

**PUBLIC WORKS AND  
GOVERNMENT SERVICES CANADA  
Client Services Team  
Heritage  
Québec Region**

**PARKS CANADA  
SAGUENAY-ST-LAWRENCE PARK MANAGEMENT**

**REDEVELOPMENT OF THE VISITOR'S RECEPTION CENTRE  
IN BAIE SAINTE-CATHERINE  
SAGUENAY-ST. LAWRENCE MARINE PARK**

**Ref N°: R.078231.001 (PWGSC)  
197/04/PR1-011 (PARKS)**

**FOR TENDER**

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**GENERAL**

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**ELECTRICAL**

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## **1. GENERAL**

### **1.1 Related sections**

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 56 00 - Temporary barriers and enclosures

### **1.2 Work covered by the following contract documents**

- .1 Public Works and Government Services Canada (PWGSC) is managing a construction project at a Parks Canada Agency site located on the St. Lawrence River in Baie-Sté-Catherine, Quebec. This work includes the expansion of a reception building to rehabilitate the washrooms and the rental service and, on the other hand, the rehabilitation of the roadway around the existing dock and the reconstruction of the launching ramp. The works relating to the reception building is specified in the main part of the plans and specifications. Works relating to pavement and launching ramp is specified in Appendix A of the plans and specifications.
- .2 Without limiting to, the work relating to the reception building included :
  - .1 The selective demolition of the architectural components, the mechanical and electrical structures indicated in the plan including, in particular and without limitation:
    - .1 The existing washrooms including all equipment, appliances and accessories;
    - .2 The demolition of the concrete floor for the installation of the new sanitary appliances;
    - .3 The windows, sliding glass doors and glass sections in the sector affected by the work;
    - .4 The dismantling of structural elements, the slab and load-bearing walls indicated in the plans;
    - .5 The interior layout of the area affected by the work, including in particular the interior finishes, ceiling and floor covering;
    - .6 Preparation of existing surfaces of the walls, partitions and ceiling of the area affected by the work so the new finishing can be applied.
  - .2 Without limitation, the list of architectural construction to be carried out including notably:
    - .1 The construction of all interior and external installations indicated in the plans;
    - .2 Apply new finishes for all areas affected by the work;
    - .3 Supply and install the new doors and windows indicated in the plans;
    - .4 The supply and installation of the new architectural components including notably the insulation, waterproofing, doors and windows, integrated furniture and the finishing on the exterior walls
    - .5 The structural work includes notably:

- .1 The demolition and rebuilding of slabs on the ground;
  - .2 The construction of concrete foundations;
  - .3 the construction of new foundations;
  - .4 The modification of existing foundation walls;
  - .5 The construction of the frame for the extension;
  - .6 Modification of the load-bearing wall in the front and interior;
  - .7 The addition of new roofs and modification of the existing roof;
  - .8 The demolition and partial rebuilding of the wooden boardwalk;
  - .9 The demolition and partial rebuilding of the asphalt and concrete edges;
  - .10 The excavation and backfill required for the work.
- 
- .6 Plumbing for the redevelopment of two washrooms (men/women) including the supply and installation of the pipes both above and below ground, vents and finishing appliances.
  - .7 Plumbing for the redevelopment of the water intake and water treatment systems.
  - .8 New coffee bar and caretaker lodge, including the drainage and pipes for the drinking water.
  - .9 A non-potable water supply system for the toilets and urinals, a drinkable water supply system for the sinks and water heater.
  - .10 Supply and installation of two propane gas water heaters to provide hot water to a commercial washing machine. Including drinking water pipes / drainage and evacuation.
  - .11 Installation of water and drainage services for a commercial washing machine (provided and installed by the customer).
  - .12 Supply and installation of a duct network for the two water heaters. Combined roof exits according to codes and standards.
  - .13 Gas propane work for the supply of the two new water heaters and a commercial dryer (provided and installed by the customer). Including the supply and installation of propane gas lines, regulators and connection to the plumbing fixtures and commercial dryer. Initialize combustion devices.
  - .14 Ventilation work for evacuating the stale air from the washrooms. Including the supply and installation of the ventilation ducts, fans, grills and diffusers.
  - .15 Ventilation work for evacuating the stale air from the caretaker lodge, coffee room and mechanical room. Including ductwork, fans, grills and wall outlets.
  - .16 Work for the evacuation ducts to the commercial dryer, the duct and wall grill for the fresh air to the dryer.

- .17 All patch work of the existing interior and exterior finishing,
- .18 The electrical work including notably the modification of the building's electrical distribution, in addition to the demolition and redevelopment for the lighting, the outlets and services, the heating, and certain mechanical connections.

.3 Without limiting to, the work pertaining to bituminous asphalt and existing launch ramp, as specified in Appendix A of these documents, included :

- .1 Partial reconstruction of existing launch ramp
- .2 Refection of bituminous asphalt in parking area on the periphery of the wharf

### **1.3 Resource person at the Parks Canada Agency**

- .1 If required (access, authorizations, circulation, safety, etc.), the Canada Parks Agency resource person with whom the contractor must communicate will be determined during the first building site meeting.

### **1.4 Order to carry out the work**

- .1 Priority should be granted to the redevelopment and implementation of the washrooms.
  - .1 A minimum of a two (2) week period before the centre's opening date is necessary for the tests, adjustments and corrective work, if required.
- .2 The contractor must make the necessary provisions to clean, make safe and completely free the building's public areas during business hours of the visitor reception centre, starting from the day preceding the centre's opening date, if necessary.

### **1.5 Type of contract**

- .1 The work must be part of a single contract

### **1.6 Use of premises by the contractor**

- .1 Use of the premises is restricted to the zone necessary to the execution of the work and storage of materials.
- .2 Coordinate use of the premises to the prescriptions of the present section.
- .3 Find extra work and storage areas necessary to the execution of the work according to the terms of the present contract and pay any costs.
- .4 Remove or modify the existing components in order to avoid damage to the remaining parts of the structure.
- .5 Repair or replace, according to the instructions of the Departmental Representative, the parts of the structures that have been modified during construction in order to connect and/or harmonize to the remaining or adjacent structures.
- .6 Once completed, the existing structure shall be in a state equivalent or superior to the state it had before the work began.

### **1.7 Work schedules (evenings and weekend)**



- .1 The building will be made available during evenings and weekends to enable the contractor to complete all work within the allotted time, subject to the calendar and schedule suggested by the contractor and pre-approved by the Departmental Representative.

#### **1.8 Occupation of the venues by the Parks Canada Agency**

- .1 Collaborate with the Parks Canada Agency to a work schedule in order to minimize conflicts and facilitate the use of the premises by this one.
- .2 Establish a schedule for the substantial completion in designated areas to allow occupation of the premises by the Parks Canada Agency before the issuance of the certificate of substantial of all work object of this contract.
- .3 Execute obligations related to the provisional certificate of work completion before occupation of the premises by the Parks Canada Agency. Contractor must allow:
  - .1 Access to the premises to Parks Canada Agency staff;
  - .2 Use of parking areas;
  - .3 the operation of the electrical and mechanical installations (HVAC and others)
- .4 When on the premises, Department Representative will ensure for those areas:
  - .1 the operation of the electrical and mechanical installations (HVAC and others)
  - .2 the maintenance;
  - .3 the safety.

#### **1.9 Elements and existing equipment to recuperate or relocate**

- .1 Equipment to recuperate or relocate
  - .1 The list of the equipment to be relocated, their identification, current location and the place where they will be relocated are indicated to the plans.
- .2 Contractor's liability
  - .1 Inspect equipment in collaboration with the Departmental Representative and take note of any missing, damaged or defective components.
  - .2 Perform mechanical and electrical disconnection of various equipment.
  - .3 Protect temporary equipment from damage.
  - .4 Store temporary equipment if necessary.
  - .5 Move equipment to their new location.
  - .6 Install and connect equipment.
  - .7 Ensure, after installation, the necessary inspections by qualified authorities.
  - .8 Repair or replace damaged components to the work site due to contractor's or subcontractor's work.

## 1.10 Workflow

- .1 Complete all work in accordance with the CAN/CSA-S6-06, and the current federal and provincial standards, including the safety code for construction work. Refer to the project's technical estimates for a detailed and complete list of the standards and other references.
- .2 All references to the codes, standards, and material standards of materials are based on the latest Edition.
- .3 The Contractor must check all of the site's conditions, dimensions, elevations and compare them with those being reproduced in the plans before beginning the workshop drawings and/or manufacturing new elements. Omissions and/or contradictions, if applicable, must be reported in writing to the Departmental Representative.
- .4 Before work begins, the Contractor must inform the Departmental Representative in writing of all mismatches observed and those which are not stated in the plans. All mismatches observed after the work begins, will be repaired/corrected/moved by the Contractor at their expense and to the complete satisfaction of the Departmental Representative.
- .5 The Contractor must provide the expertise, labour, materials and the equipment required to carry out the work stated in the plans. In addition, the Contractor must provide the maximum loads for all heavy machinery for the verification and approval by the Departmental Representative. The material storage location must be approved beforehand by the Departmental Representative. The access roads for heavy machinery are restricted to above ground areas only to protect underground services.
- .6 The Contractor must plan work in a way to ensure the clients have access to the parking lot at all times. The Contractor must take the necessary measures to ensure the clients' safety at all times.
- .7 The structural plans must be used in conjunction with the mechanical and electrical plans. The Contractor must establish coordination between the various disciplines and inform the Departmental Representative in writing of all contradictions.
- .8 The Contractor must respect the construction plans. It is strictly prohibited to make any modifications without having obtained prior written approval from the Departmental Representative.
- .9 Only use the plans labelled "issued for construction" for all work. Strictly adhere to the project estimate sections.
- .10 Documents to submit: Section 01 33 00 - *Documents and samples to be submitted*.
- .11 The structural system indicated in the plans is designed to resist the loads/forces applied only after all components have been installed. The Contractor is entirely responsible for determining the construction method/sequence while ensuring the stability of the existing and new structures and their components. This includes the supply and installation of the temporary support systems, the stays and wind bracing. The Contractor must submit three (3) copies of the workshop drawings signed and sealed by an engineer that actively belongs to the *Ordre des Ingénieurs du Québec*.
- .12 When work is being carried out, the Contractor is responsible for any damage caused to the existing works by their employees and/or other individuals under their supervision, which must be repaired at their expense when the work is being executed and to the complete satisfaction of the Departmental Representative.

- .13 In the event of contradictions in the codes, standards, plans, general notes and estimate, the most severe and rigorous standard will be applied.
- .14 The Contractor is responsible for attentively reading all plans and estimate sections and familiarizing themselves completely with the scale of work required before submitting an estimate.

#### **1.11 Existing utility services**

- .1 Use all means necessary to identify the location of all drains, ducts and other public and private utility services before undertaking any drilling, demolition or excavation activities.
- .2 Prior to discontinuation of utility services, notify the Departmental Representative and concerned utility companies and obtain necessary authorizations.
- .3 When breaking into existing utility lines or connecting to those lines, contractor must submit notice to the Departmental Representative, in writing, 48 hours before the interruption of the mechanical or electrical corresponding services. Interruptions must be as short as possible. Perform work at the time determined by the local qualified authorities, and interfering as little as possible with Parks Canada Agency activities.
- .4 Provide alternate routes for personnel, pedestrian and vehicle traffic.
- .5 Before starting any work, define the extent and location of utility lines that are in the work area and inform the Departmental Representative,
- .6 Submit, for approval by the Departmental Representative, a calendar of the shutdowns of the installations including interruption of communication services or power supply. Comply with the approved timetable and inform parties affected by these inconveniences.
- .7 Provide temporary utility services according to the Departmental Representative requirements to ensure that critical systems of a sector affected by the work are maintained.
- .8 Install construction bridges to cross trenches, in order to maintain normal pedestrian and vehicle traffic.
- .9 When non-listed utility pipes are discovered, immediately inform the Departmental Representative and record them in writing.
- .10 Protect, move or maintain the operation of functional utility pipes. If non-functional pipes are discovered during construction, cap them off in a manner authorized by the qualified authorities.
- .11 Keep record of the location of maintained, moved or abandoned/capped off utility lines.
- .12 Build the barriers in accordance with section 01 56 00 - Temporary barriers and enclosures

#### **1.12 Required documents**

- .1 Maintain on job site, one copy of each of the following :
  - .1 Contract drawings.
  - .2 Specifications.

- .3 Addenda.
- .4 Reviewed shop drawings.
- .5 List of unviewed shop drawings
- .6 On site instruction.
- .7 Contemplated change notice.
- .8 Change order.
- .9 Other modifications to contract.
- .10 Field test reports
- .11 Copy of approved work schedule
- .12 Health and safety requirements and other safety documents.
- .13 Other necessary documents.

## **2. PRODUCTS**

- 2.1 No object.**

## **3. EXECUTION**

- 3.1 No object.**

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Unit or fixed-rate prices

- .1 The total amount of the contract is allocated according to the description of work paid on a fixed-rate basis (flat-rate amount table) and the work paid on a unit rate (unit rate amount table).
- .2 Each of the broken down unit or lump sum prices shall include all expenses, all work, disbursements, payments, direct or indirect costs, mobilization and demobilization; Contractor's actions and deeds, and all liabilities, obligations, omissions and errors related to the performance of this Work. These prices also include the transportation and roll-out of materials, as well as all the costs of doing business: administration, insurance, contributions, interest, rent, taxes and other incidental expenses. Prices must cover the losses and damages resulting from the nature of the work, the fluctuation of prices and wages, business risk, strikes, delays not caused by the Departmental Representative, restrictions on transport, accidents and the action of natural forces.

### 1.2 Definition

- .1 Fixed-rate price: When the work is determined in a precise and detailed manner and a price is agreed and accepted by both parties for the entire project.
- .2 Unit price: When the specifications related to work are determined in a precise and detailed manner and that all quantities in the form are provided for estimate purposes only.

### 1.3 Description of the flat-rate amounts for the articles in the chart.

#### .1 RECEPTION BUILDING

##### .1 Construction site organization

- .1 Mobilization and demobilization of the construction site: All scaffolding, lifting equipment, storage management and material handling, the supply and maintenance of the office on the construction site and sanitary equipment, temporary protection work and maintenance of the circulation, in addition to cleaning the construction site. This article also includes all other work that does not form an integral part of the other items in the bordereau

##### .2 Demolition

- .1 Selective demolition (for construction work)
- .2 Demolition of external installations (for construction work)

##### .3 Exterior landscaping around the building:

- .1 Includes rebuilding the existing concrete curbs, supply and install the sidewalks, wooden and stainless steel handrails indicated in the architectural plan.

.4 Concrete

- .1 The construction of foundation walls, pillars and concrete slabs and metal framing, in addition to surface finishing and patching.

.5 Wood

- .1 Includes the modification of the load-bearing walls, the exterior porch and roof patching, in addition to the wood framing, interior partitions and integrated furniture.

.6 Metals

- .1 Includes notably the structural works and assemblies, handrails, railings and other architectural works.

.7 Insulation and waterproofing

- .1 All insulation and waterproofing work, exterior coating, soundproofing, the enameled steel siding, flashings and accessories

.8 Openings and closures

- .1 Includes the supply and installation:
  - .1 Aluminium and steel doors and frames, glass panes and hardware.
  - .2 Articulated metal hinged door
  - .3 Screen doors

.9 Finishing covering:

- .1 Includes the plasterboards, acoustic ceiling, ceramics tiles, wood paneling and painting, in addition to the epoxy coatings for the floor. This article also includes all reworking of existing surface finishes in the areas affected by the work.

.10 Special work:

- .1 Includes the supply and installation:
  - .1 Metal partitions for washrooms
  - .2 Washroom accessories
  - .3 An access door for mechanical systems and installations

.11 Plumbing

- .1 Includes the supply and installation of the following elements: Toilets, Sinks, Floor drain, Wash tub, Water heater, Urinals, all hardware required for connecting these elements and the installation of gas appliances.

.12 Heating, ventilation and air conditioning

- .1 Includes the supply and installation of the following elements: Evacuation for the washroom; Diffusers; Gas evacuation.

- .2 Supply and installation of the low pressure metal air ducts and related materials, the supply and return registers and grills, air evacuation, diffusers and linear grates
- .3 Louvres, air intakes and other vents integrated into the systems and mechanical installations
- .4 Requirements in regard to sustainable development for construction and control.
- .5 Insulation of the ventilation shafts, pipes and related accessories associated with commercial installations.
- .6 Balancing.
- .7 Fire protection
  - .1 Consists of supplying and installing a portable extinguisher
- .13 Electricity
  - .1 Distribution
    - .1 To provide, install and connect the distribution equipment such as the disconnectors, fuses, 120/240 Vac circuit breaker, transformers, conduits, hardware, cables, power outlet, sockets, switches.
    - .2 Connect the grounding and bonding systems required at the main electric inlet and the distribution equipment in compliance with the standards.
    - .3 Connect and initialize all new electrical distribution equipment as indicated in the plans and estimate.
    - .4 Identify cables, control panels and outlet boxes
  - .2 Connections for mechanical and heating
    - .1 Connect the electrical (supply) for the ventilation systems, the water heaters supplied and installed by division 15 or 25, as indicated in the plans.
  - .3 Lighting
    - .1 Supply, install and connect the interior and external lighting equipment as indicated in the plans and estimate. This includes the lighting for the buildings, in addition to the emergency lighting and indications for the exits.

## .2 SURFACE REPARATION EXISTING WHARF

- .1 This item is paid according to a unit price, square meter. It includes the supply of materials, warehousing and labor and equipment and tools required for the set-up of all related materials for this item.
- .2 The bid price for this item must include, without limiting it to:
  - .1 Saw cuts (one for demolition and one for cleanliness)
  - .2 The planning
  - .3 Removal of existing asphalt
  - .4 Excavation and disposal of existing materials.
  - .5 Supply and installation of geotextile
  - .6 Profiling and final preparation of the granular area
  - .7 Supply and installation of asphalt tack coat on granulate
  - .8 Supply and installation of asphalt tack coat between the two bituminous layers.
  - .9 Temporary works and equipment necessary.
  - .10 Any incidental expense.

