preparation, operation of equipment and material application and skill to MPI Architectural Painting Specification Manual standards.
    - .3 Locate where directed
    - .4 Allow 48 hours for inspection of mock-up before proceeding with Work.
    - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

## 1.08 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.
  - .1 Labels: to indicate:
    - .1 Type of paint or coating.
    - .2 Compliance with applicable standard.
    - .3 Colour number in accordance with established colour schedule.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Observe manufacturer's recommendations for storage and handling.
  - .3 Store materials and supplies away from heat generating devices.
  - .4 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.
  - .5 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative.
  - .6 Remove paint materials from storage only in quantities required for same day use.
  - .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
  - .8 Fire Safety Requirements:

- .1 Provide one Type ABC fire extinguisher adjacent to storage area.
- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (NFC).

## 1.09 SITE CONDITIONS

- .1 Ambient Conditions:
- .2 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces.
  - .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .3 Provide continuous ventilation for 7 days after completion of application of paint.
  - .4 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
  - .5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
  - .6 Provide minimum lighting level of 323 Lux on surfaces to be painted.
  - .7 Temperature, Humidity and Substrate Moisture Content Levels:
    - .1 Unless pre-approved written approval by Departmental Representative and product manufacturer, perform no painting when:
      - .1 Ambient air and substrate temperatures are below 10 degrees C.
      - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
      - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
      - .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
      - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
      - .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
    - .2 Perform painting work when maximum moisture content of the substrate is below:
      - .1 12% for concrete and masonry (clay and concrete brick/block). Allow new concrete and masonry to cure minimum of 28 days.
      - .2 15% for hard wood.
      - .3 17% for soft wood.
      - .4 12% for plaster and gypsum board.
    - .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".



- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .5 Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
  - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .6 Additional interior application requirements:
  - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
  - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

## **2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- .1 Environmental Performance Requirements:
- .2 Provide paint products meeting MPI "Environmentally Friendly" ratings based on VOC (EPA Method 24) content levels.
- .3 Green Performance in accordance with MPI Standard GPS-1 GPS-2.

### **2.02 MATERIALS**

- .1 Only Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .4 Recycled water-borne surface coatings must not contain:
  - .1 Lead in excess of 600.0 ppm weight/weight total solids.
  - .2 Mercury in excess of 50.0 ppm weight/weight total product.
  - .3 Cadmium in excess of 1.0 ppm weight/weight total product.
  - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
  - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

### **2.03 COLOURS**

- .1 Departmental Representative will provide Colour Schedule after Contract award Submit proposed Colour Schedule to Departmental Representative for review.
- .2 Colour schedule will be based upon selection of 5 base colours and 3 accent colours. No more than 8 colours will be selected for entire project and no more than 3 colours will be selected in

each area.

- .3 Selection of colours will be from manufacturer's full range of colours.
- .4 Where specific products are available in restricted range of colours, selection based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .6 For deep and ultra-deep colours; 4 coats may be required.

#### **2.04 MIXING AND TINTING**

- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

#### **2.05 GLOSS/SHEEN RATINGS**

- .1 Paint gloss is defined as sheen rating of applied paint.
- .2 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.
- .3 Color and gloss level selected by the Departmental Representative to be communicated at the work site stage.

#### **2.06 INTERIOR PAINTING SYSTEMS**

- .1 **System #1:** For existing and new exterior wood siding to be painted and any other identified surfaces (wood siding on the wall, soffit wood siding at the main entrance, new finished moldings).
  - .1 Cleaning: Clean surface as recommended by wood stain manufacturer.
  - .2 Apply a coat of opaque stain on the knots.
  - .3 Apply two (2) coats of opaque stain, PPG CCS30040 - Beach Wood color, to all existing wood surfaces to be kept.
  - .4 Apply one (1) coat of opaque stain, PPG CCS30040 - Beach Wood color, to all new wood surfaces (finish molding, new siding area).
  - .5 Surface preparation in accordance with finish system manufacturer's recommendations
- .2 **System #2:** For exterior wood elements related to deck, to be stained, and any other surfaces identified (decking, joist and new fence).

- .1 Apply two (2) coats of bleaching oil designed to accelerate natural aging of unpainted exterior wood. Contains a quantity of gray titanium dioxide pigments, iron oxide pigment and silica. Contains a chemical ingredient that whitens the wood surface. Light gray color, aged gray appearance.
- .2 Surface preparation in accordance with finish system manufacturer's recommendations
- .3 **System #3:** For the exterior steel structure exposed under the round part of the showroom (columns, beams and braces) to be cold-galvanized.
  - .1 Cathodic protection applied as a one-component cold zinc coating. Organic zinc rich coating ready for use and that contains exclusively biodegradable solvents. Can be applied by brush, roll or any spraying technique.
  - .2 Zinc quantity: About 88% (+/- 2) (weight) of pure zinc in the dry layer (DFT), Zinc purity: About 99.995% purity, Ready for use: One component zinc rich coating, Colour: Light grey, matt finish RAL #7005, Security: Non-toxic and non-flammable when dry, Specific gravity: 2,40 Kg/dm<sup>3</sup> ± 0,1, VOC (Solvent): 285 gram/litre ± 10
  - .3 Properties: High resistance to corrosion, abrasion and impact, Resistance to cold / heat: From -80°C to + 200/250°C (-112°F to + 392/482°F), Application temperature: From -10°C to +40°C (different curing times)(14°F to +104°F), Theoretical coverage: 7,05m<sup>2</sup>/kg at 40µm DFT, Practical coverage: 6,20m<sup>2</sup>/kg (sprayed) at 40µm DFT (30,3ft<sup>2</sup>/lbs at 1,5mill DFT), Resistance to marine environment: Exceptionally good, duplex system is recommended, Resistance to acids / alkaline compound: Can be applied in an Ph atmosphere range from 5,5 up to 12,5, High plasticity: Without cracks – Allow the dilatation of the metal support, Weld ability: Primer up to 40 µm can be welded without affecting the weld (X-ray), Lifetime expectation: Similar to hot dip galvanisation (depending on thickness of dry layer), Lifetime expectation duplex: Similar to hot dip galvanisation with duplex system, Conductivity : Dry film has a good conductivity, Saline mist: ASTM B117, Bending: ASTM D-522, Flexibility: ONGC-1-GP-71 Method 119.5, ONGC -1.181: Coating rich in organic zinc, Meets military requirements and specifications A.O
  - .4 Surface preparation in accordance with finish system manufacturer's recommendations
- .4 **System #4:** For epoxy finish of concrete slab to be painted (concrete surface in the basement, on the raised bases of benches and plywood shelves of the janitor's room).
  - .1 For the floor and raised bases of benches: Two-component, high solids, silicone-free, heavy thixotropic viscosity, solid colour (at the choice of Departmental Representative, within the full range of manufacturer), glossy epoxy resin. Orange peel-textured coating finish, demonstrates good mechanical and chemical resistance. Includes one prime coat and one top coat..
  - .2 Achieves high performance ratings as per ASTM G21 - resistance to fungi and ASTM D3273 - resistance to mold
  - .3 System must be compliant with the following standards: Compressive Strength ASTM D695 56 MPa (8122 psi), Tensile Strength ASTM D638 7.4 MPa (1073 psi), % Elongation 16 %, Bond Strength ASTM D4541 > 2 MPa (290 psi) (failure in substrate), Thermal Compatibility ASTM C884 Passes, Hardness, Shore D ASTM D2240 76, Indentation MIL-PRF-24613 8 %, Impact Resistance ASTM D2794 5.42 joules (3.99 ft lb ) Abrasion Resistance ASTM D4060 CS17/1000 cycles/1000 g (2.2 lb) 0.11 g (0.0038 oz), Coefficient of Friction ASTM D1894-61T Steel 0.20 Rubber 0.60, Flammability ASTM D635 35 mm (1.37 in), Coefficient of Thermal Expansion ASTM D696 1.27 x 10<sup>-4</sup> mm/mm/°C (0.70 x 10<sup>-4</sup> in/in/°F), Water Absorption ASTM C413 0.3 %, Resistance to Fungi Growth ASTM G21 Rated 1 (traces of growth), Resistance to Mold Growth ASTM