## .3 RECONSTRUCTION OF LAUNCHING RAMP

- .1 New concrete wall to be anchored to existing wall
  - .1 This item is paid according to a unit price, linear meter. It includes the supply of materials, warehousing and labor and equipment and tools required for the set-up of all related materials for this item.
  - .2 The bid price for this item must include, without limiting it to:
    - .1 Saw cuts and demolition of existing concrete.
    - .2 Supply and installation of metal anchor rods and the chemical anchoring product.
    - .3 Drilling and cleaning of holes.
    - .4 Supply and installation of reinforcing steel bars, including attachment of the bars.
    - .5 Supply and installation of formwork, including removal.
    - .6 Supply and placement of concrete.
    - .7 Riverbed excavation if necessary.
    - .8 And any incidental expense.



.2 Surface repair of existing concrete foundation wall

- .1 This item is paid according to a unit price, square meter. It includes the supply of materials, warehousing and labor and equipment and tools required for the set-up of all related materials for this item.
- .2 The bid price for this item must include, without limiting it to:
  - .1 Saw cuts and demolition of existing concrete.
  - .2 Temporary works and equipment necessary.
  - .3 Evacuation and out of site disposal of waste.
  - .4 Supply and installation of metal anchor rods and the chemical anchoring product.
  - .5 Drilling and cleaning of holes.
  - .6 Supply and installation of cement grout for concrete repair
  - .7 And any incidental expense.

.3 All other launch ramp work

- .1 This item is paid according to a fixed price. It includes the supply of materials, warehousing and labor and equipment and tools required for the set-up of all related materials for this item.
- .2 The bid price for this item must include, without limiting it to:
  - .1 Saw cuts and demolition of existing concrete.
  - .2 Temporary works and equipment necessary.
  - .3 Evacuation and out of site disposal of waste.
  - .4 Drilling and cleaning of holes.
  - .5 Reinforcing steel bars shop drawings and tables of amounts.
  - .6 Supply and installation of reinforcing steel bars, including attachment of the bars.
  - .7 Supply and installation of formwork, including removal.
  - .8 Supply and installation of new precast concrete panels
  - .9 Supply of shop drawings of formwork signed and sealed by an engineer member of OIQ.
  - .10 Inspection and supply of certificates of conformity of installations by an engineer member of OIQ.
  - .11 Supply and placement of concrete.

- .12 Riverbed excavation if necessary.
- .13 Supply of weight slips
- .14 Excavation and disposal of existing materials
- .15 Installation and supply of materials for seabed
- .16 Seabed bathymetry with points at 2 meters center/center. The date must correspond to the map zero coordinate system
- .17 Survey to delineate lots adjacent to boat launching ramp and positioned according to NAD83 geodetic datum.
- .18 And any incidental expense.

1.4 **Additional information**

- .1 After the contract is awarded, provide the price breakdown as requested by the Departmental Representative.

**2. PRODUCT**

- 2.1 **Without object.**

**3. EXECUTION**

- 3.1 **Without object.**

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related requirements

- .1 Section 01 11 01 – Summary of work
- .2 Section 01 33 00 - Documents and samples to be submitted

### 1.2 **Completion time**

- .1 The opening date for the visitor reception centre, the date on which the Contractor must have completed all work for use by the Canada Parks Agency is May 5, 2017.

### 1.3 Definition

- .1 Activity: Specified work performed as part of a project. An activity normally has a target duration, target cost and target resource requirements. The activities can be subdivided into tasks.
- .2 Bar chart (GANTT diagram): Graphical representation of data related to the project's implementation schedule. In the usual bar chart, the project's activities or other elements are presented from top to bottom, to the left of the graph, while the dates are presented on top, from left to right; the duration of each activity is indicated by horizontal segments placed between the dates. In general, the bar chart is generated from a commercially available computerized project management system.
- .3 Basic reference: Initial plan approval (for a project, work lot or an activity), taking into account the approved changes to the project scope.
- .4 Work week: A five (5) day work week, Monday to Friday, the days worked defined for the purpose of submitting the bar chart (GANTT diagram)
- .5 Duration: Required number of work periods (except holidays and other non-working periods) for an activity's performance or another project element. The duration is usually expressed in work days or work weeks.
- .6 Overall plan: Program summary indicating the main activities and key milestones.
- .7 Milestone: An important event in project implementation, most often being the completion of an important (deliverable) product.
- .8 Implementation schedule: Timelines for activity implementation and milestone achievement. A dynamic and detailed program dynamic of the required tasks or activities to reach the project's milestones. The follow-up and control process depends on the implementation schedule for the execution and control of activities; It defines the decisions that will be made throughout the project duration.
- .9 Scheduling - Project planning, follow-up and control: A global system managed by the Departmental Representative to ensure work completion is monitored in relation to the stages or milestones.

### 1.4 Requirements

- .1 Ensure that the overall plan and implementation schedule are feasible and that they respect the prescribed contract duration.

- .2 The overall plan must carry out the work according to the prescribed milestones within the agreed period.
  - .3 Limit the duration of activities to approximately ten (10) working days to prepare the progress reports.
  - .4 The contract's attribution or work start date, the work's rate of progress, the issuance of the provisional certificate of work completion and the final certificate of work completion are defined stages in the project and are essential conditions of the contract.
- 1.5 Documents / samples to be submitted for approval / information
- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted*.
  - .2 Submit a bar chart (GANTT diagram) to the Departmental Representative that will serve as the overall plan and be used for work planning and monitoring, in addition to producing progress reports.
  - .3 Submit the implementation schedule to the Departmental Representative no later than five (5) working days after the overall plan is accepted.
- 1.6 Project Milestones
- .1 The project milestones are the intermediate objectives outlined in the implementation schedule.
    - .1 Excavation work must be completed no later than 10 working days after the contract attribution date.
    - .2 Infrastructure work must be completed no later than 15 working days after the contract attribution date.
    - .3 Superstructure work must be completed no later than 20 working days after the contract attribution date.
    - .4 The building must be closed and made weatherproof no later than 30 working days after the contract attribution date.
    - .5 Interior finishing and fittings, plus the electrical and mechanical installations, must be completed no later than 60 working days after the contract attribution date.
    - .6 The provisional certificate of work completion (substantial completion) must be delivered no later than 65 working days after the contract attribution date.
- 1.7 Overall plan
- .1 Structure the implementation schedule as to allow for the planning, organization and orderly execution of work according to the bar chart (GANTT diagram).
  - .2 The Departmental Representative will examine the schedule and send to the Contractor within the following five (5) working days.
  - .3 If the schedule is deemed unfeasible, it must be revised and resubmitted within the following five (5) working days after it was received.

- .4 The accepted revised schedule will become the overall plan, which will serve as reference for the updates.

#### 1.8 Implementation schedule

- .1 Develop a detailed implementation schedule based on the overall plan.
- .2 The detailed implementation schedule must at least include the steps corresponding to the following activities.
  - .1 Contract attribution.
  - .2 Workshop drawings, samples.
  - .3 Mobilization.
  - .4 Excavation.
  - .5 Embankment.
  - .6 The building's foundation footings.
  - .7 Concrete slab on the ground.
  - .8 Wall siding and covering
  - .9 Interior architectural elements (walls, floors, ceilings).
  - .10 Plumbing.
  - .11 Lighting.
  - .12 Electricity.
  - .13 Pipes.
  - .14 Control / regulation.
  - .15 Heating, ventilation and air conditioning.
  - .16 Carpentry and built-in furniture.
  - .17 Testing and commissioning.
  - .18 Materials provided with lengthy delivery.
  - .19 The requested delivery dates when materials are provided by the Departmental Representative.

#### 1.9 Report on the state of work progress

- .1 Update the implementation schedule once (1) per week to reflect activity modification, activity completion and the activities being executed.

- .2 Attach a narrative report to the implementation schedule that indicates the state of work progress, the progress compared to the implementation schedule, in addition to presenting the current forecasts, expected delays, the impacts of these elements and possible mitigation measures.

1.10 Project meeting

- .1 Organize a meeting with the contract parties in the 15 days following the contract attribution, to discuss the administrative procedures and to define the responsibilities for each party.
- .2 The Departmental Representative, the Contractor, the main subcontractors, the building site inspectors and supervisors must all be present for this meeting.
- .3 Determine the time and location for the meeting and notify the parties involved at least five (5) working days prior to the meeting.
- .4 Incorporate the amendments to the contractual documents agreed to by the parties before the convention is signed.
- .5 Items that must be included in the agenda:
  - .1 Nomination of the official representatives for the work's participants.
  - .2 The submission schedule for the workshop drawings, product samples and color swatches according to section 01 33 00 - *Documents and samples to be submitted*.
  - .3 Requirements concerning the temporary installations, building site signalling, the offices, the sheds and storage facilities, utility services and fences according to section 01 52 00 - *Construction site installations*.
  - .4 Safety on the site according to section 01 56 00 - *Access and temporary protection structures*.
  - .5 Proposed amendments, change orders, procedures, approvals, margin percentages allowed, extensions, overtime and other administrative details.
  - .6 Products provided by the Project Owner.
  - .7 Drawings to be included in the project file according to section 01 33 00 - *Documents and samples to be submitted*.
  - .8 Maintenance manuals according to section 01 78 00 - *Documents and samples to be submitted at work completion*.
  - .9 Procedures for the delivery and acceptance of work and warranties according to section 01 78 00 - *Documents and samples to be submitted at work completion*.
  - .10 Requests for monthly installments, administrative procedures, photos, deductions.
  - .11 Designation of the inspection and testing organizations and firms.
  - .12 Insurance, policy statements.

1.11 **Meetings on the progress of work**

- .1 Establish a calendar for the meetings that will be held **every two (2) weeks** while work is being executed.
- .2 The Departmental Representative, the Contractor and the main subcontractors must all be present for this meeting.
- .3 Write the official report from the meetings and send them to the participants and any individuals who were absent, no later than five (5) days after each meeting.
- .4 Items that must be included in the agenda:
  - .1 Read and approve the minutes from the previous meeting.
  - .2 Examine the work progress since the previous meeting.
  - .3 On-site observations; problems and conflicts.
  - .4 Problems affecting the work schedule.
  - .5 Review delivery schedules for products manufactured off-site.
  - .6 Procedures and corrective actions for reducing delays to meet the established schedule.
  - .7 Revise the work schedule.
  - .8 Examine the advancement schedule of the work during the successive stages.
  - .9 Revise the submission schedule for the required documents and samples; Accelerate the process if necessary.
  - .10 Maintain quality standards.
  - .11 Examine the suggested modifications and their possible effects on the work schedule and completion date.
  - .12 Other.

2. **PRODUCTS**

- 2.1 No object.

3. **EXECUTION**

- 3.1 No object.

**END OF SECTION**

## 1. GENERAL

### 1.1 Related sections

- .1 Section 01 45 00 - Quality control

### 1.2 References

- .1 No object

### 1.3 Administrative considerations

- .1 Without delay and according to a predetermined order to prevent delays in work completion, submit ALL technical files and product installation methods used during the project to the Departmental Representative for approval, in addition to the samples when requested by the representative from the architectural estimate. A delay in this respect will not constitute a justifiable reason to obtain an extension to complete the work and no request of this kind will be accepted.
- .2 Do not begin work before verifying that all submitted parts are completely finished.
- .3 Characteristics on shop drawings, data sheets and product samples and books should be expressed in metric units (imperial units in parenthesis if required).
- .4 When elements are not produced or manufactured in metric or imperial units or that the features are not given in SI units, only then can converted values be accepted.
- .5 Review documents and samples before giving them to the Departmental Representative.
  - .1 By doing so, the Contractor ensures that applicable requirements have been or will be determined and verified and found to comply with the requirements of the Work and contract documents.
  - .2 The documents and samples that will not be stamped, signed, dated and identified BY THE CONTRACTOR in connection with the particular project will be sent back without examination and considered as rejected
- .6 Notify the Departmental Representative, in writing, at the deposit of the documents and samples, of any discrepancies in regards of the requirements of the contract documents and state the reasons.
- .7 Ensure the accuracy of the measures taken on site from adjacent structures affected by the Work.
- .8 The fact that the documents and samples submitted will be examined by the Departmental Representative does not release the Contractor from their responsibility to send complete information that is exact and compliant to the requirements in the contractual documents.
- .9 Keep on site a verified copy of each of the submitted documents.

### 1.4 Shop drawings and data sheets

- .1 The term « shop drawings » means drawings, diagrams, illustrations, tables, performance or productivity graphics, brochures and any other documentation to be provided by the Contractor to demonstrate in details a designated part of the Work.



- .2 Submit shop drawings bearing the seal and signature of a professional engineer registered in Quebec where required.
- .3 Shop drawings and data sheets must indicate:
  - .1 the materials to be used;
  - .2 restrictions and the evidence of compatibility with other materials that could come into contact with one of the others. To this end, the contractor must read the technical files (updated version) of the products specified and ensure that the products specified in the plans and estimate are compatible and inform the professionals if this is not the case. The Contractor MUST indicate on the drawings that verification is complete. See article 1.3.5;
  - .3 the methods of construction, of fixing or anchoring to use. They must contain the assembly drawings, connection details, explanatory notes and other information necessary to the performance of the Work.
  - .4 When structures or elements are connected to other structures or elements, indicate on drawings the prescription coordination, regardless of the section the structures or elements will be supplied.
- .4 Allow seven (7) days for Departmental Representative to examine each batch of submitted documents.
- .5 Modifications to shop drawings shall not modify the contract price. If it is the case, notify the Departmental Representative in writing before beginning the work.
- .6 When asked by the Departmental Representative, make changes to shop drawings in accordance with the requirements of the contract documents. When re-submitting the drawings, notify in writing the Departmental Representative of any extra modification made in excess of those required.
- .7 Documents submitted shall be accompanied by a cover letter, in two (2) copies, containing the following information :
  - .1 date;
  - .2 project name and number;
  - .3 contractor's name and address;
  - .4 Designation of each drawing, data sheet and sample provided as well as the number of submitted documents and samples :
  - .5 Any other relevant data.
- .8 Documents shall also bear or indicate :
  - .1 Date of preparation and review dates;
  - .2 Project title and number;
  - .3 Name and address of the following :
    - .1 sub-contractor;
    - .2 supplier;

- .3 manufacturer;
- .4 Stamp from the Contractor, signed by the authorized representative of the latter, stating that the documents submitted are approved, that the measures taken on-site have been checked and that all meet the requirements for the contract documents;
- .5 Relevant details to relevant portions of the Work :
  - .1 Materials and manufacturing details;
  - .2 Layout or configuration, dimensions, including those taken on-site, as well as clearances;
  - .3 Mounting or adjustment details;
  - .4 Characteristics such as power, speed or capacity;
  - .5 Performance characteristics;
  - .6 Reference standards;
  - .7 Operational mass;
  - .8 Wiring diagrams;
  - .9 Single line diagrams and schematics;
  - .10 Linkage to adjacent structures.
- .9 Distribute copies of shop drawings and specification sheets once the Departmental Representative has completed verifying the documents.
- .10 Submit one (1) electronic copy (email) of Shop drawings prescribed in the Specifications sections and according to reasonable requirements of the Departmental Representative.
- .11 If no Shop drawing is required due to the use of a standard product, submit one (1) electronic copy (email) of data sheets or manufacturer's documentation as prescribed in the technical section of the Specifications and required by the Departmental Representative.
- .12 Submit one (1) electronic copy (email) of test reports prescribed in the technical section of the Specifications and required by the Departmental Representative.
  - .1 The report signed by the official representative of the testing laboratory shall certify that material, products or systems similar to those proposed in the contract were tested according to the prescribed requirements.
  - .2 Tests shall have been made 3 years prior to the attribution of this contract.
- .13 Submit one (1) electronic copy (email) of test reports prescribed in the technical section of the Specifications and required by the Departmental Representative.
  - .1 Documents, printed on official manufacturer correspondence paper and signed by a representative of the manufacturer, shall certify that products, materials, equipment and systems are in compliance with the requirements of the Specifications.
  - .2 Certificates must bear a date prior to the attribution.

- .14 Submit one (1) electronic copy (email) of test reports prescribed in the technical section of the Specifications and required by the Departmental Representative.
  - .1 Pre-printed documents describing the installation methods for products, materials and systems, including specific instructions and MSDS showing the impedance, hazards and safety measures to be in place.
- .15 Submit one (1) electronic copy (email) of spot-check reports done by the manufacturer, prescribed in the Specifications sections and required by the Departmental Representative.
  - .1 Test reports and verifications have been carried out by the manufacturer's representative in order to confirm the compliance of products, materials or systems installed by the manufacturer.
- .16 Submit one (1) electronic copy (email) of operating and maintenance records prescribed in the Specification sections and required by the Departmental Representative.
- .17 Delete any information that does not apply to the work.
- .18 In addition to the current information, supply any additional details that apply to the Work.
- .19 Once shop drawings have been verified by the Departmental Representative and that they contain only minor errors, printed copies are sent back and processing work and installation can be undertaken. If shop drawings are rejected, annotated copies are returned and the reviewed shop drawings must be submitted according to the above indications before the processing work and installations can be undertaken.
- .20 Review of the shop drawings by the Departmental Representative is solely done to verify compliance with the general concept of the data indicated on them.
  - .1 That review does not mean that the Departmental Representative approve of final design presented in the shop drawings, responsibility of the Contractor who submits them, and does not relieve the latter of the obligation to submit accurate and complete shop drawings and to confirm to all requirements of the Work and contract documents.
  - .2 Without restricting the general issues of the preceding, it is important to clarify that the Contractor is responsible for the accuracy of the dimensions confirmed on site, to confirm information of the shaping methods or building techniques and the installation and coordination of work performed by all trades **the compatibility between the various materials used.**

#### 1.5 Product samples

- .1 Submit the product samples for validation according to the technical prescription of the specifications. Label all samples, indicating origin and intended destination.
- .2 Ship samples, prepaid, to the Departmental Representative's office.
- .3 Notify the Departmental Representative, in writing, upon presentation of product samples, of any differences they might have from the contract document requirements.
- .4 When color, pattern or texture has a prescription, submit all necessary sample range.

- .5 Modifications made to samples by the Departmental Representative shall not change the contract price. If it does change the price, notify the Departmental Representative, in writing, before starting the work.
- .6 Make necessary modifications to samples as required by the Departmental Representative while respecting the contract document requirements.
- .7 The verified and approved samples become the reference standards from which the quality of work and workmanship of the finished Work shall be evaluated.

1.6 Samples of work

- .1 When specified, create the work samples required in accordance with section 01 45 00 - Quality control.

1.7 **Certificates and official reports**

- .1 Submit the relevant documents required by the *Commission de la Santé et de la Sécurité au Travail* immediately after the contract is awarded.

1.8 **Photo documentation**

- .1 Submit a collection of digital standard resolution color photographs in JPG format submitted electronically with the progress report to the Departmental Representative every week.
- .2 Project identification: Designation and project number and date the photograph was taken.
- .3 Number of views:
  - .1 The points of view and their location will be determined by the Departmental Representative.
- .4 Frequency to send photos:
  - .1 Before the work is concealed and according to the instructions from the Departmental Representative.

2. PRODUCTS

- 2.1 No object

3. EXECUTION

- 3.1 No object

**END OF SECTION**

## 1. GENERAL

GENERAL NOTE: 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, parking, bays, etc.).

### 1.1 Related requirements

1. 01 11 01 – Summary of work
2. 01 33 00 - Documents and samples to be submitted

### 1.2 References

1. 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).

### 1.3 Action and informational submittals

1. Make submittals in accordance with Section 01 33 00 - Documents and samples to be submitted.
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. Departmental representative will review Contractor’s site-specific prevention program and provide comments to Contractor within 10 days after receipt of the document. Revise plan as appropriate and resubmit to Departmental representative within 5 days after receipt of comments from Departmental representative. Departmental representative reserves the right not to authorize the start of work on the construction site as long as the content of the prevention program is not satisfactory. The Contractor shall then update his prevention program and resubmit it to the Departmental representative if the scope of work changes or if the working methods of the Contractor differ from his initial plans or for any other applicable new condition.
4. Departmental representative’s review of Contractor’s site-specific prevention program should not be construed as approval of the program and does not reduce the Contractor’s overall responsibility for construction Health and Safety during the work.
5. Submit copies of Contractor’s authorized representative’s construction site health and safety inspection reports to Departmental representative, at least once a week.
6. 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.

7. 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.
8. Submit to Departmental representative WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Documents and samples to be submitted. Contractor must also keep one copy of these documents on the construction site.
  9. 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.
  10. Submit to Departmental representative an on-site Emergency Response Plan at the same time as the prevention program. The Emergency Response plan must contain the elements listed in the article "GENERAL REQUIREMENTS" of this section.
  11. 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.

In addition, the certifications of the Cours de santé et sécurité générale pour les chantiers de construction (General Health and Safety Training for Construction Sites) shall be available on demand on the construction site.

12. 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.

#### **1.4 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.
2. 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.
3. 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.
4. 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.

#### **1.5 Hazard assessment**

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

#### **1.6 Meetings**

1. Schedule and administer Health and Safety meeting with Departmental representative prior to commencement of Work.
2. Contractor's representative with decision power must attend any meetings at which construction site safety and health issues are to be discussed.
3. If it is anticipated that there will be 25 workers or more on the construction site at any given time, the Contractor shall set up a worksite committee and hold meetings as required by the *Code de sécurité pour les travaux de construction* (S-2.1, r. 4) (Safety code for the construction industry). A copy of the minutes of the meetings of the committee shall be provided to the Departmental representative no later than 5 days after the committee meeting.

#### **1.7 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 *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry), notwithstanding the date indicated in that *Code*.

#### **1.8 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.

#### **1.9 Responsibilities**

1. 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).
2. 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.
3. No matter the size or location of the construction site, the Contractor must clearly define the limits of the construction site by physical means and respect all specific regulation requirements applicable in this regard. The means chosen to define the limits of the construction site must be submitted to the Departmental representative.
4. 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.

#### **1.10 Work performed by external contractors**

1. No object.

#### **1.11 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.

The safety program must include at least the following:

1. company safety and health policy;



2. description of the stages of the work;
3. total costs, schedule and projected workforce curves;
4. flow chart of safety and health responsibilities;
5. physical and material layout of the construction site;
6. risk assessment for each stage of the work, including preventive measures and the procedures for applying them;
7. identification of the preventive measures relative to the specific risks inherent to the worksite indicated in the article "RISKS INHERENT TO THE WORKSITE";
8. identification of preventive measures for health and safety of employees and / or public works site as indicated in the article "SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC";
9. training requirements;
10. procedures in case of accident/injury;
11. written commitment from all parties to comply with the safety program;
12. construction site inspection checklist based on the preventive measures;
13. emergency response plan which shall contain at least the following:
  - a. construction site evacuation procedures;
  - b. identification of resources (police, firefighters, ambulance services, etc.);
  - c. identification of persons in charge of the construction site;
  - d. identification of the first-aid attendants;
  - e. communication organizational chart (including the person responsible for the site and the Departmental representative);
  - f. training required for those responsible for applying the plan;
  - g. any other information needed, in the light of the construction site's characteristics.

If available the Departmental representative will provide the evacuation procedures to the Contractor who shall then coordinate the construction site procedure with that of the site and submit it to the Departmental representative.

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.

3. In addition to the prevention program, during the course of the work the Contractor shall elaborate and submit to the Departmental representative specific written procedures for any work having a high risk factor of accident (for example: demolition procedures, specific installation procedures, hoisting plan, procedures for entering a confined space, procedures for interrupting electric power, etc.) or at the request of the Departmental representative.
4. The Contractor shall plan and organize work so as to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment.
5. Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.
6. All mechanical equipment (for example, but not limited to: hoisting devices for persons or materials, excavators, concrete pumps, concrete saws) shall be inspected before delivery to the construction site. Before using any mechanical equipment, the Contractor shall obtain a certificate of compliance signed by a qualified mechanic dated less than a week prior to the arrival of each piece of equipment on the construction site; the certificate shall remain on the construction site and transmitted to the Departmental representative on demand.
7. Ensure all inspections (daily, periodic, annual, etc.) for the hoisting devices for persons or materials required by the current standards are carried out and be able to provide a copy of the inspection certificates to the Departmental representative on demand.
8. The Departmental representative can at all times, if he suspects a malfunction or the risk of an accident, order the immediate stop of any piece of equipment and require an inspection by a specialist of his choice.
9. The Departmental representative must be consulted for the location of storing gas cylinders and tanks on the construction site.

#### **1.12 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. Without limiting his prevention program to these, the Contractor shall also include these elements in his program.

At the worksite there is the presence of the following:

1. moulds;
2. underground services (electric, gas, vapour, water system, etc.);
3. body of water close by;
4. septic tank.

### **1.13 Specific requirements for the health and safety of occupants and public**

1. The site where work will take place, will be vacant by the Parks Canada Agency's employees during the entire period of work. Note that the general public (visitors, hikers, etc.) could be present on the dock at any time (in proximity to the work). Although these individuals do not have access to the contractor's site, the contractor must take into account all special requirements to ensure the public's safety.
2. These requirements must be included in the Contractor's prevention program, in addition to any other measures provided by the Contractor to protect the health and safety of employees and / or the public when on the site.

### **1.14 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.

### **1.15 Person in charge of health and safety**

1. If the construction site meets the requirements of article 2.5.3 of the *Code de la sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the construction industry), the Contractor needs to hire a competent person authorized as a safety officer and appoint this person full time from the beginning of the work. This person's tasks shall solely be dedicated to the management of health and safety on the construction site. This safety officer must have the following qualifications:
  1. have a safety officer certificate issued by the CNESST since at least five (5) years;
  2. have site-related working experience specific to the activities associated with the present project;
  3. have working knowledge of occupational health and safety regulations in the workplace;
  4. be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter the construction site to perform work;
  5. be responsible for implementing, enforcing in detail and monitoring site-specific Contractor's Health and prevention program;
  6. be on construction site at all times during execution of work;
  7. inspect the work and ensure compliance with all regulatory requirements and those indicated in the contract documents or the site-specific prevention program.
  8. Keep a daily log of actions taken and submitting a copy to Departmental representative each week.

The safety officer's certificate shall be submitted to the Departmental representative before the start of the work.

1. When the hiring of a safety officer is not required or if this person is hired by the Departmental representative, the Contractor shall designate a competent person to supervise and take responsibility for health and safety, no matter the size of the construction site or how many workers are present at the workplace. This person shall be on construction site at all times and be able to take all necessary measures to ensure the health and safety of persons and property at or in the immediate vicinity of the construction site and likely to be affected by any of the work. The Contractor shall submit the name of this person to the Departmental representative before the start of work.

#### **1.16 Posting of document**

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, and in consultation with Departmental representative.
2. At a minimum, the following information and documents must be posted in a location readily accessible to all workers:
  1. notice of construction site opening;
  2. identification of principal Contractor;
  3. company OSH policy;
  4. site-specific prevention program;
  5. emergency plan;
  6. minutes of worksite committee meetings;
  7. names of worksite committee representatives;
  8. names of the first-aid attendants;
  9. action reports and correction notices issued by the CNESST.
  10. data sheets for all controlled products used on site

#### **1.17 Inspection of the construction site and correction of non-compliances**

1. Inspect the construction site and complete the construction site inspection checklist and submit it to the Departmental representative in accordance with the article "ACTION AND INFORMATION SUBMITTALS" in this section.
2. 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.
3. 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.

4. The Contractor shall give the safety officer or, where there is no safety officer, the person assigned to safety and health responsibilities, full authority to order cessation and resuming of work as and when deemed necessary or desirable in the interests of safety and health. This person should always act so that the safety and health of the public and construction site workers and environmental protection take precedence over cost and scheduling considerations.
5. 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.

#### **1.18 Prevention of violence**

1. Health and safety management of Public Works and Government Services Canada construction sites includes the implementation of measures designed to protect the psychological health of all persons who access the construction site where the work is taking place. Consequently, in addition to physical violence, verbal abuse, intimidation and harassment are not tolerated on the construction site. Any person who demonstrates such actions or behaviors will receive a warning and/or could be definitely expelled from the construction site by the Departmental representative.

#### **1.19 Blasting**

1. No object.

#### **1.20 Power actuated device**

1. Use powder actuated devices only after receipt of written permission from Departmental representative.
2. Any person using an explosive actuated tool shall hold a training certificate and meet all requirements of Section 7 of the *Code de sécurité pour les travaux de construction* (S- 2.1, r. 4). (Safety code for the construction industry)
3. Any other explosive-actuated device shall be used in accordance with the manufacturer's directions and applicable standards and regulations.

#### **1.21 Use of public roads**

1. Where it is necessary to encroach on a public road for operational reasons or to ensure the security of the workers, the occupants or the public (for example: the use of scaffolding, cranes, excavation work, etc.), the Contractor shall obtain at his own expense any authorizations and permits required by the competent authority.
2. The Contractor shall install at his own expense any signage, barricades or other devices needed to ensure the safety and security of the public and the Contractor's own facilities.

#### **1.22 Lockout-tagout**

1. For all work on electrically or otherwise energized equipment, the Contractor shall draw up and implement a general lockout-tagout procedure and submit it to the Departmental representative.

2. Supervisors and all workers concerned by work requiring lockout-tagout must have received training on lockout-tagout procedures by a recognized organization; Contractor shall submit training certificates to the Departmental representative.
3. Before starting the lockout-tagout procedure of a piece of equipment on an occupied site, Contractor must coordinate his work with the representative of the site if the interruption of the power sources can have an impact on the operations of the site or on its occupants.
4. Contractor must designate a qualified person as responsible for the lockout-tagout and must make sure that that person prepares a lockout-tagout data sheet for each piece of equipment involved. The lockout-tagout data sheet must be submitted to the Departmental representative at least 48 hours before the beginning of the work. The Departmental representative will review the data sheet with the representative of the site if the work takes place in an existing building. The data sheets for lockout-tagout must contain at least the following information:
  1. description of work to carry out;
  2. identification, description and location of the circuit and/or ~~piece of~~ equipment to lockout-tagout;
  3. identification of energy sources that feeds the ~~piece of~~ equipment;
  4. identification of each cutout point;
  5. sequence of lockout-tagout and the release of residual energy as well as the sequence of unlocking;
  6. list of material needed for the lockout-tagout;
  7. method of verification of zero energy implementation;
  8. name and signature of the person who prepared the data sheet.

When required by the Departmental representative, Contractor must record all this information on the site's representative form.

5. At the time of lockout-tagout, the person responsible must date the data sheet and ensure that each worker involved in the work on the circuit/piece of equipment to lockout-tagout puts his name on the data sheet and signs it.

### **1.23 Electrical work**

1. Contractor shall ensure that all electrical work is executed by qualified employees in accordance with the provincial regulation respecting vocational training and qualification.
2. Contractor shall respect all requirements of standard CSA Z462 *Workplace Electrical Safety Standard*.
3. No repairs or alterations shall be carried out on any live equipment except where complete disconnection of the equipment is not feasible.
4. Contractor shall respect all requirements prescribed in paragraph "LOCKOUT-TAGOUT" in this section.

5. Contractor shall advise in writing the Departmental representative of all the work that cannot be done with de-energized equipment and obtain his authorization. Contractor shall demonstrate to the Departmental representative that it is impossible to do the work with de-energized equipment and provide all the information necessary to request and obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) before the beginning of the work, excluding for the exceptions indicated in standard CSA Z462 Workplace electrical safety.
6. The energized electrical work permit on must contain at least the following elements:
  1. description of the circuit and equipment and its location;
  2. justification for having to do the work in an energized condition;
  3. description of safe work practices to apply;
  4. results of the shock hazard analysis;
  5. limit of the protective perimeter against electric shocks;
  6. results of the arc flash hazard analysis;
  7. description of the arc flash protection boundary;
  8. description of the personal protective equipment required;
  9. description of the means to limit access to unqualified persons;
  10. proof that an information session has been carried out;
  11. approval signature of the energized electrical work (by a person in authority or by the Departmental Representative).
7. If for the operational requirements of the occupants of the site the representative of the site requires that the Contractor performs work in an energized condition, the Contractor shall obtain all the information required to request and obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) and have it signed by the representative of the site assigned by the Departmental representative before the beginning of the work.

#### **1.24 Asbestos exposure**

1. No object.

#### **1.25 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 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.

#### **1.26 Exposure to silica**

1. For any interior or exterior work generating silica, the Contractor must respect the following requirements, in addition to those in the *Code de sécurité pour les travaux de construction* S-2.1, r.4 (Safety code for the construction industry).
  1. Work in wet environment or use tools with the inflow of water in order to reduce dustiness, if not, collect dust at the source and retain it with a high-efficiency filters not to propagate dust in the environment.
  2. Clean surfaces and tools with water, never with compressed air.
  3. Sand and pickle surfaces by using an abrasive containing less than 1% of silica (also called amorphous silica).
  4. Install shields or other containment device to prevent silica dust from migrating toward other workers or the public.
  5. Wear individual respiratory and ocular protection equipment during all the operations that could generate silica dust in accordance with the requirements of the *Code de sécurité pour les travaux de construction*, S-2.1, r.4 (Safety code for the construction industry).
  6. Wear coveralls to prevent contamination outside the construction site.
  7. Do not eat, drink, or smoke in a dusty environment.
  8. Wash the hands and the face before drinking, eating or smoking.

#### **1.27 Sandblasting**

1. No object.

#### **1.28 Lead-base paint removal**

1. No object.

#### **1.29 Exposure to animal's fecal droppings**

1. No object.



### 1.30 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 testing to the Departmental representative on demand.

### 1.31 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.

### 1.32 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 scaffolding **S** must respect the following requirements:

#### Foundation

1. Scaffolding shall be installed on a solid foundation so that it does not slip or rock.
2. Contractors wishing to install scaffolding on a roof, overhang, canopy or awning shall submit their calculations and loads, as well as plans signed and sealed by an engineer to the Departmental representative and obtain his authorization before beginning installation.

#### Assembly, bracing and mooring

1. All scaffolding shall be assembled, braced and moored in accordance with the manufacturer's instructions and the provisions of the *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 scaffolding (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 scaffolding 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.

#### **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.

#### **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. Scaffolding 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.

#### **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 scaffolding 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.

#### **Access**

1. The Contractor shall ensure that access to the scaffolding does not compromise worker safety.
2. Where the platforms of the scaffolding are comprised of planks, ladders shall be installed in such a way that planks extending beyond the platform do not block the way up or down.
3. Notwithstanding the provisions of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), stairs shall be installed on all scaffolding that have six or more rows of uprights or is six sections (or nine metres) high or higher.

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

1. When scaffolding 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.

### **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 scaffolding.
2. A plan signed and sealed by an engineer is required for all scaffolding 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.


#### **1.33 Confined spaces**







1. No object.

#### **1.34 Excavation work**

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 performs the digging of trenches or excavations must respect the following requirements:
  1. Fill out the following form and submit it to the Departmental representative before beginning to excavation work.
  2. Submit to the Departmental representative, as appropriate, the following documents:
    - a. plans and specifications, signed and sealed by an engineer, of the shoring needed to be installed for the excavation work; or
    - b. engineer's advice specifying the wall angles of the trench or excavation.

Continued on next page.



## Excavation guidelines

N° \_\_\_\_\_ of \_\_\_\_\_

This directive is provided as an example by the Commission de la santé et de la sécurité du travail (CSST). It contains the main instructions that the employer should give to the person responsible for the work on the site and to the operator of the earth-moving machine.

Company name	
Project name	Project no.
Address of the site	Construction start date

**Field survey**

Chaining or axes : from \_\_\_\_\_ to \_\_\_\_\_ Attached plan ☐ Plan no. : \_\_\_\_\_

**Working method to use**

While making sure the excavation walls do not pose the risk of landslide

☐ dig and shore according to the plans and specifications of the engineer ;  
☐ dig and shore using a trench box ;  
☐ dig without shoring as long as one of the following conditions is respected :
 

☐ rock is sound ;  
☐ no worker goes down in the trench or excavation ;  
☐ the walls are dug according to the engineer's advice.

**Dimensions of excavation (Dig according to the following profile.)**


	Minimum	Maximum
H Depth		
Wb Width at bottom		
Width at top		

**Safety measures**

Deposit the materials at a distance of at least 1.2 metre (4 feet) from top of walls.  
Do not allowed any vehicle to come closer than 3 metres (10 feet) from top of walls.