- D3273 Rated 10 (highest resistance).
- .4 Surface preparation in accordance with finish system manufacturer's recommendations.
- .5 Perform humidity % testing on surfaces prior to applying, in accordance with % recommended by manufacturer.
- .5 **System #5:** For existing and new surfaces of gypsum wall and fallout except the ceilings of the showers area to be painted.
  - .1 For existing walls and ceilings: One (1) undercoat of alkyd emulsion interior primer, sealer, and stain-blocker.
  - .2 **Important note:** For new gypsum and plaster surfaces, apply 1 coat of VOC-free latex primer-sealer.
  - .3 For new and existing walls: two (2) coats of melamine finish interior latex paint.
  - .4 For new and existing ceilings: two (2) coats of flat finish interior latex paint.
  - .5 Surface preparation in accordance with finish system manufacturer's recommendations.
  - .6 Mandatory light sanding between coats.
- .6 **System #6:** For gypsum surfaces of new ceilings in the showers and toilets area to be painted.
  - .1 For new ceilings: apply 1 coat of VOC-free latex primer-sealer.
  - .2 Two (2) coats of velvet finish zero VOC 100% acrylic interior latex paint in conformity with MPI-144.
  - .3 Surface preparation in accordance with finish system manufacturer's recommendations.
  - .4 Mandatory light sanding between coats.
- .7 **System #7:** For new and existing metal interior and exterior surfaces to be painted and all other identified surfaces (steel doors and frames, access hatches and outdoor luminaires).
  - .1 Degrease the surface with a water-based degreaser and rinsed thoroughly all surfaces with clear water.
  - .2 Three (3) coats of a zero VOC, anti-corrosion water-based acrylic urethane with a semi-gloss finish.
  - .3 Surface preparation in accordance with finish system manufacturer's recommendations.
  - .4 Mandatory light sanding between coats.
- .8 **System #8:** For wooden interior surfaces to be painted (window recess and wooden jamb) and all other identified wooden surfaces.
  - .1 Apply one (1) coat of white shellac (lacquer) on every knots or multiple or joint splices
  - .2 Apply one (1) coat of alkyde emulsion primer-sealer.
  - .3 Two (2) coats of melamine finish, 100% acrylic, zero VOC latex paint.
  - .4 Surface preparation in accordance with finish system manufacturer's recommendations.
  - .5 Mandatory light sanding between coats.
- .9 **System #9:** For outdoor cedar shingle surfaces to be cleaned, decontaminated, and stained.
  - .1 The shingle's surface must be completely dry prior to the decontamination treatment to remove all traces of mold and fungi. Allow the surface to dry for 24 to 48 hours before treatment.
  - .2 Apply cleaner and decontaminant to small areas at a time. The surface should not be hot and protected from direct sunlight. Apply the product using a garden sprayer at very low pressure. Allow the product to act for 15 to 20 minutes and rinse with clear water at low pressure (garden hose 50 lbs max).
  - .3 The surface of the shingle must be completely dry before applying the dye. Allow the surface to dry 24 to 48 hours before application. The surface should not be hot and

- protected from direct sunlight.
- .4 Apply a single coat of semi-opaque stain with a brush or spray. Produce small section at a time without creating a double thickness of product application.
- .5 The contractor will have to provide two (2) samples on a plywood of a shingle assembly having 400 mm x 400 mm with the application of the dyeing of color chosen by the Departmental Representative. Some tests may be requested in order to obtain the desired result.
- .6 Preparations of the surfaces according to the recommendations of the manufacturer of the products.
- .7 The cleaning product / decontaminant and the product of dyeing will have to come from the same manufacturer.
- .8 Color at the choice of the representative of the Ministry in the range complete manufacturer.

### **3 EXECUTION**

#### **3.01 MANUFACTURER'S INSTRUCTIONS**

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

#### **3.02 GENERAL**

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

#### **3.03 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable to be painted in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.
- .2 Interior surfaces requiring repainting: inspected by both painting contractor and general contractor who will notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .3 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

#### **3.04 PREPARATION**

- .1 Protection:

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect and general public in and about the building.
- .2 Surface Preparation:
  - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
  - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
  - .3 Place "WET PAINT" signs in occupied areas as painting operations progress.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and other surface debris by wiping with dry, clean cloths.
  - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly.
  - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
  - .6 Use trigger operated spray nozzles for water hoses.
  - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
  - .1 Apply sealer over knots, pitch, sap and resinous areas.
  - .2 Apply wood filler to nail holes and cracks.
  - .3 Tint filler to match stains for stained woodwork.
- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .7 Carried out during shop priming: clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted.
- .8 Touch up of shop primers with primer as specified.

### 3.05 EXISTING CONDITIONS

- .1 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test" and report findings to Departmental Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

### **3.06 APPLICATION**

- .1 Method of application to be as approved by manufacturer and Departmental Representative. Apply paint by brush roller or air sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
  - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
  - .2 Work paint into cracks, crevices and corners.
  - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application:
  - .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
  - .4 Brush out immediately all runs and sags.
  - .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

### **3.07 MECHANICAL/ ELECTRICAL EQUIPMENT**

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

- .2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Do not paint over nameplates.
- .5 Keep sprinkler heads free of paint.
- .6 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .7 Paint fire protection piping red.
- .8 Paint disconnects switches for fire alarm system and exit light systems in red enamel.
- .9 Paint natural gas piping yellow.
- .10 Do not paint interior transformers and substation equipment.

### **3.08 SITE TOLERANCES**

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

### **3.09 FIELD QUALITY CONTROL**

- .1 The work must be inspected by the General Contractor or the Painting Contractor, at least one week prior to start of the work.
- .2 Interior surfaces requiring painting shall be inspected prior to commencing painting work, or after prime coat. The Departmental Representative and the General Contractor must identify the various defects and problems and notify the person responsible for this work.
- .3 Where "special" painting, coating or decorating system applications (e.g. cold galvanizing product) or non-MPI listed products or systems are to be used, product manufacturer shall provide as part of this work, certification of surfaces and conditions for specific system application as well as on site supervision, inspection and approval of their products or coating system application, as required, and at no additional cost to the Owner.
- .4 Standard of Acceptance:
  - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .5 Field inspection of painting operations to be carried out by Departmental Representative.



- .6 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .7 Cooperate with inspection firm and provide access to areas of work.

### **3.10 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.11 RESTORATION**

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

### **3.12 PRODUCT TO PROVIDE AT END OF WORK**

- .1 Provide one (1) four (4) liter container of each color and type of primer and finishing coat. Mark the paint and primer containers by associating each color and type of product used with the nomenclature of accepted coatings, specifying, in addition, the colors selected for the different products.
- .2 The following information must appear on each paint container: company, type, finish, base and color number.
- .3 Use replacement materials from the same manufacturing batches as the materials used.

**END OF SECTION**

## 1. GENERAL

### 1.1 SUMMARY

- .1 This Section includes requirements for selective demolition and removal of plumbing, and related mechanical components and incidentals required to complete work described in this Section.

### 1.2 RELATED REQUIREMENTS

- .1 Section 02 41 00.08– Demolition - Minor Works

### 1.3 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA):
  - .1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

### 1.4 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes , cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide the following in accordance with Section 01 33 00– Submittal Procedures before starting work of this Section:
- .2 Landfill Records: Indicate receipt and acceptance of selective demolition waste and hazardous wastes by a landfill facility licensed to accept hazardous wastes .

## 1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Scheduling: Account for continued occupancy requirements during schedule staged occupancy and worksite activities as a defined activity item in accordance with Section 01 32 16.19– CONSTRUCTION PROGRESS SCHEDULE.

## 1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with the following:
  - .1 CNESST

## 1.8 SITE CONDITIONS

- .1 Existing Conditions: Condition of materials identified as being salvaged or demolished are based on their observed condition on date that tender is accepted .
- .2 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in the Work; immediately notify Representative if materials suspected of containing hazardous substances are encountered and perform the following activities:
  - .1 Hazardous substances will be as defined in the Hazardous Products Act.
  - .2 Stop work in the area of the suspected hazardous substances.
  - .3 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.
  - .4 Hazardous substances will be removed by Representative under a separate contract or as a change to the Work.
  - .5 Proceed only after written instructions have been received from Representative.

## 2. PRODUCTS

### 2.1 (NOT USED) (REPAIR MATERIALS)

- .1 Plumbing Repair Materials: Use only new materials required for completion or repair matching materials damaged during performance of work of this Section; new materials are required to meet assembly or system characteristics as existing systems indicated to remain and carry CSA approval labels required by the Authority Having Jurisdiction.
- .2 Firestopping Repair Materials: Use firestopping materials compatible with existing firestopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.

### 2.2 (SALVAGE AND) DEBRIS MATERIALS

- .1 Material Ownership: Demolished materials become Contractor 's property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain Representative 's property .
- .2 Salvaged Materials: Carefully remove materials designated for salvage and store in a manner to prevent damage or devaluation of materials.