☐ Respect the engineer's plan concerning work in the proximity of an existing facility.  
☐ Follow the location plan to locate the underground infrastructures.  
☐ Install signaling devices prescribed in the traffic plan (barriers, visual references, etc.).  
☐ Assign a flag person or more to control the flow of traffic.  
☐ Respect the procedure prescribes for work near power lines.  
☐ Provide protection devices for the workers, such as concrete crash barriers.

Name	Occupation	
Signature	Date	Telephone no.

Directive submitted

☐ to the responsible of the work on the site      ☐ to the operator of the earth-moving machine

DOCUMENT 2001-001

### **1.35 Lifting loads with crane or boom truck**

1. Unless specified otherwise, the Contractor must prepare a hoisting plan and submit it to the Departmental representative for all lifting operations done with a crane or a boom truck at least 5 days before these lifting operations begin. The hoisting plan must contain at a minimum the information listed at the end of this article.
2. The hoisting plan must be signed and sealed by an engineer for the following lifting operations:
  1. lifting of concrete panels;
  2. lifting mechanical/electrical equipment on a roof or on the floor of a building;
  3. lifting of loads encroaching on the public road;
  4. lifting large dimension or very heavy loads;
  5. all other lifting operation, in accordance with the requirements of the Departmental representative.
3. In addition to the above requirements, the Contractor must plan the hoisting operations in a way as to avoid that the loads pass over the occupied zones on the site. When there is no alternative, the hoisting plan must absolutely be signed and sealed by an engineer and must guarantee the security of the occupants in that zone; the plan must also be approved by the Departmental representative. The Departmental representative can, if he deems necessary, require that the work be done at night or on weekends.
4. Upon the beginning of the work on the construction site, the Contractor must submit the list of the hoisting plans anticipated for the whole project to the Departmental representative. That list shall be updated as needed if changes occur during the work.
5. In addition to the mechanical service inspection certificate, the annual inspection certificate and the crane logbook must be aboard all cranes and boom truck cabs.
6. The entire lifting area shall be marked off to prevent the entry of non-authorized persons.
7. The Contractor shall carefully inspect all of the slings and lifting accessories and make sure that those in poor condition are destroyed and scrapped.
8. Compressed-gas cylinders shall be lifted with a basket specially designed for this purpose.
9. MINIMUM CONTENT OF HOISTING PLAN
  1. Sketch indicating at a minimum, the location of the crane, the surrounding facilities, the zone covered by the hoisting operations, the pedestrian's pathways and vehicular routes, the security perimeter, etc.
  2. Weight of loads
  3. Dimension of loads
  4. List of hoisting devices and weight of each
  5. Total weight lifted

6. Maximum height of obstacles to clear
7. Height of loads lifting relative to the surface of the roof (in the case of loads to be placed on roofs)
8. Use of guide cables
9. Type of crane used
10. Crane capacity
11. Boom length
12. Boom angle
13. Crane's radius of action
14. Deployment of stabilizers
15. Percentage usage of the crane's capacity
16. Verification confirmation of hoisting equipment
17. Identification of the crane operator and the person responsible for the hoisting operations with date and signatures

#### **1.36 Hot work**

1. Hot work means any work where a flame is used or a source of ignition may be produced, i.e., riveting, welding, cutting, grinding, burning, heating, etc.
  1. Before the beginning of each shift of work and for each sector, the Contractor must obtain a "Hot Work Permit" emitted by the person responsible for the site.
  2. Submit a copy of the hot work permit to the site's custodian department
  3. A working portable fire extinguisher suitable to the fire risk shall be available and easily accessible within a 5 m radius from any flame, spark source or intense heat.
  4. The Contractor must appoint an individual to do continuous monitoring of the fire risks for a period of one (1) hour after the end of the shift of hot work. This individual shall sign the section for this purpose on the permit and give it to the person in charge of the construction site after the one-hour period.
  5. When the hot work is done in areas where there is combustible materials or where the walls, ceilings or floors are made of or covered with combustible materials, a final inspection of the work area must be scheduled four (4) hours after the work has finished. Unless specified otherwise by the Departmental representative, the Contractor must assign a person to carry out this monitoring.
  6. A meeting must be held with the ministry representative and the site representative to determine who will provide monitoring.

### **Welding and cutting**

1. In addition to the requirements prescribed in the preceding paragraphs, the Contractor must respect the following requirements:
  1. Welding and cutting work must be carried out in accordance with the requirements of the *Code de Sécurité pour les travaux de construction, S-2.1, r.4* (Safety code for the construction industry) and CSA standard W117.2, Safety in Cutting, Welding and Allied Processes.
  2. Air extraction system with filters must be used for all welding and cutting work performed inside.
  3. Stop all activities producing flammable or combustible gas, vapours or dust in the vicinity of the welding or cutting work.
  4. Store all compressed gas cylinder on a fireproof fabric and make sure that the room is well ventilated.
  5. Store all oxygen cylinders more than 6 metres from a flammable gas cylinder (ex: acetylene) or a combustible such as oil or grease, unless the oxygen cylinder is separated from it by a wall made of non-combustible material as mentioned in the article 3.13.4 of the *Code de sécurité pour les travaux de construction, S-2, r. 6* (Safety code for the construction industry)
  6. Store the cylinders far from all heat sources.
  7. Not to store the cylinders close to the staircases, exits, corridors and elevators.
  8. Do not put acetylene in contact with metals such as silver, mercury, copper and alloys of brass having more than 65% copper, to avoid the risk of an explosive reaction.
  9. Check that welding equipment with electric arc has the necessary tension and are grounded.
  10. Ensure that the conducting wires of the electric welding equipment are not damaged.
  11. Place the welding equipment on a flat ground away from the bad weather.
  12. Install fireproof canvas when the welding work is done in a superposition and where there is the risk of falling sparks.
  13. Move away or protect the combustible materials which are closer than 15 metres from the welding work.
  14. Prohibition to weld or cut any closed container.
  15. Do not perform any cutting, welding or work with a naked flame on a container, a tank, a pipe or other container containing a flammable or explosive substance unless:
    - a. they have been cleaned and air samples indicating that work can be done without danger has been taken; and
    - b. provisions to ensure the safety of the workers have been made.

## **1.37 Roofing work**

### **Protection against fall from heights**

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.

### **Protection against burns**

1. Individuals assigned to the boilers shall wear long sleeves, safety glasses and a face shield when filling the boilers.
2. Individuals working with asphalt or other hot liquids shall wear gloves, long sleeves and safety glasses.



### **Protection against fire**

1. The storage and use of propane cylinders shall comply with the standard CAN/CSA-B149.2, *Propane Storage and Handling Code*. The cylinders shall be stored outdoors, in a safe place, away from any unauthorized handling, in a storage cabinet specially designed for this purpose. The cylinders shall be securely kept upright and locked at all times in a place where no vehicles are allowed unless the cylinders are protected by barriers or similar protection.
2. The number of propane cylinders on the roof shall not exceed the number of cylinders necessary for a day's work, and cylinders shall at all times be secured upright or held in a cart designed for this purpose.
3. All hot work (burning, heating, riveting, welding, cutting, grinding, etc.) must be done in accordance with paragraph "Hot Work" 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.

## **1.38 Steel structure erection or dismantling work**

1. In addition to respecting section 3.24 du *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry), the Contractor must also respect the requirements described in the following paragraphs.

2. Contractor must submit the following documents to the Departmental representative before the beginning of steel structure erection work:
  1. erecting procedures in accordance with article 3.24.10 du *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry);
  2. rescue procedures for the release of a worker suspended in a safety harness within a maximum of 15 minutes; procedures must be adapted to the construction site and in accordance with article 3.24.4 of that same code; the procedure must be accompanied by a written confirmation that it has been tested;
  3. statement from an engineer that the anchor rods have been installed in accordance with the anchoring plan as required by the article 3.24.12 of that same code;
  4. hoisting procedures in cases where the lifting is done in one of the ways described in the article 3.24.15 of that same code;
  5. name of the individual identified as rescuer and his rescue training certificate;
  6. name of the individual identified as first-aid attendant and his first-aid training certificate.
3. The Contractor must make sure that the following documents are available for consultation on construction site at all times:
  1. Steel structure manufacturer's erection plan in accordance with the requirements of article 3.24.9 du *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry);
  2. Column anchor rods's anchoring plan in accordance with the requirements of article 3.24.11 du *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry).

### **1.39 Work near bodies of water**

1. For all work done near a body of water (such as work above water, work on a wharf, work on the edge of a watercourse, etc.), the Contractor must respect the requirement of the following paragraphs in addition to those in article 2.10.13 du *Code de sécurité pour les travaux de construction* (Safety code for the Construction Industry).
2. The Contractor must plan his work in a way to implement safety measures to prevent any worker from falling in the water. The use of these measures should be favoured over the wearing of a life jacket.
3. If no other safety measure can protect the workers, ensure that they all wear a life jacket that is able to maintain their head out of the water and keep them afloat without any effort of the arms.
4. Submit the following documents to the Departmental representative before the beginning of the work:
  - a. description of the body of water;
  - b. description of the work done next to this body of water;

- c. plan of transportation on water adapted to the work and to the characteristics of the body of water;
- d. rescue plan adapted to the work and to the characteristics of the body of water;
- e. Each of the document listed above must contain at a minimum the information required in section 11 of the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry).

If there is the possibility that all or part of the work can be done during the winter, the safety measures included in the documents required above must be adapted accordingly.

- 5. The Contractor must submit to the Departmental representative the certificate of training required in article 11.2 du *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry). for the following individuals:
  - 1. the person assigned to prepare the documents required in the preceding paragraph; and
  - 2. each person responsible for the transport or rescue operations.
- 6. If the rescue plan stipulates the use of a vessel, the Contractor must submit to Departmental representative the competency card or certificate for the individuals in the rescue team for his work, issued by Transport Canada.
- 7. The Contractor must include in his weekly inspection checklist the devices required in the articles 11.4 and 11.5 du *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry).
- 8. Ensure that a rescue vessel moored and in the water is available at each place where a worker may fall in the water. However, a vessel may serve more than one workplace on the same construction site provided the distance between any of these workplaces and the vessel is less than 30 m.
- 9. Where the construction site is a wharf, a pier, a quay or any similar structure, a ladder with at least two (2) rungs below the surface of the water shall be installed on the front of the structure every 60 m.

#### **1.40 Interior use of internal combustion engines**

- 1. In addition to respecting article 3.10.17 of the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry), the Contractor must also respect the requirements described in the following paragraphs.
- 2. The use of a gas-powered equipment inside a building is prohibited even if the building is provided with openings.
- 3. The use of other equipment powered by an internal combustion engine inside a building must be submitted to the approval of the Departmental representative.
- 4. For the use of any piece of equipment powered by an internal combustion engine inside a building, even if the building is provided with openings, the Contractor must install a

ventilation system able to maintain the concentrations of toxic gases below the regulatory values. The stale air shall be exhausted outside the building.

1. Before using equipment powered by an internal combustion engine, the Contractor must plan and write the following:
  - a. number of fans to install;
  - b. power of the fans;
  - c. location of the fans;
  - d. dimensions of the openings that will be open during the work.
5. During the operation of equipment with internal combustion engine, the Contractor must measure the concentrations of carbon monoxide and nitrogen oxides in the work area and at the breathing area of the workers; the concentration levels measured must be recorded in a register every 30 minutes that must be available for consultation.
6. If work is in an occupied building, the Contractor must also measure the concentrations of carbon monoxide and nitrogen oxides in the rooms next to the work area and the concentration levels measured must be recorded in a register every 30 minutes.
7. If the carbon monoxide or nitrogen oxides detector alarm goes off during the work, the Contractor must stop the work and take the corrective measures required before resuming the work.
8. A portable fire extinguisher must be available at all times in the work area during the use of equipment with internal combustion engines.
9. The equipment must be maintained at a safe distance from all combustible material.
10. The storage of fuel for any equipment with internal combustion engine is prohibited inside a building.

#### **1.41 Temporary heating**

1. In addition to respecting section 3.11 of the *Code de sécurité pour les travaux de construction* (S-2.1, r.4) (Safety code for the Construction Industry), the Contractor must also respect the requirements described in the following paragraphs.
2. A portable fire extinguisher must be available at all times near the heating units, no matter what type of heating is used.
3. The heating units must always be used in accordance with the manufacturer's specifications.
4. If applicable, the canvas or tarpaulins used next to the heating units must be solidly fixed so as not to be projected on the heaters, on the pipes connected to the heaters or on any other heat source.
5. The gas cylinders must be installed in a way that they are protected from vehicle and other equipment traffic.

6. For the use of heating units other than electric, the Contractor must install a carbon monoxide detector in the work area, next to the heating units and/or the workers, throughout the course of the heating period. The Contractor must immediately apply the corrective measures required to the heating units if the detector's alarm goes off.
7. The Contractor must ensure a minimum surveillance of the heating units outside the hours of work (nights and weekends). He must submit a surveillance plan to the Departmental representative before the use of the heating units.

#### **1.42 Work near overhead power lines**

1. When there is an overhead power line in the work zone and that the Contractor chooses to apply paragraph b) of article 5.2.2 of the *Code de sécurité pour les travaux de construction* (2.1, r.4) (Safety code for the Construction Industry), a copy of the agreement with the electrical power company and a copy of the work process, required in the article 5.2.2 b), must be submitted to the Departmental representative before the beginning of the work in relation to these documents.

#### **1.43 Diving operations**

1. No object.

#### **1.44 Health and safety subordination agreement**

1. No object.

### **2. PRODUCTS**

- 2.1 **No object**

### **3. EXECUTION**

- 3.1 **No object**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 - Health and safety requirements
- .3 Section 01 74 11 - Cleaning

### 1.2 References

#### .1 Definitions:

- .1 Pollution and environmental damage: Presence of chemical elements or agents, physical or biological that have a harmful effect on the health and wellbeing of people, that alter major ecological balances for humans and that constitute an attack on the species that play an important role for humans, or that degrades the environment's aesthetic, cultural or historical character.
- .2 Environmental protection: prevention/control of pollution and disturbance to the habitat and the environment during construction.

#### .2 References

##### .1 The Canadian Green Building Council (CaGBC)

- .1 LEED Canada-NC, version 1.0-2004, LEED (Leadership in Energy and Environmental Design): New Construction and Major Renovations Green Building Rating System (Reference kit) (including the 2007 addendum).
- .2 Rating System - Addendum - For new construction and major renovations, LEED Canada-NC, version 1.0- 2007 addendum.
- .3 LEED Canada-CI, version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Commercial Interiors Green Building Rating System.
- .4 LEED Canada 2009 for the design and construction-2010, LEED (Leadership in Energy and Environmental Design): Green Building Rating System
- .5 LEED Canada- Existing Buildings-Operations and Maintenance 2009, LEED Canada 2009 (Leadership in Energy and Environmental Design): Green Building Rating System: Operations and Maintenance

##### .2 U.S. Environmental Protection Agency (EPA) / Office of Water

- .1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
- .2 General construction permit (GCP) from EPA 2012.

### 1.3 Documents/samples to be submitted for approval/information

- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents/Samples to be submitted*.

.2 Data Sheets:

- .1 Submit the required data sheets, manufacturer's instructions and documentation relating to the products used when the work is executed. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing.
- .2 Submit two (2) data sheet samples required for WHIMS, in accordance with section 01 35 29.06 - *Health and safety requirements*.
- .3 Submit an environmental protection plan to the Departmental Representative for examination and approval before construction activities begin or before the materials are delivered to the construction site.
- .4 The plan must present a comprehensive overview of known or potential environmental problems to be solved during construction.
- .5 The actions included in the environmental protection plan must be presented according to a level of detail relative to the environmental problems and the construction work to be executed.
- .6 The environmental protection plan must include the following:
  - .1 The name of the persons responsible for compliance with the plan.
  - .2 The name and skills of the persons responsible for the hazardous waste outlet manifests to be removed from the site.
  - .3 The name and skills of the persons responsible for training the staff on the construction site.
  - .4 A description of the training program for the assigned environmental protection personnel.
  - .5 The drawings that outline the location of temporary excavations or site tracks constructed as embankments, watercourse crossings, materials, constructions, sanitary installations, deposits of surplus materials or contaminated materials; The drawings illustrate the methods that will be used to control the runoff and confine the materials on the site.
  - .6 The spill contingency plan must include the procedures to be followed, the instructions to be followed and the reports to be produced in the event of an unpredictable spill of new or used regulated substances or hydraulic oil.
  - .7 A non-hazardous solid waste disposal plan, including methods and locations for the disposal of solid waste and debris from clearing.
  - .8 An air pollution prevention plan with measures specified to contain dust, debris, materials and waste within the site.
  - .9 A contamination prevention plan that specifies which potentially hazardous substances will be used on the site, measures to prevent these substances from being suspended in the air or introduced into the soil, besides the details of the measurements that will be taken to ensure that the storage and handling of these substances is compliant with federal, provincial and municipal laws and regulations.

1.4 **Fire**

- .1 Fires and burning waste on the construction site are prohibited.

1.5 **Drainage**

- .1 Develop and submit a plan for measures against erosion and transporting sediment, indicating the means to be implemented, including work monitoring and reporting, to verify compliance with the Federal, provincial and municipal laws and regulations, and EPA 832 / R-92-005 document, Chapter 3.
- .2 A stormwater pollution prevention plan can replace the erosion and transporting sediment plan.
- .3 Provide temporary drainage and pumping to keep the excavations and site dry.
- .4 Ensure that the water pumped to a waterway, sewer system, an evacuation or drainage system does not contain suspended solids.
- .5 Ensure the evacuation or disposal of water containing suspended solids or harmful substances is done in accordance with the requirements of local authorities.

1.6 **Work carried out near waterways**

- .1 The waterways must remain free of excavated material, waste and debris.
- .2 Extract materials from the beds of waterways only after obtaining the written approval from the Departmental Representative
- .3 It's strictly prohibited to store or transfer petroleum products within 10 meters of a waterway.
- .4 It's strictly prohibited to extract any materials from waterways, including pumping.