### 3. EXECUTION

#### 3.1 EXAMINATION

- .1 Verification of Existing Conditions: Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Representative will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

#### 3.2 PREPARATION

- .1 Protection of Existing Systems to Remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
  - .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts of existing buildings scheduled to remain.
  - .2 Notify Representative and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
  - .3 Prevent debris from blocking drainage inlets.
  - .4 Protect mechanical systems that must remain in operation.
- .2 Protection of Building Occupants: Sequence demolition work so that interference with the use of the building by the Representative and users is minimized and as follows:
  - .1 Prevent debris from endangering the safe access to and egress from occupied buildings.
  - .2 Notify Representative and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

#### 3.3 EXECUTION

- .1 Demolition and Removal : Coordinate requirements of this Section with as follows:
  - .1 Disconnect and cap mechanical services in accordance with requirements of local Authority Having Jurisdiction.
  - .2 Do not disrupt active or energized utilities without approval of the Representative.
  - .3 Erect and maintain dust proof and weather tight partitions to prevent the spread of dust and fumes to occupied building areas; remove partitions when complete.
  - .4 Demolish parts of existing building to accommodate new construction and remedial work as indicated.
  - .5 At end of each day's work, leave worksite in safe condition.
  - .6 Perform demolition work in a neat and workmanlike manner:
    - .1 Remove any tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
    - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.

### 3.4 CLOSEOUT ACTIVITIES

- .1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre).

END OF SECTION

## 1. GENERAL

### 1.1 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
  - .1 ANSI/ASME B16.15-06, Cast Copper Alloy Threaded Fittings, Classes 125 and 250.
  - .2 ANSI/ASME B16.18-12, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ANSI/ASME B16.22-13, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ANSI/ASME B16.24-11, Cast Copper Alloy Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500.
  - .5 ASME B16.26-13, Cast Copper Alloy Fittings for Flared Copper Tubes.
  - .6 ASME B31.9-14, Building Services Piping.
  - .7 ASME B36.19M-04, Stainless Steel Pipe.
- .2 ASTM International Inc.
  - .1 ASTM A 182/A 182M-16, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
  - .2 ASTM A 269-15a, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .3 ASTM A 307-14, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .4 ASTM A 312/A 312M-16, Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
  - .5 ASTM A 351/A 351M-16, Castings, Austenitic, for Pressure Containing Parts.
  - .6 ASTM A 403/A 403M-16, Wrought Austenitic Stainless Steel Piping Fittings.
  - .7 ASTM A 536-84(2014), Standard Specification for Ductile Iron Castings.
  - .8 ASTM B 32-08(2014), Solder Metal.
  - .9 ASTM B 42-15a, Seamless Copper Tube, Standard Sizes.
  - .10 ASTM B 88M-14, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
  - .1 ANSI/AWWA C111/A21.11-12, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - .2 ANSI/AWWA C151/A21.51-09, Ductile Iron Pipe, Centrifugally Cast, for Water.
  - .3 Interiors.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA B242-05, Groove and Shoulder Type Mechanical Pipe Couplings.
- .5 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).
  - .7 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).
    - .1 MSS-SP-67-02a, Butterfly Valves.
    - .2 MSS-SP-70-06, Gray Iron Gate Valves, Flanged and Threaded Ends.
    - .3 MSS-SP-71-05, Gray Iron Swing Check Valves, Flanged and Threaded Ends.
    - .4 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.
  - .8 National Research Council (NRC)/Institute for Research in Construction
    - .1 NRCC 38728, National Plumbing Code of Canada (NPC) - 2015.
  - .9 Transport Canada (TC)
    - .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).
- 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 insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.
  - .3 Closeout Submittals:
    - .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- 1.3 DELIVERY, STORAGE AND HANDLING
  - .1 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates padding and packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .2 Place materials defined as hazardous or toxic in designated containers.
  - .3 Handle and dispose of hazardous materials in accordance with CEPA , TDGA , Regional and Municipal regulations.
- 2. PRODUCTS
  - 2.1 PIPING
    - .1 Domestic hot, cold and recirculation systems, within building.
      - .1 Above ground: copper tube, hard drawn, type L: to ASTM B 88M.
      - .2 Buried or embedded: copper tube, soft annealed, type K : to ASTM B 88M, in long lengths and with no buried joints.
  - 2.2 FITTINGS
    - .1 Bronze pipe flanges and flanged fittings, Class 150: to ANSI/ASME B16.24.
    - .2 Cast bronze threaded fittings, Class 125: to ANSI/ASME B16.15.

- .3 Cast copper, solder type: to ANSI/ASME B16.18.
- .4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.
- .5 NPS 2 and larger: ANSI/ASME B16.18 or ANSI/ASME B16.22 roll grooved to CSA B242.
- .6 NPS 1 ½ and smaller : wrought copper to ANSI/ASME B16.22 or cast copper to ANSI/ASME B16.18; with 301stainless steel internal components and EPDM seals. Suitable for operating pressure to 1380 kPa.

## 2.3 JOINTS

- .1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.
- .2 Bolts, nuts, hex head and washers: to ASTM A 307, heavy series.
- .3 Solder: 95/5 tin copper alloy.
- .4 Teflon tape: for threaded joints.
- .5 Grooved couplings: designed with angle bolt pads to provide rigid joint, complete with EPDM gasket.
- .6 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

## 2.4 GATE VALVES

- .1 NPS 2 and under, soldered:
  - .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc..
  - .2 Lockshield handles: as indicated..
- .2 NPS 2 and under, screwed:
  - .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc.

## 2.5 GLOBE VALVES

- .1 NPS2 and under, soldered:
  - .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet.
  - .2 Lockshield handles: as indicated.
- .2 NPS 2 and under, screwed:
  - .1 To MSS-SP-80, Class 150, 1 MPa, bronze body, screwed over bonnet, renewable composition disc.

## 2.6 SWING CHECK VALVES

- .1 NPS 2 and under, soldered:
  - .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, regrindable seat.



## 2.7 BALL VALVES

- .1 NPS 2 and under, screwed:
  - .1 Class 150.
  - .2 Bronze body, chrome plated brassball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle.
- .2 NPS 2 and under, soldered:
  - .1 To ANSI/ASME B16.18, Class 150.
  - .2 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors.

## 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 Install in accordance with Quebec Plumbing Code and local authority having jurisdiction.
- .2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .6 valves
  - .1 Isolate equipment, fixtures and branches with ball valves.
  - .2 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.

### 3.3 PRESSURE TESTS

- .1 Test pressure: greater of 1 time maximum system operating pressure or 860 kPa.

### 3.4 FLUSHING AND CLEANING

- .1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to Provincial and Federal potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing.

### 3.5 PRE-START-UP INSPECTIONS

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- .3 Ensure that pressure booster systems are operating properly.
- .4 Ensure that air chambers, expansion compensators are installed properly.

### 3.6 DISINFECTION

- .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction.
- .2 Upon completion, provide laboratory test reports on water quality for Departmental Representative.

### 3.7 START-UP

- .1 Timing: start up after:
  - .1 Pressure tests have been completed.
  - .2 Disinfection procedures have been completed.
  - .3 Certificate of static completion has been issued.
  - .4 Water treatment systems operational.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
  - .1 Establish circulation and ensure that air is eliminated.
  - .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
  - .3 Bring HWS storage tank up to design temperature slowly.
  - .4 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
  - .5 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

### 3.8 PERFORMANCE VERIFICATION

- .1 Scheduling:
  - .1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.
- .2 Procedures:
  - .1 Verify that flow rate and pressure meet Design Criteria.
  - .2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
  - .3 Sterilize HWS and HWC systems for Legionella control.

- .4 Verify performance of temperature controls.
- .5 Verify compliance with safety and health requirements.
- .6 Check for proper operation of water hammer arrestors. Run [one] outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
- .7 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.
- .3 Reports:
  - .1 Submit a certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

### 3.9 CLEANING

- .1 Clean in accordance with Section 01 74 10 - Cleaning.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 Waste Management and Disposal.

END OF SECTION

## 1. GENERAL

### 1.1 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
  - .1 ASTM D2235- 04 , Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
  - .2 ASTM D2564- , Standard Specification for Solvent Cements for Poly (Vinyl-Chloride) (PVC) Plastic Piping Systems.
- .2 CSA Group (CSA)
  - .1 CAN/CSA-Series B1800- 06 , Thermoplastic Non pressure Pipe Compendium - B1800 Series.
- .3 Green Seal Environmental Standards (GSES)
  - .1 Standard GS-36- , Commercial Adhesives.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1168- A2005 , Adhesive and Sealant Applications.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

## 2. PRODUCTS

### 2.1 PIPING

1. Underground piping for sanitary drainage, rainwater drainage shall be in p.v.c. sdr-35 in accordance with standards NQ-3624-130 and nq-5624-135 for 6 " dia. and greater, and in " abs " plastic in accordance with ACNOR B181.1-M85 standard for 4 " dia and less.
2. Aboveground sanitary vent piping, except in a return air plenum ceiling, shall be PVC fuel DWV with a flame spread index of 25 or less in accordance with Quebec Construction Codes, for a noncombustible construction. All piping must be ULC approved to CAN4-S102.2 and ACNOR B 181.2-M90. All piping penetration through rated walls and floors should be sealed with CAN / ULC-S115 certified firestop devices and test at a differential pressure of 50PA. The adhesive used shall be CSA certified and meet the requirements of ASTM D2564.

### 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 Install in accordance with Provincial Plumbing Code, local authority having jurisdiction and National Plumbing Code .

#### 3.3 TESTING

- .1 Pressure test buried systems before backfilling.
- .2 Hydraulically test to verify grades and freedom from obstructions.
- .3 Provide test report to department representative.

END OF SECTION

## 1 GENERAL

### 1.1 ACTION AND INFORMATIONAL SUBMITTALS

#### .1 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets

#### .2 Shop Drawings:

##### .1 Indicate on drawings:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

##### .2 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

### 1.2 CLOSEOUT SUBMITTALS

#### .1 Operation and Maintenance Data: submit operation and maintenance data for required equipment

- .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.

#### .2 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.

#### .3 Site records:

- .1 Departmental Representative will provide (1) set of reproducible mechanical drawings. As-built drawings:
- .2 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
- .3 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).
- .4 Submit to Departmental Representative for approval and make corrections as directed.

- .5 Perform testing, adjusting and balancing for HVAC using as-built drawings.
- .6 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .4 Submit copies of as-built drawings for inclusion in final TAB report.

### 1.3 MAINTENANCE MATERIAL SUBMITTALS

- .1 Provide one set of special tools required to service equipment as recommended by manufacturers.

### 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 in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect material to snicks, scratches, and blemishes
  - .3 Replace defective or damaged materials with new.

## 2 EXECUTION

### 2.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for equipments.
  - .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

### 2.2 PAINTING REPAIRS AND RESTORATION

- .1 Prime and touch up marred finished paintwork to match original.

### 2.3 SYSTEM CLEANING

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

## 2.4 FIELD QUALITY CONTROL

### .1 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 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.

## 2.5 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

## 2.6 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment

## 2.7 PROTECTION

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

END OF SECTION



## 1. GENERAL

### 1.1 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
  - .1 ASME B31.1, Power Piping.
- .2 ASTM International
  - .1 ASTM A 125, Standard Specification for Steel Springs, Helical, Heat-Treated.
  - .2 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .3 ASTM A 563, Standard Specification for Carbon and Alloy Steel Nuts.
- .3 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
  - .1 MSS SP 58-2002, Pipe Hangers and Supports - Materials, Design and Manufacture.
  - .2 MSS SP 69-2003, Pipe Hangers and Supports - Selection and Application.
  - .3 MSS SP 89-2003, Pipe Hangers and Supports - Fabrication and Installation Practices.
- .4 Underwriter's Laboratories of Canada (ULC)

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
  - .1 Provide manufacturer's printed product literature and data sheets for hangers and supports and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Manufacturers' Instructions:
  - .1 Provide manufacturer's installation instructions.

## 2. PRODUCTS

### 2.1 SYSTEM DESCRIPTION

- .1 Design Requirements:
  - .1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
  - .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP 58.
  - .3 Ensure that supports, guides, anchors do not transmit excessive quantities of

heat to building structure.

- .4 Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
- .5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP 58.

.2 Performance Requirements:

- .1 Design supports, platforms, catwalks, hangers to withstand seismic events

## 2.2 GENERAL

- .1 Fabricate hangers, supports and sway braces in accordance with MSS SP 58. ANSI B31.1 and
- .2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

## 2.3 CONSTANT SUPPORT SPRING HANGERS

- .1 Springs: alloy steel to ASTM A 125, shot peened, magnetic particle inspected, with +/-5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with Certified Mill Test Report (CMTR).
- .2 Load adjustability: 10% minimum adjustability each side of calibrated load. Adjustment without special tools. Adjustments not to affect travel capabilities.
- .3 SPEC NOTE: Factory set travel stops are required to ensure that hanger level is at "cold" position and must be designed to permit future re-engagement without the need for hanger adjustments.
- .4 Provide upper and lower factory set travel stops.
- .5 Provide load adjustment scale for field adjustments.
- .6 Total travel to be actual travel + 20%. Difference between total travel and actual travel 25 mm minimum.
- .7 Individually calibrated scales on each side of support calibrated prior to shipment, complete with calibration record.

## 2.4 VARIABLE SUPPORT SPRING HANGERS

- .1 Vertical movement: 13 mm minimum, 50 mm maximum, use single spring pre-compressed variable spring hangers.
- .2 Vertical movement greater than 50 mm: use double spring pre-compressed variable spring hanger with 2 springs in series in single casing.
- .3 Variable spring hanger complete with factory calibrated travel stops. Provide certificate of calibration for each hanger.
- .4 Steel alloy springs: to ASTM A 125, shot peened, magnetic particle inspected, with +/-5 % spring rate tolerance, tested for free height, spring rate, loaded height and provided with CMTR.

## 2.5 EQUIPMENT SUPPORTS

- .1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05 12 23 - Structural Steel for Buildings. Submit calculations with shop drawings.

## 2.6 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

## 2.7 OTHER EQUIPMENT SUPPORTS

- .1 Submit structural calculations with shop drawings.

## 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 Install in accordance with:
  - .1 Manufacturer's instructions and recommendations.

### 3.3 HANGER SPACING

- .1 Plumbing piping: into Canadian Plumbing Code or Provincial Code, (the most demanding applying)
- .2 Fire protection: to applicable fire code.
- .3 Gas and fuel oil piping: up to NPS 1/2: every 1.8 m.
- .4 Copper piping: up to NPS 1/2: every 1.5 m.
- .5 Flexible joint roll groove pipe: in accordance with table below for steel, but not less than one hanger at joints. Table listings for straight runs without concentrated loads and where full linear movement is not required.
- .6 Within 300 mm of each elbow.

Maximum Pipe Size : NPS	Maximum Spacing Steel	Maximum Spacing Copper
up to 1-1/4	2.4 m	1.8 m
1-1/2	3.0 m	2.4 m
2	3.0 m	2.4 m
2-1/2	3.7 m	3.0 m
3	3.7 m	3.0 m
3-1/2	3.7 m	3.3 m
4	3.7 m	3.6 m
5	4.3 m	
6	4.3 m	
8	4.3 m	
10	4.9 m	
12	4.9 m	

- .7 Pipework greater than NPS 12: to MSS SP 69.

### 3.4 HANGER INSTALLATION

- .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.

### 3.5 HORIZONTAL MOVEMENT

- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.
- .2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

### 3.6 FINAL ADJUSTMENT

- .1 Adjust hangers and supports:
  - .1 Ensure that rod is vertical under operating conditions.
  - .2 Equalize loads.
- .2 Adjustable clevis:
  - .1 Tighten hanger load nut securely to ensure proper hanger performance.
  - .2 Tighten upper nut after adjustment.
- .3 C-clamps:
  - .1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
- .4 Beam clamps:
  - .1 Hammer jaw firmly against underside of beam.

### 3.7 FIELD QUALITY CONTROL

#### .1 Manufacturer's Field Services:

- .1 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.

END OF SECTION

## 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.

### 1.2 REFERENCES

#### .1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.6097, Interior Alkyd Gloss Enamel.
- .2 CAN/CGSB-24.3-92, Identification of Piping Systems.

#### .2 National Fire Protection Association (NFPA)

- .1 NFPA 13-2002, Standard for the Installation of Sprinkler Systems.
- .2 NFPA 14-2003, Standard for the Installation of Standpipe and Hose 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 paint material at official hazardous material collections site approved by Departmental Representative
- .3 Do not dispose of unused paint material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

## 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 laminated plastic or 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 PWGSC 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 Pictograms:
  - .1 Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.
- .3 Legend:
  - .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.
- .4 Arrows showing direction of flow:
  - .1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.
  - .2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.
  - .3 Use double-headed arrows where flow is reversible.
- .5 Extent of background colour marking:
  - .1 To full circumference of pipe or insulation.
  - .2 Length to accommodate pictogram, full length of legend and arrows.
- .6 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.