1.7 **Pollution prevention**

- .1 Maintain temporary facilities to prevent erosion and pollution, implemented under the terms of the present contract.
- .2 Ensure control of emissions from equipment and tools in accordance with the requirements from local authorities.
- .3 Prevent the blasting materials and other foreign matter from contaminating the air and the waterways beyond the area of application.
  - .1 Provide temporary shelter according to the directions from the Departmental Representative.
- .4 Spray dry materials with water and cover waste to prevent the wind from displacing dust or debris. Remove dust on the temporary roads.



1.8 **Notice of non-compliance**

- .1 A written notice of non-compliance will be issued to the Contractor by the Departmental Representative in the case of non-compliance with any federal, provincial or municipal laws, regulations or licenses, or any other element of the environmental protection plan provided by the Contractor.
- .2 Upon receipt of a notice of non-compliance, the Contractor shall propose remedial measures to the Departmental Representative and implement the measures with the approval of the Departmental Representative.
  - .1 The Contractor must wait for the approval in writing from the Departmental Representative prior to implementing the proposed measures.
- .3 The Departmental Representative will issue a stop work order until the satisfactory corrective measures are taken.
- .4 No further delays or adjustments will be granted for stop work orders.

**2. PRODUCTS**

2.1 **Material**

- .1 Keep the machinery in operation only when it's being used, except when extreme temperatures prevent its shutdown.

**3. EXECUTION**

3.1 **Cleaning**

- .1 Cleaning during work: Perform cleaning activities in accordance with section 01 74 11 - *Cleaning*.
  - .1 Ensure the locations are clean at the end of each working day.
- .2 Ensure that public waterways and storm sewers remain free from disposed waste and volatile materials.
- .3 Remove the recycling bins and containers from the site and dispose of materials at the appropriate facilities.

**END OF SECTION**

1. GENERAL INFORMATION

1.1 Related sections

.1 No object.

1.2 Codes, standards and other reference documents

.1 Work must be carried out in accordance with the requirements of the National Building Code (NBC), including all amendments published up to the final date for receipt of submissions and other relevant provincial or local codes; In case of a discrepancy between the requirements from the various documents, the strictest will prevail.

.2 The work must satisfy or exceed the requirements of the following documents:

.1 Contractual documents.

.2 The standards, codes and other prescribed reference materials.

.1 Notwithstanding the revision dates indicated, the most recent versions of the standards and references described shall prevail.

1.3 Discovery of hazardous materials

.1 Asbestos: The demolition of works made or covered with materials containing asbestos applied by projection or troweling present hazards to health. If materials of this nature are discovered during demolition work, immediately discontinue the demolition work and notify the Departmental Representative.

.2 PCB (polychlorinated biphenyl): If polychlorinated biphenyl is discovered during demolition work, immediately discontinue the demolition work and notify the Departmental Representative.

.3 Mould: If mould is discovered during demolition work, immediately discontinue the demolition work and notify the Departmental Representative.

1.4 Non-smoking environment

.1 Smoking restrictions and bylaws must be respected.

1.5 National parks act

.1 Carry out work in accordance with the National parks act when work is carried out within the boundaries of a national park.

2. PRODUCTS

2.1 No object.

3. EXECUTION

3.1 No object.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 No object.

### 1.2 References

- .1 No object.

### 1.3 Inspection

- .1 The Departmental Representative must have access to the works. If part of the work is performed outside the site, access to the site must also be assured throughout the duration of the work.
- .2 Make a request within a reasonable time period if the work must be subject to inspections, approvals or special tests ordered by the Departmental Representative or required under local regulations for the site.
- .3 If the Contractor has covered or has covered a work before it is subjected to the required inspections, approvals or special tests, the Contractor shall uncover the work in question, perform inspections or tests to the satisfaction of competent authorities, and then return the work to its original condition.
- .4 The Departmental Representative can order the inspection of any part of the work where compliance with the contractual documents is in doubt. If after examination the work in question is declared non-compliant with the requirements of the contractual documents, the Contractor must take necessary measures to make the work compliant with the specified requirements and assume the costs for the inspection and repair. If after examination of the work in question is declared compliant with the requirements of the contractual documents, the Departmental Representative will assume the costs for the inspection and restoration.
- .5 All workshop drawings must be signed and sealed by an engineer that actively belongs to the OIQ.

### 1.4 Independent test and inspection organizations

- .1 The Departmental Representative will retain the services of independent testing and inspection agencies, if required. The cost of these services will be assumed by the Departmental Representative.
- .2 Provide the materials required by the organizations indicated for the tests and the inspections to be carried out.
- .3 The use of test and inspection organizations shall in no way relieve the Contractor of their responsibility for the performance of the work in accordance with the requirements of the contractual documents.

- .4 If defects are identified during the testing and / or inspections, the designated organization will require further inspection and / or testing to accurately define the nature and extent of these defects. The Contractor must correct the defects and the imperfections according to directions from the Departmental Representative, without additional expenses to the Departmental Representative and assume the cost of the tests and the inspections that must be performed after these corrections.

#### 1.5 Access to the construction site

- .1 Allow the test and inspection organizations to have access to the site and to the manufacturing and processing workshops located outside the site.
- .2 Collaborate with these organizations and take all reasonable measures so they have the required means for access.

#### 1.6 Procedure

- .1 Advise the appropriate agency, the Departmental Representative when testing is required so all parties can be present.
- .2 Submit the samples and/or materials required for testing according to the specifications, within a reasonable delay and in a predetermined order to ensure the work is executed without delays.
- .3 Provide the labour and facilities required for the collection and handling of samples and material on-site. Also provide the space required for sample storage and treatment.

#### 1.7 Rejected work or activities

- .1 Remove the defective elements considered to be non-compliant with the contractual documents and rejected by the Departmental Representative, either because they were not carried out according to the codes of practice, or because they were carried out with defective materials or products, even if they were already integrated into the works. Replace or remake the elements in question according to requirements of the contractual documents. No extensions will be granted for delays or claims.
- .2 Immediately repair the work of other contractors that has been damaged during the aforementioned repairs or replacements if required.
- .3 If, in the opinion of the Departmental Representative, it's not appropriate to repair the defective work or those deemed not to be compliant with the contractual documents, the Departmental Representative will deduct the difference in value between the work executed and the prescribed work in the contractual documents, the amount of this difference is determined by the Departmental Representative.

#### 1.8 Reports

- .1 Provide one (1) example and one (1) electronic copy (via email) of the test and inspection reports to the Departmental Representative.
- .2 Provide copies of these reports of the equipment being inspected or tested to the subcontractors responsible for the work inspected or tested by the manufacturer or processor.

1.9 Factory testing

- .1 Submit the factory test certificates that are stated in the various sections of the specification.

1.10 Material, devices and systems

- .1 Submit the adjustment and balance reports for the mechanical and electrical systems.

2. PRODUCTS

- 2.1 No object.

3. EXECUTION

- 3.1 No object.

END OF SECTION

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 74 11 - Cleaning

### 1.1 References

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel
- .2 Canadian Standards Association (CSA International)
  - .1 CSA - A23.1/A23.2 - 04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121-RM1978 (R2003), Douglas fir plywood.
  - .3 CAN/CSA-S269.2 M1987 (R2003), Scaffolding.
  - .4 CAN/CSA - Z321 - 96 (R2001), Signs and Symbols for the Workplace.
- .3 U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

### 1.2 Documents/samples to be submitted for approval/information

- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted.*

### 1.3 Access and exits

- .1 Perform the design, construction and maintenance of temporary workplace access points and exits, including stairs, ramps, ladders, scaffolding, all independent of finished surfaces and in compliance with municipal and provincial regulations.

### 1.4 Installation plan and material removal

- .1 Prepare a site plan briefly indicating the proposed site and dimensions of the area to be enclosed and used by the Contractor, the number of site trailers required, the access roads to the enclosed area and details for the enclosure installation.
  - .1 To present the plan to the Departmental Representative during the start-up meeting for approval, before construction work begins.
- .2 Indicate the areas to be covered with gravel to prevent mud deposits.
- .3 Indicate any additional zone or transit zone.

- .4 Provide, set up or arrange the required site facilities to allow the work to be completed as soon as possible.

- .5 Dismantle and dispose of the material from the construction site when no longer required.

#### 1.5 **Scaffolding**

- .1 Scaffolding: Compliant with the CAN/CSA-S269.2 standard.
- .2 Provide and maintain the scaffolding, access ramps, ladders, swing scaffolding, platforms, temporary staircases required for work performance, in accordance with municipal, provincial and other regulations.

#### 1.6 **Lifting Equipment**

- .1 Provide and install the hoists and cranes required for moving workers, materials and equipment in addition to the maintenance and operation.
- .2 Winches and cranes must be operated by skilled workers.

#### 1.7 **On-site storage/Acceptable loads**

- .1 Ensure that work is carried out within the limits outlined in the contractual documents. Ensure that the premises is not cluttered with materials in an unreasonable manner.
- .2 Do not overload or allow any part of the structure to be overloaded as not to compromise its integrity.

#### 1.8 **Parking on the site**

- .1 Parking is permitted on the construction site, provided that this does not impede the work performance or impair the safe access of vehicles and pedestrians.
- .2 Develop suitable access routes to the site and ensure they are maintained.
- .3 Clean the cycling and pedestrians trails, in addition to the traffic lanes if site equipment is used in those areas.

#### 1.9 **Use of public utilities**

- .1 Perform all connections and fittings for the electrical, telephone, internet, aqueduct and sewer systems required to complete the work and pay the cost for their use.

#### 1.10 **The offices for the Departmental Representative and professionals / construction site trailer**

- .1 Provide a ventilated space, heated to a temperature of 22 degrees Celsius, equipped with lighting fixtures providing a lighting level of 750 lux of sufficient size to allow site meetings to be held and provide a table for drawings to be laid out.
- .2 Provide a clearly identified first aid kit, approved by the CNESST and place in a location that's easily accessible.

**1.11 Storage of materials, equipment and tools**

- .1 Provide weatherproof lockable sheds for the storage of materials, equipment and tools kept clean and in good working order.
  - .1 The Departmental Representative will not be held responsible for the breakage or theft of materials and tools that are not correctly stored.
- .2 Leave the materials and equipment on the site that do not require protection from the elements, but ensure that they do not obstruct the work.
  - .1 Follow the regulations in section 3.3 of the National Fire Code of Canada (NFC) relative to outdoor material storage.

**1.12 Cleaning**

- .1 Perform cleaning activities in accordance with section 01 74 11 - *Cleaning*.
- .2 Remove debris, waste and packaging materials from the construction site on a daily basis.
- .3 Remove the dust and mud from coated roadways.
- .4 Store the materials / equipment recovered during demolition work.
- .5 Do not store new or reconditioned equipment/materials in the construction site facilities.

**1.13 Sanitary facilities**

- .1 Provide sanitary facilities for workers compliant with the relevant rules and regulations.
- .2 Display the requisite notices and take all precautions required by the local health authorities. Keep the premises and site clean.
- .3 Existing sanitary facilities can be used with approval from the Departmental Representative.

**1.14 Construction site signalling**

- .1 Provide a construction site sign and install it at the location designated by the Departmental Representative within two (2) weeks after the contract is signed,
- .2 The panel must measure 1200 mm X 2400 mm, be made of plywood with a wooden frame and bear an inscription made by a lettering artist.
- .3 The name of the building Owner must be indicated on the panel; The stylized lettering to be used will be determined by the Departmental Representative compliant to the directions.
- .4 No other signs or posters will be installed on the construction site apart from the warning signs.
- .5 Provide a site sign consisting of a foundation, framework and a 1200 mm x 2400 mm element for the support surface.
  - .1 Foundation: Made from 15 MPa concrete, according to the CSA-A23.1 standard, at least 200 mm X 900 mm thick.



- .2 Frame elements and furring strips: EPS, 89 mm X 89 mm, pressure treated.
- .3 Surface support: Douglas fir plywood, covered, of average density, compliant with the SCA O121 standard.
- .4 Paint: Alkyd resin printing paint, exterior, compliant with the CAN/CGSB 1.189 standard; Exterior Alkyd Primer for Wood, compliant with the CAN/CGSB-1.59 standard.
- .5 Fastenings: Galvanized hot-dip steel nails and mechanical bolts.
- .6 Vinyl coating: Vinyl film, self-adhesive, bearing the identification of the site.
- .6 Install the site panel in the location indicated by the Departmental Representative and assemble as outlined below.
  - .1 Make the concrete foundation, mount the frame and fasten the plywood panel to the frame.
  - .2 Cover all surfaces of the panel and framework in a coat of printing paint and two layers of primer. Use white paint on the front panel and black paint on the other surfaces.
  - .3 Apply the vinyl coating to the painted front panel according to the installation instructions provided.
- .7 The inscriptions on the instruction signs and safety notices must be written in both official languages. The graphic symbols must be compliant with the CAN/CSA-Z321 standard.
- .8 Keep the approved signs and notices in good condition for the entire duration of the work and remove them once the work is complete, or before if requested by the Departmental Representative.

#### 1.15 Protection and maintenance of traffic

- .1 Provide access roads and temporary bypasses to maintain traffic as required.
- .2 Maintain and protect traffic on the roads affected during the construction work, unless otherwise specified by the Departmental Representative.
- .3 Provide measures for the protection and diversion of traffic, including supervisory and signaling services, barricade installation, the installation of lighting devices around and in front of the equipment and work area, in addition to the installation and maintenance of the appropriate warning, hazard and directional signs.
- .4 Protect the traveling public against damage to all persons and property.
- .5 The Contractor's moving equipment used for transporting materials / equipment to and from the construction site must keep traffic congestion to a minimum.
- .6 Ensure that existing lanes and permissible load limits on the lanes are adequate. The Contractor is required to repair the roads damaged as a result of construction work.
- .7 Build the access roads and tracks required for the site.

- .8 Develop worksite roads with adequate slopes and widths; avoid sharp curves, blind corners and dangerous intersections.
- .9 Provide lighting fixtures, signs, barricades and distinctive markings required for safe circulation.
- .10 Take the necessary measures to remove dust and ensure safe operations at all times.
- .11 The location, gradient, width and layout of access roads and tracks on the site are subject to approval by the Departmental Representative.
- .12 Lighting equipment must provide complete visibility across the entire width of the roads and work areas on the site during evening and night shifts.
- .13 Plan for snow removal during the construction work.
- .14 Dismantle the construction site roads designated by the Departmental Representative once the work is completed.

1.16 Cleaning

- .1 Remove debris, waste and packaging materials from the construction site on a daily basis.
- .2 Remove the dust and mud from coated roadways.
- .3 Store the materials / equipment recovered during demolition work.
- .4 Do not store new or reconditioned equipment/materials in the construction site facilities.

**2. PRODUCTS**

2.1 **No object**

**3. EXECUTION**

3.1 **Temporary methods for controlling erosion and sediment**

- .1 Establish temporary means to control erosion and sediment deposits, intended to prevent ground loss that may result from running rain water or wind erosion, in addition to maintaining the ground on the properties and adjacent pedestrian paths. These means must comply with the requirements of the appropriate authorities.
- .2 Inspect control methods implemented in the maintenance and repair as required until permanent vegetation has established.
- .3 Remove the control methods at the appropriate time, in addition to restoring and stabilizing the surfaces moved during the work.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 52 00 - Construction facilities

### 1.1 References

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-O121-M1978 (R2003), Douglas fir plywood.

### 1.2 Material installation and removal

- .1 Provide, set up or arrange the work for access and temporary protection to allow the work to be completed as soon as possible.
- .2 Dismantle and dispose of the material from the construction site when no longer required.

### 1.3 Enclosure

- .1 Build an enclosure around the perimeter of the construction site to protect the public and workers against injury, and public or private property from damage.
- .2 The enclosure must be 1800 mm high and be built using 2448 mm wide panels or manufactured with gauge 6 wire, welded and embossed, throughout the site's land section and the Departmental Representative must approve the enclosure prior to mobilization.
- .3 Indicate the enclosure's position on the site installation plan as required in section 01 52 00 - *Construction facilities*.

### 1.4 Shelters, confinements and weather closures

- .1 Provide watertight closures and attach them to the door and window bays, along the top of mechanical shafts and other openings in floors and roofs.
- .2 Cover floor surfaces where the walls are not yet assembled; seal the other openings. Install confinements inside the building, where temporary heating is required.
- .3 The confinements must be able to withstand wind pressure and snow loads, which have been calculated.

### 1.5 Dust shields

- .1 Provide dust shields or isolated bulkheads to close off areas where dust-generating activities are carried out to protect workers, the public and the finished surfaces or areas of the structure.
- .2 Keep the screens and move as required until the activities are completed.

**1.6 Temporary partitions**

- .1 In accordance with Article 5.6.1.14 of the National Fire Code of Canada (NCF), install temporary partitions with a fire resistance rating of at least one (1) hour between the sectors occupied by the Departmental Representative and the occupied building sites.
  - .1 Temporary partitions must be constructed from floor to floor (or to another fire separation), consisting of a framework in uprights spaced 600 mm apart and covered on both sides with 16 mm drywall. Install ULC 45 minute approved doors frames and hardware in required locations.
- .2 Ensure that spaces adjacent to the work are not affected by construction waste, besides restricting dust and other contaminants.

**1.7 Access roads to the construction site**

- .1 Provide roads, ramps and pedestrian crossings necessary to access the site.

**1.8 Access roads for emergency vehicles**

- .1 Provide access to the site for emergency vehicles with sufficient height clearances.

**1.9 Protect adjacent public and private property**

- .1 Protect adjacent public and private property against any damage that may result from the execution of the work.
- .2 Assume full responsibility for damages when required.

**1.10 Protect the building's finished surfaces**

- .1 Protect the material and the structure's surfaces, complete and partial, for the entire duration of work.
- .2 Provide the screens, tarps and barriers required.
- .3 Confirm the location of each and the installation schedule with the Departmental Representative three (3) days before the protection measures are installed.
- .4 Assume all responsibility for any damage caused to the works due to lack of or inappropriate protection.

**2. PRODUCTS**

- 2.1 **No object**

**3. EXECUTION**

- 3.1 **No object**

**END OF SECTION**

## **1. GENERAL INFORMATION**

### **1.1 Related sections**

- .1 No object.