- .7 Colours and Legends:
  - .1 Where not listed, obtain direction from Departmental Representative.
  - .2 Colours for legends, arrows: to following table:
  - .3 Background colour marking and legends for piping systems:

Contents	Background colour marking	Legend
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HWS recirculation	Green	DOM. HW CIRC
Domestic cold water supply	Green	DOM. CWS
Waste water	Green	WASTE WATER
Plumbing vent	Green	SAN. VENT

## 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.

## 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 Provide ULC or CSA registration plates as required by respective agency.
- .3 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 or 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 10 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

## 1. GENERAL

### 1.1 SUMMARY

- .1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.
- .2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

### 1.2 QUALIFICATIONS OF TAB PERSONNEL

- .1 Submit names of personnel to perform TAB to Departmental Representative within 90 days of award of contract.
- .2 TAB: performed in accordance with the requirements of standard under which TAB Firm's qualifications are approved:
  - .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1.
  - .2 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.
  - .3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing.
- .3 Recommendations and suggested practices contained in the TAB Standard: mandatory.
- .4 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.
- .5 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.
- .6 TAB Standard quality assurance provisions such as performance guarantees form part of this contract.
  - .1 For systems or system components not covered in TAB Standard, use TAB procedures developed by TAB Specialist.
  - .2 Where new procedures, and requirements, are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC, NEBB, or TABB), requirements and recommendations contained in these procedures and requirements are mandatory.

### 1.3 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads
- .2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under

normal and emergency loads and operating conditions.

- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

#### 1.4 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction.

#### 1.5 CO-ORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

#### 1.6 PRE-TAB REVIEW

- .1 Review contract documents before project construction is started and confirm in writing to Departmental Representative adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.
- .2 Review specified standards and report to Departmental Representative in writing proposed procedures which vary from standard.
- .3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

#### 1.7 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in Division 23.

#### 1.8 OPERATION OF SYSTEMS DURING TAB

- .1 Operate systems for length of time required for TAB and as required by Departmental Representative for verification of TAB reports.

#### 1.9 START OF TAB

- .1 Notify Departmental Representative 7 days prior to start of TAB.
- .2 Start TAB when building is essentially completed, including:
- .3 Installation of ceilings, doors, windows, other construction affecting TAB.
- .4 Application of weatherstripping, sealing, and caulking.
- .5 Pressure, leakage, other tests specified elsewhere Division 23.
- .6 Provisions for TAB installed and operational.
- .7 Start-up, verification for proper, normal and safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:

- .1 Proper thermal overload protection in place for electrical equipment.
- .2 Air systems:
  - .1 Filters in place, clean.
  - .2 Duct systems clean.
  - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
  - .4 Correct fan rotation.
  - .5 Fire, smoke, volume control dampers installed and open.
  - .6 Coil fins combed, clean.
  - .7 Access doors, installed, closed.
  - .8 Outlets installed, volume control dampers open.

#### 1.10 APPLICATION TOLERANCES

- .1 Do TAB to following tolerances of design values:
  - .1 HVAC systems: plus 10 %, minus 5 %.

#### 1.11 ACCURACY TOLERANCES

- .1 Measured values accurate to within plus or minus 2 % of actual values.

#### 1.12 INSTRUMENTS

- .1 Prior to TAB, submit to Departmental Representative list of instruments used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Departmental Representative.

#### 1.13 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit, prior to commencement of TAB:
- .2 Proposed methodology and procedures for performing TAB if different from referenced standard.

#### 1.14 PRELIMINARY TAB REPORT

- .1 Submit for checking and approval of Departmental Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
  - .1 Details of instruments used.
  - .2 Details of TAB procedures employed.
  - .3 Calculations procedures.
  - .4 Summaries.

#### 1.15 TAB REPORT

- .1 Format in accordance with referenced standard.
- .2 TAB report to show results in SI units and to include:
  - .1 Project record drawings.
  - .2 System schematics.
- .3 Submit 1 copie of TAB Report to Departmental Representative for verification and approval, in both official languages in D-ring binders, complete with index tabs.

#### 1.16 VERIFICATION

- .1 Reported results subject to verification by Departmental Representative
- .2 Provide personnel and instrumentation to verify up to 30 % of reported results.
- .3 Number and location of verified results as directed by Departmental Representative.
- .4 Pay costs to repeat TAB as required to satisfaction of Departmental Representative

#### 1.17 SETTINGS

- .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.
- .2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

#### 1.18 COMPLETION OF TAB

- .1 TAB considered complete when final TAB Report received and approved by Departmental Representative.

#### 1.19 AIR SYSTEMS

- .1 Standard: TAB to most stringent of this section and TAB standards of SMACNA and ASHRAE.
- .2 Do TAB of systems, equipment, components, controls specified Division 23
- .3 Measurements: to include as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration.
- .4 Locations of equipment measurements: to include as appropriate:
  - .1 Inlet and outlet of dampers, filter, coil, humidifier, fan, other equipment causing changes in conditions.
  - .2 At controllers, controlled device.
- .5 Locations of systems measurements to include as appropriate: main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

END OF SECTION



## 1 GENERAL

### 1.1 SUMMARY

#### .1 Section Includes:

- .1 Thermal insulation for piping and piping accessories in commercial type applications.

### 1.2 REFERENCE STANDARDS

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
  - .1 ASHRAE Standard 90.1-01 , Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).
- .2 ASTM International (ASTM)
  - .1 ASTM B209M-04 , Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate Metric .
  - .2 ASTM C335-04 , Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
  - .3 ASTM C411-04 , 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 C533-2004 , Calcium Silicate Block and Pipe Thermal Insulation.
  - .6 ASTM C547-2003 , Mineral Fiber Pipe Insulation.
  - .7 ASTM C795-03 , Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
  - .8 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.
  - .2 CAN/CGSB-51.53-95 , Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- .4 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
  - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 Manufacturer's Trade Associations

- .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-03 , Surface Burning Characteristics of Building Materials and Assemblies.
  - .2 CAN/ULC-S701-01 , Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .3 CAN/ULC-S702-1997 , Thermal Insulation, Mineral Fibre, for Buildings
  - .4 CAN/ULC-S702.2-03 , Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

### 1.3 DEFINITIONS

- .1 For purposes of this section:
  - .1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.
  - .2 "EXPOSED" - will mean "not concealed" as specified.
- .2 TIAC ss:
  - .1 CRF: Code Rectangular Finish.
  - .2 CPF: Code Piping Finish.

### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00- Submittal Procedures .
  - .1 Product Data:
    - .2 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.
      - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00- Submittal Procedures.
- .2 Shop Drawings:
  - .1 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 Quebec, Canada.
- .3 Samples:
  - .1 Submit samples in accordance with Section 01 33 00- Submittal Procedures .
  - .2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood board. Affix label beneath sample indicating service.
- .4 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.

## 1.5 QUALITY ASSURANCE

- .1 Qualifications:
- .2 Installer: specialist in performing work of this Section, and have at least (3) years successful experience in this size and type of project, member of TIAC.
- .3 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06- Health and Safety Requirements .

## 1.6 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 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .3 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Storage and Protection:
  - .1 Protect from weather, construction traffic.
  - .2 Protect against damage.
  - .3 Store at temperatures and conditions required by manufacturer.
- .3 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 Place excess or unused insulation and insulation accessory materials in designated containers.
  - .3 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.
  - .4 Dispose of unused adhesive material at official hazardous material collections site approved by Departmental Representative .

## 2 PRODUCTS

### 2.1 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102.
  - .1 Maximum flame spread rating: 25 .

- .2 Maximum smoke developed rating: 50 .

## 2.2 INSULATION

- .1 Mineral fibre 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 A-1: rigid moulded mineral fibre without factory applied vapour retarder jacket.
  - .1 Mineral fibre: to ASTM C547 CAN/ULC-S702 .
  - .2 Maximum "k" factor: to CAN/ULC-S702.
- .4 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
  - .1 Mineral fibre: to CAN/ULC-S702 ASTM C547 .
  - .2 Jacket: to CGSB 51-GP-52Ma.
  - .3 Maximum "k" factor: to CAN/ULC-S702 ASTM C547 .
- .5 TIAC Code C-2: mineral fibre blanket faced with factory applied vapour retarder jacket (as scheduled in PART 3 of this section).
  - .1 Mineral fibre: to ASTM C547 CAN/ULC-S702 .
  - .2 Jacket: to CGSB 51-GP-52Ma.
  - .3 Maximum "k" factor: to CAN/ULC-S702 ASTM C547 .

## 2.3 INSULATION SECUREMENT

- .1 Tape: self-adhesive, aluminum, reinforced plain , 50 mm wide minimum.
- .2 Contact adhesive: quick setting.
- .3 Canvas adhesive: washable.
- .4 Tie wire: 1.5 mm diameter stainless steel.
- .5 Bands: stainless steel, 19 mm wide, 0.5 mm thick.

## 2.4 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

## 2.5 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic compatible with insulation.

## 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 PRE-INSTALLATION REQUIREMENT

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.
- .2 Surfaces 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 this specification.
- .3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
  - .1 Install hangers, supports outside vapour retarder jacket.
- .5 Supports, Hangers:
  - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

### 3.4 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 TIAC Code: A-1.
  - .1 Securements: Tapeat 300 mm on centre.
  - .2 Seals: lap seal adhesive, lagging adhesive.
  - .3 Installation: TIAC Code 1501-H .
- .3 TIAC Code: A-3.
  - .1 Securements: Tapeat 300 mm on centre.
  - .2 Seals: VR lap seal adhesive, VR lagging adhesive.
  - .3 Installation: TIAC Code: 1501-C .
- .4 TIAC Code: with C-2 vapour retarder jacket.
  - .1 Seals: lap seal adhesive, lagging adhesive.
  - .2 Installation: TIAC Code: 1501-C .
- .5 Thickness of insulation as listed in following table.
  - .1 Run-outs to individual units and equipment not exceeding 4000 mm long.
  - .2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Applica- tion	Temp degrees C	TIAC code	Pipe sizes (NPS) and insulation thickness (mm)					
Run out	to 1	1 1/4 to 2	2 1/2 to 4	5 to 6	8 & over			
Domestic HWS	[A-1]	25	25	25	38	38	38	
Domestic CWS	[A-3]	25	25	25	25	25	25	
Domestic CWS with vapour retarder	[C-2]	25	25	25	25	25	25	

.1 Finishes:

- .1 Concealed, indoors: canvas on valves, fittings. No further finish.
- .2 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.

3.6 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

## 1. GENERAL

### 1.1 SUMMARY

#### .1 Section Includes:

- .1 Materials and installation of low-pressure metallic ductwork, joints and accessories.

### 1.2 REFERENCES

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
- .2 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A 480/A 480M Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
  - .2 ASTM A 635/A 635M, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot Rolled.
  - .3 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- .3 National Fire Protection Association (NFPA).
  - .1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
  - .2 NFPA 90B, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
  - .3 NFPA 96, 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,
  - .2 SMACNA HVAC Air Duct Leakage Test Manual,
  - .3 IAQ Guideline for Occupied Buildings Under Construction
  - .4 South Coast Air Quality Management District (SCAQMD) Rule 1113, June 3, 2011.
  - .5 South Coast Air Quality Management District (SCAQMD) Rule 1168, July 1, 2005.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Design, manufacture, and install all ducts, accessories required as shown on drawings.
- .2 Design, install ductwork in accordance with this section.
- .3 install sealing in accordance with sealing class requirements and permitted leakage levels. Seal and test the ducts until satisfactory results are obtained.

## 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 A: longitudinal seams, transverse joints, duct wall penetrations and connections made airtight with sealant and tape.
- .2 Class B: longitudinal seams, transverse joints and connections made airtight with sealant tape or combination thereof.
- .3 Class C: transverse joints and connections made air tight with gasketssealanttapeor combination thereof. Longitudinal seams unsealed.
- .4 Unsealed seams and joints.

### 2.2 SEALANT

- .1 Sealant: oil resistant, water borne, polymer type flame resistant duct sealant. Temperature range of minus -30 degrees C to plus 93 degrees C.

### 2.3 TAPE

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

### 2.4 DUCT LEAKAGE

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

### 2.5 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows.
  - .1 Rectangular: standard radius Centreline radius: 1.5 times width of duct .
  - .2 Round: five piece. Centreline radius: 1.5 times diameter.
- .3 Mitred elbows, rectangular:
  - .1 To 400 mm: with double thickness turning vanes.
  - .2 Over 400 mm: with double thickness turning vanes.
- .4 Branches:
  - .1 Rectangular main and branch: with [radius on branch 45 degrees entry on branch.
  - .2 Round main and branch: enter main duct at 45 degrees with conical connection.



- .3 Provide volume control damper in branch duct near connection to main duct.
  - .4 Main duct branches: with splitter damper.
  - .5 Transitions:
    - .1 Diverging: 20 degrees maximum included angle.
    - .2 Converging: 30degrees maximum included angle.
- 2.6 FIRE STOPPING
  - .1 Retaining angles around duct, on both sides of fire separation
  - .2 Fire stopping material and installation must not distort duct.
- 2.7 GALVANIZED STEEL
  - .1 Lock forming quality: to ASTM A 653/A 653M, Z90 zinc coating.
  - .2 Thickness, fabrication and reinforcement: to SMACNA.
  - .3 Joints: to SMACNA
- 2.8 STAINLESS STEEL
  - .1 To ASTM A 480/A 480M, Type 304.
  - .2 Finish: No. 4.
  - .3 Thickness, fabrication and reinforcement: to SMACNA .
  - .4 Joints: to be continuous inert gas welded.
- 2.9 ALUMINUM
  - .1 To SMACNA. Aluminum type: 3003-H-14.
  - .2 Thickness, fabrication and reinforcement: to SMACNA
  - .3 Joints: to be continuous weld.
- 2.10 BLACK STEEL
  - .1 To ASTM A 635/A 635M.
  - .2 Thickness: 1.2 mm or as indicated.
  - .3 Fabrication: ducts and fittings to ASHRAE and SMACNA.
  - .4 Reinforcement: as indicated.
  - .5 Joints: continuous weld.
- 2.11 KITCHEN EXHAUST SYSTEMS
  - .1 Construct in accordance with NFPA 96.
  - .2 Material: black steel ASTM A 635/A 635M
  - .3 Thickness: \_1.37 mm.
  - .4 Fabrication: NFPA 96.

- .5 Reinforcement: SMACNA.

## 2.12 HANGERS AND SUPPORTS

- .1 Hangers and Supports: in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment
  - .1 Hanger configuration: to SMACNA.
- .2 Upper hanger attachments:
  - .1 For concrete: manufactured concrete inserts.
  - .2 For steel joist: manufactured joist clamp or steel plate washer.
  - .3 For steel beams: manufactured beam clamps:

## 3. EXECUTION

### 3.1 GENERAL

- .1 Do work in accordance with SMACNA and as indicated.
- .2 Do not break continuity of insulation vapour barrier with hangers or rods.
  - .1 Insulate strap hangers 100 mm beyond insulated duct. Ensure diffuser is fully seated.
- .3 Install breakaway joints in ductwork on sides of fire separation.
- .4 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.

### 3.2 HANGERS

- .1 Strap hangers: install in accordance with SMACNA.
- .2 Angle hangers: complete with locking nuts and washers.
- .3 Hanger spacing: in accordance with SMACNA

### 3.3 WATERTIGHT DUCT

- .1 Provide watertight duct for:
  - .1 Fresh air intake.
  - .2 Minimum 3000 mm from duct mounted humidifier in all directions.
- .2 Form bottom of horizontal duct without longitudinal seams.
  - .1 Weld joints of bottom and side sheets.
  - .2 Seal other joints with duct sealer.
- .3 Slope horizontal branch ductwork down towards fume hoods served.
  - .1 Slope header ducts down toward risers.
- .4 Fit base of riser with 150 mm deep drain sump and 32 mm drain connected, with deep seal trap and valve

END OF SECTION

## 1 GENERAL

### 1.1 SUMMARY

#### .1 Section Includes:

- .1 Materials and installation for duct accessories including flexible connections, access doors, vanes and collars.

### 1.2 REFERENCES

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

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit documents requested by the Departmental Representative
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:
    - .2 Duct access doors.
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Instructions: submit manufacturer's installation instructions.

## 2 PRODUCTS

### 2.1 GENERAL

- .1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.
- .2 Elements must be in accordance with ASHRAE 90.1 requirements.
- .3 The elements must have a low VOC content.

### 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] or foam rubber.
- .4 Hardware:
  - .1 Up to 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.

- .4 Doors over 1000 mm: piano hinge and two handles operable from both sides.

## 2.3 SPIN-IN COLLARS

- .1 Conical galvanized sheet metal spin-in collars with lockable butterfly damper.
- .2 Sheet metal thickness to co-responding round duct standards.