### **1.2 References**

- .1 References to relevant standards can be made in each section of the specification.
- .2 Comply with the standards indicated above, in whole or in part, according to the specifications of the specification.
- .3 In cases where there is doubt as to the compliance of certain products or systems with relevant standards, the Departmental Representative reserves the right to verify by testing.
- .4 If products or systems comply with the contractual documents, the costs for these tests will be assumed by the Departmental Representative, otherwise they will must be assumed by the Contractor.

### **1.3 Quality**

- .1 The products, materials, equipment, devices and parts used to complete the work must be new, in perfect condition and the best quality for the purposes in which they are intended. Provide proof of the nature, origin and quality of the products supplied if required.
- .2 The purchase policy is based on acquiring, at a minimal cost, articles containing the greatest percentage of recycled and recovered materials, while maintaining satisfactory levels of competitiveness. Make reasonable efforts to use recycled materials / equipment for both the construction and work execution.
- .3 The products found to be defective before the work is complete will be refused, regardless of the conclusions from the previous inspections. Inspections are not intended to relieve the Contractor of their responsibilities, but simply to reduce the risk of omission or error. The Contractor will ensure the removal and replacement of defective products at their expense, and will be responsible for delays and costs in consequence.
- .4 In the event of a dispute as to product quality or suitability, only the Departmental Representative has the authority to make the decision based on the requirements of the contractual documents.
- .5 Promote consistency by using materials and elements of the same type from the same manufacturer, unless otherwise stated in the quotation.
- .6 Labels, trademarks and permanent nameplates that are apparent on the products used are not acceptable unless they provide operation instructions, a fire resistance rating, or if they are placed on the equipment installed in mechanical or electrical installations.

### **1.4 Ease of product procurement**

- .1 Take note of the requirements relating to product delivery and plan for any possible delays immediately after the contract is signed. If product delivery delays are foreseeable, notify the Departmental Representative so measures can be taken to substitute replacement products, or make the necessary corrections sufficiently in advance so the work is not delayed.

- .2 If the Departmental Representative has not been notified of anticipated delivery delays when work has begun and it appears likely that the work will be delayed, the Departmental Representative reserves the right to substitute products with other comparable products that can be delivered more quickly, without increase to the contract cost.

#### 1.5 **Storage, handling and protection of the products**

- .1 Handle and store products by preventing damage, alteration or soiling, in addition to following the manufacturer's instructions, if applicable.
- .2 Store bundled or batch products in their original packaging; Ensure the packaging, label and manufacturer's seal is left intact. Do not unpack or untie the products until they are required for the work.
- .3 Products that may be damaged by weathering must be stored under a tamper-proof enclosure.
- .4 Place lumber and sheet materials on rigid, flat supports as not to rest directly on the floor. Ensure there's a slight slope to facilitate the flow of condensate.
- .5 Store and mix the paint products in a heated and well ventilated room. Remove oily rags and other flammable waste from the work sites on a daily basis. Take all necessary precautions to prevent risks of spontaneous combustion.
- .6 Replace damaged products at no additional cost, to the satisfaction of the Departmental Representative.
- .7 Retouch the factory-finished surfaces that were damaged to the satisfaction of the Departmental Representative of the Ministry. Use products identical to those used for the original finish for the final retouches. It's strictly prohibited to apply finishing or retouching products to the identification plates.

#### 1.6 **Transportation**

- .1 Pay the transportation costs of the products required to complete the work.
- .2 The transportation charges of the products provided by the Project Owner will be assumed by the Departmental Representative. Ensure the unloading, handling and storage of the products.

#### 1.7 **Manufacturer's Instructions**

- .1 Install or set up the products according to the manufacturer's instructions unless stated otherwise in the specification. Do not rely on the labels or containers supplied with the products. Obtain a copy of his written instructions directly from the manufacturer.
- .2 Inform the Departmental Representative in writing of any discrepancy between the requirements in the specification and the manufacturer's instructions, so they can take the appropriate measures.
- .3 If the manufacturer's instructions are not respected, the Departmental Representative, may require removal and installation of products that have been set up or installed incorrectly, without increase to the contract price or completion time.

**1.8 Quality of work**

- .1 Implementation must be of the highest possible quality and the work must be performed by skilled workers, qualified in their respective domains. Inform the Departmental Representative if the work to be carried will probably not achieve the anticipated results.
- .2 Do not hire individuals who are unskilled or do not have the required skills to perform the work entrusted to them. The Departmental Representative reserves the right to restrict access to the construction site to anyone found to be incompetent or negligent.
- .3 Only the Departmental Representative can resolve disputes over the quality of work and the workforce's skills and their decision is irrevocable.

**1.9 Coordination**

- .1 Ensure that the workers cooperate to complete the work. Conduct close and constant monitoring of their work.
- .2 The Contractor is responsible for coordinating the work and installing the crossings, sleeves and accessories.

**1.10 Elements to conceal**

- .1 Unless otherwise specified, conceal the ducts, conduits and electrical cables in the floors, walls and ceilings of the rooms and finished areas.
- .2 Before concealing elements, inform the Departmental Representative of any abnormal situations. Install according to the directions from the Departmental Representative.

**1.11 Reconditioning**

- .1 Execute the reconditioning required to repair or replace parts, or components found to be defective or unacceptable in the work. Coordinate the work to be performed on the adjacent structures affected as required.
- .2 Reconditioning must be performed by specialists familiar with the materials and equipment used; This work must be carried out in such a way that no part of the work is damaged or is likely to be damaged.

**1.12 Location of the equipment**

- .1 The locations outlined for the equipment, outlets and other electrical or mechanical materials must be considered as approximate.
- .2 Inform the Departmental Representative of any problem that could arise with the equipment's location and proceed with the installation as instructed.

**1.13 Mountings - General information**

- .1 Unless otherwise specified, provide accessories and metal mountings with the same texture, color and finish as the element to be secured.
- .2 Avoid electrolytic effects between metals or dissimilar materials.
- .3 Use galvanized hot-dip corrosion-resistant fasteners and anchorages for securing exterior structures, unless outlined in the relevant section of the specification to use mounting pieces in stainless steel or another material.

- .4 It's important to determine the spacing for the anchorages by taking into account the load limit and shear strength to ensure they are permanently attached. Dowel pins or any other organic matter are not accepted.
- .5 Minimize the use of exposed mountings; ensure they are evenly spaced and carefully placed.
- .6 Fasteners that could cause chipping or cracking in the element to which they are attached will be rejected.

#### 1.14 **Mountings - Materials**

- .1 The mounting pieces must be standard commercial shapes and sizes, made from the appropriate material and with a suitable finish for the intended use.
- .2 Unless otherwise specified, use heavy-duty, semi-fine quality, hexagonal-shaped mounting pieces. Use grade 304 stainless steel parts for external installations.
- .3 The bolt stem must not protrude from the bolt any longer than the bolt's diameter.
- .4 Use flat washers on machines and equipment and sheet metal lock washers with flexible gaskets in places where there are vibrations. Use resilient flat washers to secure devices and materials on stainless steel elements.

#### 1.15 **Protection of works in progress**

- .1 Do not overload any part of the building. Unless otherwise specified, obtain written authorization from the Departmental Representative before cutting or drilling a framework element or placing a sleeve.

#### 1.16 **Existing utility networks**

- .1 When connections with existing networks must be made, execute them at the times assigned by the local authorities, with the least possible interference to the work's progress, in addition to the circulation of pedestrians and vehicles.
- .2 Protect, move or maintain operational service lines. If pipes are discovered during construction, close them as approved by the responsible authorities, identify and record the closed-off points.

## 2. **PRODUCTS**

- 2.1 **No object**

## 3. **EXECUTION**

- 3.1 **No object**

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 74 21 - Construction and demolition waste management and disposal

### 1.2 Cleanliness of the building site

- .1 Keep the work site clean and free of debris and waste material.
  - .1 Ensure that each subcontractor is responsible for the cleanliness of the sites after the work is complete.
  - .2 Ensure that the premises adjacent to the work areas remain clean and free of debris, waste, dust or contaminants of any kind for the entire construction period.
- .2 Remove debris and waste materials from the site on a daily basis during the predetermined hours, or remove according to direction from the Departmental Representative. Waste materials must not be burned on the building site unless this removal method is authorized by the Departmental Representative.
- .3 Make the necessary arrangements and obtain permits from the authorities for the removal of debris and scrap materials.
- .4 Provide containers on-site for the disposal of debris and waste materials.
- .5 Provide and use separate identified containers for recycling. Refer to section 01 74 21 - Construction and demolition waste management and disposal
- .6 Remove debris and waste materials in the designated landfill areas located off-site.
- .7 Clean interior surfaces prior to finishing the work and keep these areas free of dust and other impurities while working.
- .8 Store volatile waste in closed metal containers and dispose of them off-site at the end of each work shift.
- .9 Ensure the premises is properly ventilated when handling volatile or toxic substances. However, it's strictly prohibited to use the building ventilation system for this purpose.
- .10 Only use cleaning products recommended by the manufacturer for the surfaces to clean and use them according to the manufacturer's recommendations for each surface type.
- .11 Establish the cleaning schedule so that dust, debris and other contaminated dirt does not land on freshly painted wet surfaces and does not contaminate building's systems.
- .12 Remove snow and ice from the building's access roads.

### 1.3 Final clean-up

- .1 When most of the work is done, remove surplus materials, tools, in addition to construction equipment and materials that are no longer required to perform the rest of the work.

- .2 Remove debris and waste materials, except what is generated by other contractors and leave the premises clean and ready to occupy.
- .3 Remove surplus materials, tools, equipment and construction materials before the final inspection.
- .4 Remove debris and waste materials, including what is generated by the Departmental Representative or by other contractors.
- .5 Remove debris and waste materials from the site during the predetermined hours, or remove according to directions from the Departmental Representative. The waste materials must not be burned on the construction site.
- .6 Make the necessary arrangements and obtain permits from the authorities for the removal of debris and scrap materials.
- .7 Clean and polish glass, mirrors, hardware parts, wall tiles, chrome and enameled surfaces, laminate surfaces, stainless steel or porcelain-enamel elements, in addition to the mechanical and electrical equipment. Replace all glass that is broken, scratched or damaged.
- .8 Remove dust, stains, marks and scratches from decorative structures, mechanical and electrical appliances, furniture components, walls and floors, in addition to various equipment and accessories.
- .9 Clean the reflectors, diffusers and other lighting surfaces.
- .10 Dust the inside surfaces of the building and vacuum, besides cleaning behind the grille, louveres, registers and mosquito screens.
- .11 Wax, soap, seal or treat the flooring according to manufacturer's directions.
- .12 Examine the finishes, accessories and materials to ensure they meet the prescribed operating and quality requirements.
- .13 Sweep and clean sidewalks, steps and other exterior surfaces; sweep or rake the remaining land.
- .14 Remove dirt and other debris from exterior surfaces.
- .15 Clean and sweep the roofs.
- .16 Sweep and clean coated surfaces.
- .17 Thoroughly clean materials and equipment and clean or replace the systems' mechanical filters.
- .18 Clean the roofs, drains and discharges.
- .19 Clear debris or surplus materials from crawl spaces and other accessible concealed spaces.
- .20 Remove snow and ice from the building's access roads.
- .21 Remove granular material from site to enable circulation around the building.

.22 Restore the land and existing outdoor facilities as they were before the work began.

## **2. PRODUCTS**

2.1 **No object**

## **3. EXECUTION**

3.1 **No object**

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 74 11 - Cleaning

### 1.2 Waste management objectives

- .1 Before work begins, meet with the Departmental Representative to review the Representative of the Ministry for waste management's objectives and the waste reduction plan proposed by the Contractor relative to the construction, renovation and demolition (CRD) generated by the project.
- .2 Minimize the amount of non-hazardous solid waste generated by the work; Maximize the reduction at source, reuse/repurpose and recycle the solid waste produced by CRD activities.
- .3 Protect the environment and prevent the damage relative to environmental pollution.

### 1.3 References

#### .1 Definitions

- .1 Installation of approved/authorized recycling: A recycling system approved by the applicable provincial authority, or other material recycling system approved by the Departmental Representative.
- .2 Class III non-hazardous materials: Waste from construction, renovation and demolition.
- .3 Waste from construction, renovation and/or demolition (CRD): Class III non-hazardous materials generated construction, restoration and/or demolition activities.
- .4 Discharge - inert waste: Bituminous and concrete materials only.
- .5 Separation of Waste at Source Program (SWSP): Implement and coordinate activities on a continuous basis to ensure that the designated waste is sorted into predefined categories and sent for recycling and reuse/repurposing, which will maximize recovery and reduce disposal costs.
- .6 Recyclability: Products or materials that can be recovered at the end of their life cycle and transformed into a new product for reuse or repurposing.
- .7 Recycling System: The process of collecting or transforming waste and worn materials to be reintroduced in a consumption cycle as new quality products.
- .8 Recycling: Operations that include the sorting, cleaning, treatment and reformation of solid waste and other matters or materials, intended to promote their use in a form different from their original state. Recycling does not include combustion, incineration or thermal methods for waste destruction.

- .9 Reuse/Repurposing: Repeated use of a product or material in its original form for a different use for reuse and similar purposes for repurposing. Reuse/repurposing includes the following.
  - .1 Recovery of products that can be reused / repurposed and materials generated by the modernization of a structure or works prior to demolition, for the resale, reuse, repurposing for the same project or storing for future use.
  - .2 Return the products and materials that can be reused/repurposed to the suppliers, e.g. pallets and unused products.
- .10 Recovery: Removal of structural and non-load bearing components and materials during deconstruction or dismantling of industrial, commercial or institutional structures for reuse / repurposing or recycling.
- .11 Sorted waste: Waste already classified by type.
- .12 Separation at the source: Separation of different types of waste products and materials when as soon as they become waste.
- .13 Waste Audit (WA) : Detailed inventory with the estimated quantities of waste that will be generated by construction, demolition, deconstruction and / or renovation activities. The WA includes the evaluation, in volume and mass, quantities of waste materials and waste that will be reused / repurposed, recycled or discharged.
- .14 Report for waste recovery: Detailed report of the final results that quantifies the cumulative weight and percentage of waste reused / repurposed, recycled and discharged throughout the work. Measure the achievement of the Waste Reduction Plan's (WRP) objectives and note the lessons learned.
- .15 Waster Management Coordinator (WMC): The Contractor's representative is responsible for supervising activities related to waste management and coordinating the requirements relative to the reports, documents and samples to be submitted.
- .16 Waste Reduction Plan (WRP): A written document that outlines the possibilities for the reduction, reuse or repurposing and recycling of waste generated by the project. Outline the goals, implementation and reporting procedures, expected results and responsibilities relative to valorization. Information on the waste reduction plan from the waste audit.

#### 1.4 Separation of Waste at Source Program (SWSP)

- .1 Prepare the SWSP before work begins as part of the waste reduction plan.
- .2 The SWSP outlines the methodology and planned activities on-site for the separation of reusable / repurposable and recyclable materials and waste to discharge.
- .3 Provide sufficient facilities and containers to collect, handle and store the expected quantities of reusable / repurposable and recyclable waste materials on-site.
- .4 Place the containers to facilitate waste material deposits without interruption to construction site activities.
- .5 Place the separated waste materials in a location where they are safe from damage.

- .6 Sale of the recovered waste material is not permitted on-site, unless authorized in writing by the Departmental Representative;
- .7 And provided that the safety regulations and safety requirements on-site are respected.

**1.5 Use of the premises and facilities**

- .1 Perform work with minimal disruption to the premise's normal use.
- .2 Keep the established installation safety measures in force. Implement the provisional safety measures approved by the Departmental Representative.

**1.6 Waste processing site**

- .1 The Contractor is responsible for finding waste recovery resources and service providers. The recovered waste materials must be transported to approved and/or authorized recycling installations, or recycling system.

**1.7 Material storage, handling and protection**

- .1 Store waste materials salvaged for reuse / repurposing or recycling at the locations identified by the Departmental Representative.
- .2 Unless otherwise specified, waste materials that must be removed become property of the Contractor.
- .3 Protect, place in piles, store and catalogue the salvageable elements.
- .4 Separate the non-salvageable elements from the salvageable elements. Transport and deliver non-salvageable items to the authorized disposal facility.
- .5 Protect the framing elements left in place and the salvaged waste materials from shifting and damage.
- .6 Support the work buildings in course of construction affected by the work. If the safety of the building is likely to be compromised, stop work and immediately notify the Departmental Representative.
- .7 Protect surface water drains from being damaged or clogged; Protect electrical and mechanical installations.
- .8 Plan for sufficient facilities and containers to collect and store the expected quantities of reusable / repurposable and recyclable waste materials on-site.
- .9 Separate and store the waste materials generated by the project in the designated areas.
- .10 Prevent the contamination of waste materials to be salvaged and recycled, in accordance with the acceptance conditions of the designated treatment facilities.
  - .1 It's recommended to separate waste materials at the source.
  - .2 Remove the waste materials randomly collected to an off-site treatment facility to be sorted.
  - .3 Obtain the waybills, receipts and / or weigh tickets for waste materials separated and removed from the premises.

- .4 Materials that are reused / repurposed on-site are considered as recovered and must be included in all reports.

#### 1.8 **Waste removal**

- .1 It is strictly prohibited to hide waste and garbage.
- .2 It is strictly prohibited to dispose of waste in a waterway, or a storm or sanitary sewer.
- .3 Recover materials from the premises as the work progresses.

#### 1.9 **Work schedule**

- .1 Coordinate waste management with the other activities to ensure the work runs smoothly.

### 2. **PRODUCTS**

#### 2.1 **No object**

### 3. **EXECUTION**

#### 3.1 **General information**

- .1 Perform work in accordance with the WRP and the SWSP.
- .2 Handle waste that is not reused / repurposed, recycled or salvaged in accordance with the applicable codes and regulations.

#### 3.2 **Clean-up**

- .1 Clean-up during work: Perform clean-up activities in accordance with section 01 74 11 - *Cleaning*.
  - .1 Ensure the locations are clean at the end of each working day.
- .2 Final clean-up: Remove the surplus equipment/materials, waste, tools and equipment in accordance with section 01 74 11 - *Cleaning*.
- .3 Waste management: Separate waste for their reuse/repurposing and recycling in accordance with section 01 74 21 - *Construction and demolition waste management and disposal*
  - .1 Remove the recycling bins and containers from the site and dispose of materials at the appropriate facilities.
  - .2 Separate waste materials to be reused/repurposed again or recycled and place them in the designated areas.