## 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 data sheet.

END OF SECTION

## 1 GENERAL

### 1.1 SUMMARY

- .1 Section Includes:
  - .1 Fire dampers

### 1.2 REFERENCES

- .1 American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
  - .1 ANSI/NFPA 90A-, Standard for the Installation of Air Conditioning and Ventilating Systems.
- .2 Underwriters Laboratories of Canada (ULC)
  - .1 CAN4-S112-, Fire Test of Fire Damper Assemblies.
  - .2 CAN4-S112.2-, Standard Method of Fire Test of Ceiling Firestop Flap Assemblies.
  - .3 ULC-S505-, Fusible Links for Fire Protection Service.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit one copie of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 23-05-00
- .2 Indicate the following:
  - .1 Fire dampers.
  - .2 Fusible links.
  - .3 Design details of break-away joints.
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 The Contractor shall submit a specific installation drawing for each type of firewall and situation of this project in accordance with the manufacturer's instructions.

### 1.4 QUALITY ASSURANCE

- .1 Certificates:
  - .1 Catalogue or published ratings those obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

### 1.5 MAINTENANCE

- .1 Extra Materials:
  - .1 Provide following:
    - .1 5 fusible links of each type.

## 2 PRODUCTS

### 2.1 FIRE DAMPERS

- .1 Fire dampers: arrangement Type B or C, bear label of ULC meet requirements of provincial fire authority and ANSI/NFPA 90A. Fire damper assemblies fire tested in accordance with CAN4-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 Top hinged: offset single damper, round or square; multi-blade hinged e guillotine type sized to maintain full duct cross section as indicated.
- .4 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.
- .5 retaining angle iron frame, on full perimeter of fire damper, on both sides of fire separation being pierced.
- .6 Equip fire dampers with steel sleeve or frame installed disruption ductwork or impair damper operation.
- .7 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 with ULC.
- .8 Design and construct dampers to not reduce duct or air transfer opening cross-sectional area.
- .9 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.
- .10 Unless otherwise indicated, the installation details given in SMACNA Install Fire Damp HVAC and in manufacturer's instructions for fire dampers shall be followed.

## 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 Install in accordance with ANSI/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 Before concealing fire dampers, an authorized manufacturer representant shall inspect the premises. He will provide written certification that he has inspected the fire protection systems and that it's true with the manufacturer's requirements to have the required performance. No installation will be accepted without this inspection letter
- .5 Install access door adjacent to each damper. Co-ordinate with installer of firestopping.
- .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.

END OF SECTION

## 1 GENERAL

### 1.1 SYSTEM DESCRIPTION

#### .1 Performance Requirements:

- .1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

#### .1 Product Data:

- .2 Submit manufacturer's printed product literature, specifications and datasheet . Include product characteristics, performance criteria, and limitations.

#### .3 Indicate following:

- .1 Capacity.
- .2 Throw and terminal velocity.
- .3 Noise criteria.
- .4 Pressure drop.
- .5 Neck velocity.

#### .4 Quality assurance submittals: submit following

- .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.

### 1.3 MAINTENANCE

#### .1 Extra Materials:

##### .1 Include:

- .1 Keys for volume control adjustment.
- .2 Keys for air flow pattern adjustment.

## 2 PRODUCTS

### 2.1 GENERAL

- .1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity as indicated.

#### .2 Frames:

- .1 Full perimeter gaskets.
- .2 Plaster frames where set into plaster or gypsum board and as specified.
- .3 Concealed fasteners.

- .3 Concealed manual volume control damper operators.



- .4 Colour: as directed by Departmental Representative.

## 2.2 MANUFACTURED UNITS

- .1 Grilles, registers and diffusers of same generic type, products of one manufacturer.
- .2 The manufacturer shall analyze system and advise if a diffuser must be changed (size or series) to ensure the comfort of the occupants. Everything will be done without charge.

## 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 Install in accordance with manufacturers instructions.
- .2 Install with flat head screws in countersunk holes where fastenings are visible.
- .3 Bolt grilles, registers and diffusers, in place, in gymnasium and similar game rooms.
- .4 Provide concealed safety chain on each grille, register and diffuser in gymnasium and similar game rooms and elsewhere as indicated.

### 3.3 FIELD QUALITY CONTROL

## 1. END OF SECTION

## 1. GENERAL

### 1.1 REFERENCE STANDARDS

#### .1 CSA Group

- .1 CSA C22.1-12 , Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
- .2 CSA C22.2 No. 0-M91 (C2006)
- .3 CAN/CSA-C22.3 No.1-10 , Overhead Systems.
- .4 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.

### 1.2 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.

### 1.3 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 lighting fixtures, heaters, thermostats, fire alarm equipment, exit devices and any other equipment requested by the engineer.

#### .3 Shop drawings:

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Québec, Canada.
- .2 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.
- .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .5 Submit one copy of the drawings to the engineer.
- .6 If changes are required, notify Departmental Representative of these changes before they are made.

#### .4 Certificates:

- .1 Provide CSA certified equipment and material .

- .2 Where CSA certified equipment and material is not available, submit such material and equipment 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, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
- .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.

#### 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 installed equipment.
  - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
  - .2 Operating instructions to include following:
    - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
    - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
    - .3 Safety precautions.
    - .4 Procedures to be followed in event of equipment failure.
    - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
  - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
  - .4 Post instructions where directed.
  - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
  - .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect electrical equipment to nicks, scratches, and blemishes

- .3 Replace defective or damaged materials with new.

## 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.

### 2.2 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment in accordance with Section 01 61 00- Common Product Requirements .
- .2 Equipment and Material to be CSA certified. Where CSA certified equipment and material are not available, obtain special approval from Departmental Representative before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .3 Factory assemble control panels and component assemblies.

### 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:
- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on labels to be approved 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.

### 2.5 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes numbered , 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

### 3. EXECUTION

#### 3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for electrical equipment.
  - .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.
- .2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.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 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete.
  - .1 Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

### 3.5 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 05 32- Outlet Boxes, Conduit Boxes and Fittings .
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors.
  - .1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

### 3.6 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
  - .1 Local switches: 1400 mm.
  - .2 Wall receptacles:
    - .1 General: 300 mm.
    - .2 Above top of continuous baseboard heater: 200 mm.
    - .3 Above top of counters or counter splash backs: 175 mm.
    - .4 In mechanical rooms: 1400 mm.
  - .3 Fire alarm bells: 2100 mm.

### 3.7 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

### 3.8 FIELD QUALITY CONTROL

- .1 Load Balance:
  - .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
  - .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
  - .3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under

normal load, as well as hour and date on which each load was measured, and voltage at time of test.

- .2 Conduct following tests in accordance with Section 01 45 00- Quality Control .
  - .1 Power distribution system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Lighting and its control.
  - .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
  - .5 Systems: fire alarm.
  - .6 Insulation resistance testing:
    - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
    - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
    - .3 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Departmental Representative.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

### 3.9 SYSTEM STARTUP

- .1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.

### 3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning .
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning .

END OF SECTION

## 1. GENERAL

### 1.1 RELATED REQUIREMENTS

- .1 Section 26 27 26 OUTLET BOXE, CONDUIT BOXES AND FITTING

### 1.2 REFERENCES

- .1 CSA International
  - .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)
  - .1 EEMAC 1Y-2-1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
  - .2 National Electrical Manufacturers Association (NEMA)

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 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 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 accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.



## 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 NEMA to consist of:
  - .1 Connector body and stud clamp for copper conductors.
  - .2 Clamp for copper conductors.
  - .3 Stud clamp bolts.
  - .4 Bolts for copper conductors.
  - .5 Sized for conductors as indicated.
- .4 Clamps or connectors for armoured cable, mineral insulated cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA-C22.2 No.18.

## 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 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.
  - .4 Install bushing stud connectors in accordance with EEMAC 1Y-2.

### 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

## 1. GENERAL

### 1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 COMMUN WORK FOR ELECTRICAL.

### 1.2 PRODUCT DATA

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

## 2. PRODUCTS

### 2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger.
- .2 Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.

### 2.2 TECK 90 CABLE

- .1 Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Conductors:
  - .1 Grounding conductor: copper.
  - .2 Circuit conductors: copper, size as indicated.
- .3 Insulation:
  - .1 Ethylene propylene rubber EP.
  - .2 Cross-linked polyethylene XLPE.
  - .3 Rating: , 600 V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: flat interlocking aluminum.
- .6 Overall covering: thermoplastic polyvinyl chloride, compliant to applicable Building Code classification for this project.
- .7 Fastenings:
  - .1 One hole malleable iron straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
  - .2 Channel type supports for two or more cables at 100 mm centers.
  - .3 Threaded rods: 6 mm diameter to support suspended channels.
- .8 Connectors:
  - .1 Watertight, explosion-proof approved for TECK cable.