#### 3.3 **Report for waste recovery:**

- .1 Prepare a written waste recovery report that outlines the quantities of reused / repurposed, recycled or destroyed materials and the authorized sites that received the materials.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 74 11 - Cleaning

### 1.2 Process summary

- .1 The process is summarized as follows:
  - .1 Substantial completion of work:
    - .1 Compliance with the conditions preceding the substantial completion of work.
    - .2 Inspection for the substantial completion of work.
    - .3 Emission of the Certificate of Substantial Completion of Work.
  - .2 Final completion of work:
    - .1 Comply with the conditions preceding the final completion of work.
    - .2 Inspection for the final completion of work:
    - .3 Emission of the Certificate of Completion of Work.
  - .3 Inspection performed by the Departmental Representative:
    - .1 The Departmental Representative will perform a work inspection with the Contractor to identify defects and failures.
    - .2 The Contractor must perform the requested corrections.
  - .4 Completion of the tasks: Submit a document stipulated in the contract certifying that the tasks have been completed:
    - .1 The work has been completed and inspected and deemed to comply with the requirements in the contractual documents.
    - .2 The failures and the defects found during inspections were corrected.
    - .3 The work is complete and ready for the final inspection.
  - .5 Inspection for the substantial and final completion of work:
    - .1 Submit a request for the work to be inspected, which will be carried out jointly with the Departmental Representative and the Contractor, when all tasks are complete.
    - .2 If work is deemed to be incomplete by the Departmental Representative, finish the elements that are not complete and submit a new inspection request.



**1.3 Substantial completion of partial permanent work**

- .1 When the part of the permanent work is required for use and the substantial completion of part of the permanent work is a prerequisite for such use, the applicable conditions outlined in this section will apply to the part of the permanent work to be used.

**1.4 Substantial completion of work**

- .1 Conditions preceding the substantial completion of work:
  - .1 Perform the following steps before requesting an inspection from the Departmental Representative for the substantial execution:
    - .1 Obtain and provide evidence of compliance with the lawful requirements.
    - .2 Remove any surplus products, construction tools, equipment, models and similar objects not required to perform the remaining work from the site .
    - .3 Correct any deficiencies in the contract that could adversely affect the facility's operation.
    - .4 Complete the work and ensure that it meets the purpose for which it was intended.
    - .5 Revise the contractual documents and inspect the work to confirm that the prerequisites for substantial completion are met and that the work is ready for the substantial completion inspection.
    - .6 Perform substantive cleaning (general).
  - .2 Work not required to be completed before substantial completion:
    - .1 Final clean-up.
    - .2 Follow-up documents.
    - .3 Product warranties.
- .2 Inspection for the substantial completion of work:
  - .1 Present the inspection request in writing for the substantial completion of work to the Departmental Representative, who certifies that the preconditions have been met and outlines the known exceptions of items to be completed, corrected or presented in list form.
  - .2 The Ministère's Representative, within a reasonable time after receiving the Contractor's request will;
    - .1 perform the inspection for the substantial completion of work or inform the Contractor that the prerequisites have not been adequately met.
    - .2 distribute the inspection results from the Departmental Representative for the substantial completion of work, which will form the list of deficiencies for the contract's substantial completion of work (list of deficiencies ASTC).

.3 Substantial completion of work:

.1 After the inspection, the Departmental Representative:

- .1 Issue a certificate of substantial completion of work indicating the effective date of substantial completion and attach a copy of the ASTC Deficiency List; or
- .2 Inform the Contractor that the prerequisites for substantial completion are met and that the work is ready for the substantial completion inspection, if required.

.2 When the certificate of substantial completion of work is issued, the Departmental Representative will assume the responsibility for the care, custody and control of the work that has been completed, including the following responsibilities:

- .1 Maintenance.
- .2 Protection of public services.

1.5 **Final completion of work**

.1 Conditions preceding the final completion of work.

- .1 Complete all work before requesting the inspection from the Departmental Representative for final completion, including:
  - .1 Perform clean-up activities in accordance with section 01 74 11 - *Cleaning*.
  - .2 Waste management: Separate waste for recycling.
  - .3 Follow-up documents.
  - .4 Product warranties.
  - .5 Correct all deficiencies in the contract except the elements from the warranty provisions in the contractual documents.
- .2 Revise the contractual documents and inspect the work to confirm that the prerequisites for final completion are met and that the work is ready for the final completion inspection.

.2 Inspection for the final completion of work:

- .1 Present the inspection request in writing for the final completion of work to the Departmental Representative, including a copy of the most recent ASTC deficiency list from the Departmental Representative, who certifies that the deficiencies in the contract have been corrected or resolved in a manner agreed between the Departmental Representative and the Contractor. If necessary, provide the list of known exceptions on request.
- .2 The Ministère's Representative, within a reasonable delay after receiving the Contractor's request will;
  - .1 Perform the inspection for the final completion of work or inform the Contractor that the prerequisites have not been adequately filled.

.3 Final completion of work:

.1 After the inspection, the Departmental Representative:

- .1 Issue a certificate of final completion of work indicating the effective date of final completion of work; or
- .2 Inform the Contractor of the contractual deficiencies that must be corrected before the certificate of final completion of work will be issued.

**2. PRODUCTS**

2.1 **No object**

**3. EXECUTION**

3.1 **No object.**

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related requirements

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 45 00 - Quality control

### 1.2 Drawings as built

- .1 Submit one (1) copy of the plans that outlines all modifications and differences that occurred during the work relative to the contractual documents and that were caused either by the state of the premises, contingencies on-site or the changes required by professionals.

### 1.3 Documents/samples to be submitted

- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted*.
- .2 Instructions must be prepared by qualified individuals who are knowledgeable about the operation and maintenance of the described products.
- .3 The samples submitted will be returned after the final inspection of the work, accompanied by the comments from the Departmental Representative.
- .4 If required, review the contents before re-submitting the documents.
- .5 Two (2) weeks before the substantial completion of work, submit four (4) final copies of the operations and maintenance manual, in English and French, to the Departmental Representative.
- .6 The equipment and replacement materials, the specialized tools and the replacement parts provided must be new, free of defects and of the same manufacturing quality as the products used for the completion of the work.
- .7 On request, provide the documents confirming the type, provisioning source and quality of the products provided.
- .8 Defective products will be rejected, even if they have been previously inspected and must be replaced at no additional cost.
- .9 Assume the transportation costs for these products.
- .10 Submit a hard copy and an electronic version of all documents listed this section of the specification.

### 1.4 Presentation

- .1 Present the data in an instruction manual format. One (1) paper copy and one copy in PDF format.
- .2 The manual's title must indicate the project name, project date, the client, the names of the professionals involved and the contractor, in addition to their respective contact information

- .3 Assemble the data in a logical order. The contents must be clearly indicated in a **table of contents**
- .4 Use rigid vinyl binders with three D-rings, 219 mm x 279 mm refill paper with stiff back and pockets.
- .5 Assemble the data in a logical order when multiple binders are required. Clearly indicate the contents on each binder.
- .6 The document's designation, i.e. "Project file," the project's designation and the table of contents must be clearly indicated on the cover page of each binder.
- .7 Organize the contents by system, in a logical sequence of operations, according to the numbered sections of the specification and the order in which they appear in the table of contents.
- .8 Provide a tab separator for each product and each system on which the product's description and list of the main parts of equipment must be typed.
- .9 The text must consist of printed data provided by the manufacturer or typed data.
- .10 Place a reinforced and perforated strip for each of the drawings. Insert in the binder and to fold the large drawings according to the text pages' format.
- .11 Provide CAD files with a 1:1 scale, in DWG format on a CD.

#### 1.5 **Contents of each volume**

- .1 Table of contents: Indicate the project's name;
  - .1 the date the documents were filed;
  - .2 the name, the address and the telephone number of the Contractor in addition to the name of their representatives;
  - .3 A list of products and systems, indexed according to the volume content.
- .2 Indicate the following for **ALL** products or each system:
  - .1 the names, addresses and telephone numbers of the subcontractors and suppliers, in addition to local distributors of materials and spare parts.
  - .2 **The textures and colors of the products with visible surfaces.**
- .3 Data Sheets: The manual must contain **ALL** data sheets for **ALL** products used in completing the contract. Mark each sheet to clearly identify specific products and parts as well as plant data; Delete irrelevant information.
- .4 Drawings: The drawings used to complete the data sheets and to illustrate the relationship between the various elements of the hardware and systems; They include the control and principle diagrams.
- .5 Typewritten text: To complete the data sheets as required.
  - .1 Give instructions in a logical order for each intervention, incorporating the manufacturer's instructions prescribed in section 01 45 00 - *Quality control*.

**1.6 Drawings and samples to be included in the project file.**

- .1 In addition to the documents outlined in the General conditions, keep a copy or set of the following documents on-site for the Departmental Representative.
  - .1 contractual drawings;
  - .2 specification;
  - .3 addenda;
  - .4 change orders and other contractual amendments;
  - .5 revised workshop drawings, data sheets and samples;
  - .6 records of tests performed on-site;
  - .7 inspection certificates;
  - .8 certificates issued by the manufacturers.
- .2 Store project file documents and samples in the work site office separately from the documents for the execution of work.
  - .1 Provide filing cabinets and shelves besides a safe storage area.
- .3 Label documents and classify them according to the list of section numbers in the project file's table of contents.
  - .1 Clearly print the project file number on the label of each document.
- .4 Keep project file documents clean, dry and legible. Not to use them as documents for the completion of work.
- .5 The Departmental Representative must have access to the documents and the project's file samples for inspection purposes.

**1.7 Record of ground conditions**

- .1 Record the information on set of opaque black line drawings and in a copy of the project file provided by the Departmental Representative.
- .2 Record the information using felt-point markers with a different color for each important system. Record information as work progresses. Do not conceal the works before the required information has been recorded.
- .3 Contractual drawings and workshop drawings: Indicate each data set to show the works such as they are, including the following.
  - .1 The measured depth of the foundation elements relative to the level of the first finished floor.
  - .2 The location of utility pipelines and underground accessories relative to permanent surface developments measured in horizontal and vertical planes.

- .3 The location of the utility pipes and interior accessories, relative to the visible and accessible construction elements.
- .4 On-site modifications to the structures' dimensions and details.
- .5 Modifications made as a result of change orders.
- .6 The details that are not reproduced in the original contractual documents.
- .7 References to the workshop drawings and relative modifications.
- .4 Specification: Indicate each data set to show the works such as they are, including the following.
  - .1 The Manufacturer's name, trademark and catalog number of each product actually installed, including optional items and replacement parts.
  - .2 Changes subject to addendum or change orders.
- .5 Keep manufacturers' certificates, inspection certificates and on-site test records as prescribed in each technical section of the specification.

#### 1.8 **Material and systems**

- .1 For each piece of equipment and system: Provide a description of the device or system and its component parts; Indicate its function, normal operating characteristics and constraints; Provide the characteristic curves, together with the technical data and test results; Provide the complete list and the commercial numbers of the parts that can be replaced.
- .2 Provide the lists for the power circuits (switchboards), including the electrical characteristics, control circuits and telecommunications circuits.
- .3 Provide coded wiring diagrams of the hardware installed.
- .4 Methods of operation: Indicate the start-up instructions and sequences, running and normal operation; Regulation, control, shutdown, decommissioning and emergency; Summer and winter operations and any other special instructions.
- .5 Maintenance: Provide instructions for routine maintenance and troubleshooting, in addition to the instructions for disassembly, repair and reassembly, alignment, adjustment, balancing and verification of components and networks.
- .6 Provide the maintenance and lubrication schedules, besides the list of required lubricants.
- .7 Provide the manufacturer's written instructions regarding the components' operation and maintenance.
- .8 Provide descriptions for the sequence of operations prepared by the various manufacturers for the command and control devices and equipment.
- .9 Provide a list of the original manufacturer's parts, illustrations, drawings and assembly diagrams required for maintenance.

- .10 Provide the control diagrams of the installed control / regulation devices prepared by the different manufacturers.
- .11 Provide coordination drawings from the Contractor and the color-coded diagrams for the installed pipework.
- .12 Provide a list of the labeling numbers for the valves, indicating the location and function for each device and references for the control and principle diagrams.
- .13 Provide a list of spare parts from the original manufacturer with current prices and recommended quantities to keep in stock.
- .14 Provide the testing and balancing reports prescribed in section 01 45 00 - *Quality control*.
- .15 Additional requirements: According to the specifications in the specification for the various technical sections.

#### 1.9 **Finishing materials and products**

- .1 Provide the following information for each of the finishing materials and products:
  - .1 Data sheets, indicate the catalogue number;
  - .2 Dimensions;
  - .3 Composition;
  - .4 Texture colors and designations;
  - .5 Provide the information required for special products for restocking.
- .2 Also provide the instructions regarding:
  - .1 Cleaning agents and methods;
  - .2 Recommended schedule for the cleaning and maintenance;
  - .3 Precautions against harmful methods and harmful products.
- .3 Additional requirements: According to the specifications in the specification for the various technical sections.

#### 1.10 **Spare parts**

- .1 Provide spare parts according to the quantities prescribed in the various technical sections of the specification.
- .2 The spare parts provided must come from the same manufacturer and match the quality of the elements used in the work.
- .3 Deliver and store spare parts on the construction site as indicated.
- .4 Receive and list all parts and submit the inventory list to the Departmental Representative. Insert the approved list in the maintenance manual.
- .5 Keep receipts of all the parts supplied and submit before the final payment.



**1.11 Replacement materials/equipment**

- .1 Provide materials and equipment according to the quantities prescribed in the various technical sections of the specification.
- .2 The materials and equipment provided must come from the same manufacturer and match the quality of the elements used in the work.
- .3 Deliver and store the materials/equipment on the construction site as indicated.
- .4 Receive and list all materials and equipment, then submit the inventory list to the Departmental Representative. Insert the approved list in the maintenance manual.
- .5 Keep receipts of all the materials and equipment supplied and submit before the final payment.

**1.12 Special tools**

- .1 Provide special tools according to the quantities prescribed in the various technical sections of the specification.
- .2 The tools must be labelled with their function and the equipment for which they are intended.
- .3 Deliver and store the special tools on the construction site as indicated.
- .4 Receive and list all special tools and submit the inventory list to the Departmental Representative. Insert the approved list in the maintenance manual.

**1.13 Storage, handling and protection**

- .1 Store spare parts, replacement materials and special tools in a way that prevents damage or deterioration.
- .2 Store the spare parts, replacement materials and equipment, in addition to the special tools in their original packaging preserved in good condition and with the manufacturer's seal and label intact.
- .3 Products that may be damaged by weathering must be stored under a tamper-proof enclosure. Store paint and products likely to freeze in a heated and ventilated room.
- .4 Evacuate damaged or deteriorated items or products and replace them at no additional cost to the satisfaction of the Departmental Representative.

**1.14 Warranty and guarantees**

- .1 Develop a collateral management plan that includes all information relative to the warranties.
- .2 Submit the management plan to the Departmental Representative thirty (30) days prior to the pre-completion guaranty meeting.
- .3 The warranty management plan must report the actions and documents that will ensure that the Departmental Representative is able to benefit from the guarantees in the contract.

- .4 The plan must be presented in narrative form and must contain sufficient detail to be subsequently used and understood by the staff responsible for the maintenance and repairs.
- .5 Submit information regarding guarantees obtained during the construction phase to the Departmental Representative for approval.
- .6 Record all information in a binder to be submitted on the acceptance of work. Comply with the following requirements.
  - .1 Separate each warranty and guarantee with tabbed sheets according to the table of contents.
  - .2 Make a list of subcontractors, suppliers and manufacturers, with the name, address and telephone number of the designated person in charge.
  - .3 Obtain the warranties and guarantees signed in duplicate by the subcontractors, suppliers and manufacturers within ten (10) days of the completion of the work package affected.
  - .4 Ensure that the documents provided are in proper form, they contain all the required information and are notarized. Countersign the documents to be submitted when required.
  - .5 Keep the warranties and guarantees until the time prescribed to be submitted.
- .7 With the exception of items commissioned with authorization from the Departmental Representative, do not alter the effective date of the guarantee until the date of substantial completion of work has been determined.
- .8 Perform a warranty inspection with the Departmental Representative nine (9) months after the date of acceptance of work.
- .9 The guarantee management plan must include the following information.
  - .1 The roles and responsibilities of persons associated with the various warranties, including the points of contact and telephone numbers of officials within the Contractor's organizations, the subcontractors, manufacturers or the suppliers involved in the work.
  - .2 The list and status of warranty certificates for items and packages subject to extended warranties, notably the roofs, balancing HVAC systems, pumps, motors, transformers and commissioned systems such as fire protection systems, alarm systems, fire extinguisher systems, lighting protection systems.
  - .3 The list of all materials, components, systems or work packages covered by a guarantee, with the information indicated below for each.
    - .1 The name of the element, material, system or lot.
    - .2 Serial and model numbers.
    - .3 The location.
    - .4 The names and telephone numbers of manufacturers and suppliers.

- .5 The names, addresses and telephone numbers of distributors for spare parts and replacement equipment / materials.
- .6 The guarantees and their application conditions, including a general construction guarantee of one (1) year. Items, equipment, systems or lots covered by an extended warranty must be indicated with the expiry date for each.
- .7 References to warranty certificates, if applicable.
- .8 The warranty's effective and expiry date.
- .9 A summary of maintenance activities to be performed to maintain the warranty.
- .10 References to relevant operation and maintenance manuals.
- .11 The names and telephone numbers of the organization and the people to be contacted for the service guarantee.
- .12 The typical response and repair / troubleshooting times for the various components under warranty.
- .4 Display copies of the operating and maintenance instructions near the designated equipment, whose operating characteristics are important for reasons relative to the guarantee or security.
- .5 The expression of the Contractor's intention to be present at the inspections planned for nine (9) months after the affected work is completed.
- .6 The labeling procedure for the items, equipment and systems covered by an extended warranty and its progress.
- .7 Display copies of the operating and maintenance instructions near the designated equipment, whose operating characteristics are important for reasons relative to the guarantee or security.
- .10 Promptly respond to any verbal or written request for troubleshooting / repair work required under warranty.
- .11 All verbal instructions must be followed written instructions.
- .1 The Departmental Representative may take action against the Contractor if the Contractor does not comply with their obligations.