## 2.3 ARMOURED CABLES

- .1 Conductors: insulated, copper size as indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from aluminum strip.
- .4 Type: ACWU90 PVC jacket over thermoplastic armour and compliant to applicable Building Code classification for this project wet locations.
- .5 Connectors: anti short connectors.

## 2.4 NON-METALLIC SHEATHED CABLE

- .1 Non-metallic sheathed copper cable type: NMD90 nylon, size as indicated.

## 3. EXECUTION

### 3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative.
- .3 Perform tests before energizing electrical system.

### 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 Conductor length for parallel feeders to be identical.
- .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.

### 3.3 INSTALLATION OF TECK90 CABLE (0 -1000 V)

- .1 Group cables wherever possible on channels.
- .2 Install cable securely supported by hangers.

### 3.4 INSTALLATION OF ARMOURED CABLES

- .1 Group cables wherever possible on channels.

### 3.5 INSTALLATION OF NON-METALLIC SHEATHED CABLE

- .1 Install cables.
- .2 Install straps and box connectors to cables as required.

END OF SECTION

## 1. GENERAL

### 1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

### 1.2 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with 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 accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

## 2. PRODUCTS

### 2.1 SUPPORT CHANNELS

- .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended set in poured concrete walls and ceilings.

## 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 after receipt of written approval to proceed from Departmental Representative.

### 3.2 INSTALLATION

- .1 Secure equipment to hollow solid masonry, tile and plaster surfaces with nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

- .6 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .7 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .8 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .9 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .10 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

### 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

## 1. GENERAL

### 1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1-06, Canadian Electrical Code, Part 1, 20th Edition.

## 2. PRODUCTS

### 2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 Combination boxes with barriers where outlets for more than one system are grouped.

### 2.2 GALVANIZED STEEL OUTLET BOXES

- .1 One-piece electro-galvanized construction.
- .2 Single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .3 102 mm square or octagonal outlet boxes for lighting fixture outlets.
- .4 Extension and plaster rings for flush mounting devices in finished tile walls.

### 2.3 MASONRY BOXES

- .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

### 2.4 CONCRETE BOXES

- .1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.

### 2.5 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

- .1 Electro-galvanized, sectional, screw ganging steel boxes, minimum size 76 x 50 x 63 mm with two double clamps to take non-metallic sheathed cables.

### 2.6 FITTINGS - GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.



### 3. EXECUTION

#### 3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

END OF SECTION

## 1. GENERAL

### 1.1 REFERENCES

- .1 CSA International
  - .1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.
- .2 CAN/CSA C22.2 No.42.1-00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
- .3 CSA C22.2 No.55-M1986(R2008), Special Use Switches.
- .4 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national standard, with UL 20).

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wiring devices and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province Québec, Canada.

### 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 wiring devices for incorporation into manual.

### 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

## 2. PRODUCTS

### 2.1 SWITCHES

- .1 15 A, 120 V/347 V, single pole, three-way, four-way switches to: CSA C22.2 No.55 and CSA C22.2 No.111.

- .2 Manually-operated general purpose AC switches with following features:
  - .1 Terminal holes approved for No. 10 AWG wire.
  - .2 Silver alloy contacts.
  - .3 Urea or melamine moulding for parts subject to carbon tracking.
  - .4 Suitable for back and side wiring.
  - .5 White toggle.
- .3 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads or heating loads.
- .4 Switches of one manufacturer throughout project.

## 2.2 RECEPTACLES

- .1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA C22.2 No.42 with following features:
  - .1 White urea moulded housing.
  - .2 Suitable for No. 10 AWG for back and side wiring.
  - .3 Break-off links for use as split receptacles.
  - .4 Eight back wired entrances, four side wiring screws.
  - .5 Triple wipe contacts and rivetted grounding contacts.
- .2 Single receptacles CSA type 5-15 R, 125 V, 15 A, U ground with following features:
  - .1 White urea moulded housing.
  - .2 Suitable for No. 10 AWG for back and side wiring.
  - .3 Four back wired entrances, 2 side wiring screws.
- .3 Other receptacles with ampacity and voltage as indicated.
- .4 Receptacles of one manufacturer throughout project.

## 2.3 COVER PLATES

- .1 Cover plates for wiring devices to: CSA C22.2 No.42.1.
- .2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .3 plasticwhite cover plates, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.
- .4 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

## 2.4 SOURCE QUALITY CONTROL

- .1 Cover plates from one manufacturer throughout project.

### 3. EXECUTION

#### 3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices 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 Switches:
  - .1 Install single throw switches with handle in "UP" position when switch closed.
  - .2 Install switches in gang type outlet box when more than one switch is required in one location.
  - .3 Mount toggle switches at height [in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Receptacles:
  - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
  - .2 Mount receptacles at height [in accordance with Section 26 05 00 - Common Work Results for Electrical.
  - .3 Where split receptacle has one portion switched, mount vertically and switch upper portion.
  - .4 Install GFI type receptacles as indicated.
- .3 Cover plates:
  - .1 Install suitable common cover plates where wiring devices are grouped.
  - .2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

#### 3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### 3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
- .3 Repair damage to adjacent materials caused by wiring device installation.

END OF SECTION

## 1. GENERAL

### 1.1 REFERENCE STANDARDS

#### .1 CSA Group (CSA)

- .1 CSA C22.2 No. 5-09 , Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

#### .1 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.

#### .2 Certificates:

- .1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit one copie of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet standards and regulations.
  - .1 Production certificate of origin must be submitted to Departmental Representative for approval.
- .2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.
- .3 Any work of manufacturing, assembly or installation to begin only after acceptance of production certificate of origin by Departmental Representative . Unless complying with this requirement, Departmental Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.
- .4 Production certificate of origin must contain:
  - .1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate.
  - .2 Licensed dealer's name and address and person of distributor responsible for Contractor's account.
  - .3 Contractor's name and address and person responsible for project.
  - .4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate.
  - .5 Name and address of building where circuit breakers will be installed:
    - .1 Project title.
    - .2 End user's reference number.

.3 List of circuit breakers.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store circuit breakers in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

2. PRODUCTS

2.1 BREAKERS GENERAL

- .1 Circuit breakers, Moulded-case circuit breakers to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient .
- .3 Plug-in moulded case circuit breakers: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient .
- .4 Common-trip breakers: with single handle for multi-pole applications.
- .5 Circuit breakers to have minimum 14KA.

2.2 THERMAL MAGNETIC BREAKERS (DESIGN A)

- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 MAGNETIC BREAKERS (DESIGN B)

- .1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short circuit protection.

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 INSTALLATION

- .1 Install circuit breakers 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



## 1. GENERAL

### 1.1 REFERENCES

- .1 American National Standards Institute (ANSI)
  - .1 ANSI C82.1-04, Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
  - .2 ANSI C82.4-02(R2007), Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps Multi Supply Type.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE )
  - .1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- .3 ASTM International Inc.
  - .1 ASTM F 1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 Canadian Standards Association (CSA International)
- .5 ICES-005-07, Radio Frequency Lighting Devices.
- .6 Underwriters' Laboratories of Canada (ULC)

### 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, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative
- .3 Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.
  - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures.

### 1.3 QUALITY ASSURANCE

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

### 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's recommendations. .
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

- .3 Divert unused metal materials from landfill to metal recycling facility.
- .4 Disposal and recycling of fluorescent lamps as per local regulations.
- .5 Disposal of old PCB filled ballasts.

## 2. PRODUCTS

### 2.1 LAMPS

- .1 Incandescent lamps: Incandescent bulbs are not allowed. Energy Star light-emitting diode (LED) lamps should be used instead of incandescent lamps.
- .2 Light Emitting Diode (LED) Lamps:
  - .1 Indoor Lighting: The temperature of the light-emitting diodes (LEDs) shall be as indicated on plans with a color rendering index equal to or greater than 80. Lamp life equal to or greater than 40,000 hours measured at 90% the luminous flux at an exposure of 25 ° C.

### 2.2 FINISHES

- .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

### 2.3 OPTICAL CONTROL DEVICES

- .1 As indicated in luminaire schedule.

### 2.4 LUMINAIRES

- .1 As indicated in luminaire schedule.

## 3. EXECUTION

### 3.1 INSTALLATION

- .1 Locate and install luminaires as indicated.
- .2 Provide adequate support to suit ceiling system.

### 3.2 WIRING

- .1 Connect luminaires to lighting circuits:
  - .1 Install flexible or rigid conduit for luminaires as indicated.

### 3.3 LUMINAIRE SUPPORTS

- .1 For suspended ceiling installations support luminaires independently of ceiling, support luminaires from ceiling grid in accordance with local inspection requirements.

### 3.4 LUMINAIRE ALIGNMENT

- .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

### 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