1.15 **Warranty label**

- .1 Label each item, equipment or system covered by a warranty at the time of installation. Use durable, water and oil resistant labels approved by the Departmental Representative.
- .2 Secure the labels with copper wire and spray a waterproof silicone coating on the copper wire.
- .3 Leave the date of reception until the work is accepted for purposes of occupation.

.4 Labels must include the information and signatures indicated below.

- .1 Type of material/product.
- .2 Model number.
- .3 Serial number.
- .4 Contract number.
- .5 Warranty period.
- .6 Signature of the inspector.
- .7 Signature of the Contractor.

2. **PRODUCTS**

2.1 **No object.**

3. **EXECUTION**

3.1 **No object.**

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 78 00 - Documents and items to submit upon work completion

### 1.2 Abbreviations

- .1 BMM - Building Management Manual
- .2 CM - Commissioning.
- .3 PI - Product Information
- .4 PC - Performance Control.
- .5 TAB - Testing, Adjustment and Balancing.
- .6 WHMIS - Workplace Hazardous Materials Information System.

### 1.1 General requirements

- .1 216 mm x 279 mm commercial size paper.
- .2 Methodology used to facilitate updating.
- .3 Drawings, diagrams and schematic representations elaborated in a professional manner.
- .4 Data and information in electronic format presented in a format accepted and approved by the Departmental Representative.

### 1.2 Approvals

- .1 Coordinate the requirements for the preparation, submission and approval of data and information by the Departmental Representative before starting.

### 1.3 General information

- .1 Provide the Departmental Representative with the following information to be incorporated into the BMM.
  - .1 An extensive list of the names, addresses, telephone and fax numbers of the Contractor and the subcontractors who participated in the work.
  - .2 Brief descriptions of mechanical and electrical systems installed and commissioned.
  - .3 Information on the operation and maintenance of mechanical systems and equipment installed and commissioned.
  - .4 Operation and maintenance manual for all equipment from the original manufacturers.
  - .5 Checklists for commissioning, duly completed.
  - .6 Test method for the commissioning used.

- .7 The product information (PI) performance control (PC) report forms completed, reviewed and accepted by the Departmental Representative.
- .8 Commissioning reports.

#### 1.4 **Contents of the operation and maintenance manuals.**

- .1 Refer to section 01 78 00 - *Documents and items to submit upon work completion* for more information on this subject.
- .2 The Departmental Representative will review and approve the manual's format and presentation EIGHT (8) weeks after the contract is awarded.
- .3 The manual must contain the relevant manufacturer's brochures and documentation on the products, devices and systems installed during work.
- .4 It must be organized to facilitate data manipulation in the BMM and contain the documents mentioned in the following paragraphs.
- .5 Duly completed product information (PI) forms required, besides the data and relevant information from other sources as required.
- .6 Directory of information on installed systems, devices and components.
- .7 Approved workshop drawings, besides the required data sheets and maintenance sheets.
- .8 Manufacturer's data and recommendations for manufacturing, installation, commissioning, start-up, operation and maintenance, besides the decommissioning of systems, equipment and components, in addition to the staff's training materials.
- .9 List of spare parts, special tools and replacement equipment with the storage location noted.
- .10 Relevant information concerning warranty or warranties.
- .11 Inspection certificates with the expiry dates for items requiring periodic recertification in summary.
- .12 Information about the maintenance program, including the following:
  - .1 Method and frequency of recommended maintenance.
  - .2 Information on the removal and replacement of equipment and components, including the equipment required to perform the work, lifting points in addition to the entry and exit routes.

#### 1.5 **Reference documents to be included in the related annexes**

- .1 Provide the Departmental Representative with reference material for the installed systems and equipment, including the following:
  - .1 General documents:
    - .1 Final commissioning plan.
    - .2 WHIMS information guide

- .3 Approved specification and drawings after execution.
- .4 Commissioning procedures.
- .5 References to the specification sections.
- .2 Documents relative to the mechanical systems:
  - .1 Pipeline diagrams.
  - .2 Maintenance manual for the hydraulic unit
  - .3 Maintenance manual for the cylinder locking mechanisms
- .3 Documents relative to the electrical systems:
  - .1 Log for the electrical material.
  - .2 Diagrams and nomenclatures.
  - .3 Document that indicates the location of cables and components.
  - .4 Copies of the posted instructions. 0
- .2 Participate in planning the BMM with the Departmental Representative.

#### 1.6 **Language**

- .1 Separate binders are to be used for the English and French versions of the BMM.

#### 1.7 **Use of current technology.**

- .1 Use current technology to produce documents, which will facilitate access at all times and facilitate the maintenance and ensure compatibility with user requirements.
- .2 Obtain the approval from the Departmental Representative before starting work.

### 2. **PRODUCTS**

- 2.1 **No object.**

### 3. **EXECUTION**

- 3.1 **No object.**

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 - Health and safety requirements
- .3 Section 01 74 21 - Construction and demolition waste management and disposal

### 1.2 References

- .1 The Canadian Council of Ministers for the Environment (CCME)
  - .1 PN 1327-2003, Code of technical recommendations for environmental protection applicable to above ground and underground storage systems of petroleum and related products.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

### 1.3 Definitions

- .1 Demolition: Minimum work and measures to be taken to carry out the dismantling of elements and equipment, or the total or partial demolition of buildings as part of the construction of new architectural and engineering works. Methods and procedures are the responsibility of the Contractor.
- .2 Hazardous materials: Hazardous substances, freight, goods and products, including, but not limited to, poisons, corrosive agents, flammable materials, ammunition, explosives, radioactive substances and any other materials, which if misused, could have adverse effects on human health or well-being, or the environment.
- .3 Waste Audit (WA): Detailed survey of the products and materials in which a building is made. The waste audit includes the evaluation, in volume and mass, quantities of waste materials generated by construction. The quantities of materials reused/repurposed, recycled and discharged must be indicated separately.
- .4 Waste Reduction Plan (WRP): A written report that defines, based on data presented in the Waste Audit (WA), all measures to be taken to ensure the reduction, reuse / repurposing and recycling of products and materials.

### 1.4 Documents / samples to be submitted for approval / information

- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted.*
- .2 Workshop drawings
  - .1 Submit the data sheets and workshop drawings in accordance with section 01 33 00 - *Documents and samples to be submitted.*



- .2 The workshop drawings submitted must be signed and sealed by an engineer registered or licensed to work in Canada, in the province of Québec.
- .3 Submit the drawings for the shoring and bracing of load-bearing walls, or other walls before undertaking the demolition work to the Departmental Representative when requested by the proper authorities. These drawings must be prepared by a qualified engineer authorized to practice in Canada, in the province of Québec and the proposed work practices must be illustrated.
- .4 Before beginning work on-site, submit a detailed waste reduction plan in accordance with section 01 74 21 - *Construction and demolition waste management and disposal*, which contains the following information.
  - .1 The nature and expected quantities of materials and equipment to be recovered, reused / repurposed, recycled and landfilled, expressed as a percentage.
  - .2 Schedule for selective demolition work
  - .3 The quantity and locations of the recycling bins.
  - .4 The expected collection frequency.
  - .5 The names and addresses of the trucking companies, waste management centres and / or organizations that accept waste.

## **1.5 Waste management and disposal**

- .1 Waste management and disposal
  - .1 Separate waste for their reuse/repurposing and recycling in accordance with section 01 74 21 - *Construction and demolition waste management and disposal*

## **1.6 Conditions for implementation**

- .1 If materials that resemble designated materials identified as hazardous are discovered during the execution of the work, stop work, take the appropriate precautions and immediately notify the Departmental Representative.
  - .1 Do not resume work before having received directions in writing from the Departmental Representative.
- .2 Inform the Departmental Representative before blocking the access to the building or shutting off the services.

## **1.7 Coordination**

- .1 The Contractor must coordinate their work using structural drawings and other disciplines.
- .2 The Contractor must notify the Engineer in writing if there is a discrepancy between the series of different drawings and to await authorization in writing from the Engineer before work begins again.
- .3 Confirm all dimensions and general layout with the drawings from other disciplines. Look at the drawings of other disciplines for all dimensions, elevations and additional details.

## **2. PRODUCTS**

### **2.1 Materials and equipment**

- .1 Shut down the equipment, tools and machinery when not in use unless extreme temperature conditions require uninterrupted operation.
- .2 Demonstrate that tools, equipment and machinery are used in a way that allows for materials to be recovered in the best possible condition.

## **3. EXECUTION**

### **3.1 Preliminary work**

- .1 Carry out work in accordance with section 01 35 29.06 - *Health and safety requirements*.
- .2 Protection
  - .1 Take the necessary measures to prevent the displacement, collapse or damage to the utility lines, adjacent structures and building sections to keep. Provide structural shoring and bracing as required.
  - .2 Minimize dust and noise produced by the work, besides inconvenience to the occupants.
  - .3 Protect the building's appliances, mechanical and electrical installations, in addition to the utility pipes.
  - .4 Provide dust shields, tarps, guard rails, support elements and other necessary protective devices.
- .3 Disconnect and reroute the service lines for the electrical, telephone and telecommunications networks. Place cautionary marks on the lines and electrical equipment that must remain live during demolition to supply other structures.
- .4 Locate and protect the utility lines. Do not touch any utility lines that are in service or live and the lines that cross the premises must not be moved.
- .5 Disconnect and seal the lines designated for mechanical installations.
  - .1 Remove the natural gas lines according to the directions from the Departmental Representative.
  - .2 Remove the water and sewer lines according to the directions from the Departmental Representative.
  - .3 Remove the lines from other underground networks according to the directions from the Departmental Representative.

### **3.2 Demolition, recovery and elimination**

- .1 Take all necessary measures to prevent any displacement or sagging of the building sections to keep and prevent them from being damaged.

- .2 Supply and install the parts required for reinforcement and shoring. Repair damaged structures and assume responsibility for injuries that may result from demolition work.
- .3 Dismantle the parts of the existing building that are required to build the new structure. Sort equipment and materials, grouped into separate piles depending on whether they are recycled and / or reused / repurposed.
- .4 Refer to the demolition requirements and drawings for the equipment and materials to be recovered for reuse / repurposing.
- .5 Remove the items to be reused / repurposed and store them as instructed by the Departmental Representative and replace them in accordance with the requirements of the relevant section in the quote.
- .6 Resize the banks of the partially demolished building components according to the tolerances specified by the Departmental Representative to facilitate the introduction of new elements.
- .7 Unless otherwise instructed, dispose of the removed equipment and materials to the appropriate recycling facilities or reuse / repurposing companies in accordance with the requirements from the proper authorities.

### **3.3 Storing**

- .1 Identify the different piles by indicating the type of material and quantity.
- .2 Take the appropriate security measures and allocate sufficient resources to prevent theft, vandalism and material deterioration.
- .3 Deposit materials for ecological disposal at a location that will facilitate their removal from the site and their examination by potential users interested in their reuse / repurposing and that will not impede their dismantling, processing or transportation by truck.

### **3.4 Removal from the construction site**

- .1 Transport materials for ecological disposal to approved waste management centres in accordance with the relevant regulations. It is prohibited to transport materials to, or from the waste management centres or waste accepting organizations listed in the waste reduction plan without written authorization from the Departmental Representative.
- .2 Dispose of other materials in accordance with the applicable regulations in the approved facilities identified in the waste reduction plan. It is prohibited to transport materials anywhere besides the centres listed in the waste reduction plan without written authorization from the Departmental Representative.

### **3.5 Property clean-up and restoration**

- .1 Keep the premises clean and in good order for the duration of the demolition work.
- .2 Once the work is complete, restore the surfaces, parking areas, pedestrian walkways that were affected by the work to their original condition.

**END OF SECTION**

## 1. GENERAL

### 1.1 Reference standards

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-O86S1, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
  - .3 CSA O121, Douglas Fir Plywood.
  - .4 CSA O151, Canadian Softwood Plywood.
  - .5 CSA O153, Poplar Plywood.
  - .6 CAN/CSA-O325.0, Construction Sheathing.
  - .7 CSA O437 Series, Standards for OSB and Waferboard.
  - .8 CSA S269.1, Falsework for Construction Purposes.
  - .9 CAN/CSA-S269.3, Concrete Formwork, National Standard of Canada
- .2 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

## 2. PRODUCTS

### 2.1 Materials

- .1 Formwork materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA O437 Series, CSA-O153.
  - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.
  - .3 Rigid insulation board: to CAN/ULC-S701.

.1 Form ties:

- .4 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
- .5 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.

.2 Falsework materials: to CSA-S269.1.

### 3. EXECUTION

#### 3.1 Fabrication and erection

- .1 The contractor is responsible for all necessary on-site measurements needed to avoid water accumulation at the bottom of the excavations.
- .2 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .8 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .9 Align form joints and make watertight.
  - .1 Keep form joints to minimum.
- .10 Locate horizontal form joints for exposed columns 2400 mm above finished floor elevation.
- .11 Use 20 mm chamfer strips on corners, unless specified otherwise.
- .12 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

- .13 Construct forms for architectural concrete, and place ties as directed.
  - .1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .14 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
  - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .15 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

### **3.2 Removal and reshoring**

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 Three days for walls and sides of beams.
  - .2 Three days for columns.
  - .3 Twenty-eight days for beam soffits, slabs, decks and other structural members, or seven days when replaced immediately with adequate shoring to standard specified for falsework.
  - .4 Twenty-four hours for footings and abutments.
- .2 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

**END OF SECTION**

## 1. GENERAL

### 1.1 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
  - .1 SP-66, ACI Detailing Manual 2004.
- .2 ASTM International
  - .1 ASTM A 82/A 82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
  - .2 ASTM A 143/A 143M, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - .3 ASTM A 185/A 185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  - .4 ASTM A 775/A 775M, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 CSA International
  - .1 CSA-A23.1-A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CAN/CSA-A23.3, Design of Concrete Structures.
  - .3 CSA-G30.18, Carbon Steel Bars for Concrete Reinforcement.
  - .4 CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .5 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .6 CSA W186, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC, Reinforcing Steel Manual of Standard Practice.

### 1.2 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

- .1 Store materials in 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 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Cold-drawn annealed steel wire ties: to ASTM A 82/A 82M.
- .4 Deformed steel wire for concrete reinforcement: to ASTM A 82/A 82M.
- .5 Welded steel wire fabric: to ASTM A 185/A 185M.
- .6 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.
- .7 Mechanical splices: subject to approval of Engineer.
- .8 Plain round bars: to CSA-G40.20/G40.21.
- .9 Chemical Anchors product. The following products are acceptable:
  - 1. HIT HY-200 from Hilti
  - 2. Sika AnchorFix-3001 from Sika
  - 3. ET 22 High Strength from Simpson

### **2.2 FABRICATION**

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Departmental Representative written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.



### **3. EXECUTION**

#### **3.1 FIELD BENDING**

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

#### **3.2 PLACING REINFORCEMENT**

- .1 All reinforcement bars must be properly held in place during concrete pour using chairs or concrete blocks.
- .2 Place reinforcing steel as indicated on placing drawings and in accordance with [CSA-A23.1/A23.2.
- .3 Prior to placing concrete, obtain Departmental Representative approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.

**END OF SECTION**

## 1. GENERAL

### 1.1 References

- .1 Abbreviations and acronyms
- .2 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
  - .1 Type GU, GUb and GUL - General use cement.
  - .2 Type MS and MSb - Moderate sulphate-resistant cement.
  - .3 Type MH, MHb and MHL - Moderate heat of hydration cement.
  - .4 Type HE, HEb and HEL - High early-strength cement.
  - .5 Type LH, LHb and LHL - Low heat of hydration cement.
  - .6 Type HS and HSb - High sulphate-resistant cement.
- .3 Fly ash:
  - .1 Type F - with CaO content less than 15%.
  - .2 Type CI - with CaO content ranging from 15 to 20%.
  - .3 Type CH - with CaO greater than 20%.
- .4 Type S.
- .5 Reference standards
  - .1 ASTM International
    - .1 ASTM C 260/C, Standard Specification for Air-Entraining Admixtures for Concrete.
    - .2 ASTM C 309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
    - .3 ASTM C 494/C 494M, Standard Specification for Chemical Admixtures for Concrete.
    - .4 ASTM C 1017/C 1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
    - .5 ASTM D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

- .6 ASTM D 624, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .7 ASTM D 1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .8 ASTM D 1752, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.2, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
  - .2 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 CSA International
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
  - .3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

## **1.2 Action and informational submittals**

- .1 Provide testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

## **1.3 Quality assurance**

- .1 Provide Departmental Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
  - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

#### **1.4 Delivery, storage and handling**

- .1 Delivery and Acceptance Requirements:
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
  - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
  - .2 Deviations to be submitted for review by Departmental Representative.
- .3 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

### **2. PRODUCTS**

#### **2.1 Performance criteria**

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

#### **2.2 Materials**

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Water: to CSA A23.1.
- .3 Aggregates: to CSA A23.1/A23.2.
- .4 Admixtures:
  - .1 Air entraining admixture: to ASTM C 260.
  - .2 Chemical admixture: to ASTM C 494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .5 Curing compound: to CSA A23.1/A23.2 white and ASTM C 309.
- .6 Mechanical waterstops: ribbed labyrinth extruded PVC Arctic Grade of sizes indicated.
- .7 Premoulded joint fillers:
  - .1 Bituminous impregnated fibre board: to ASTM D 1751.
  - .2 Sponge rubber: to ASTM D 1752, Type I.
- .8 Specification of concrete:
  - .1 Compressive Strength @ 28 days : 30MPa

- .2 Coarse Agregate : 20 mm
- .3 Slump : 80 mm  $\pm$  20 mm
- .4 Entrained Air (except interior slab on-grade) : 5 @ 7%

### 3. EXECUTION

#### 3.1 Preparation

- .1 Obtain Departmental Representative written approval before placing concrete.
  - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .6 Protect previous Work from staining.
- .7 Clean and remove stains prior to application for concrete finishes.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .9 Do not place load upon new concrete until authorized by Departmental Representative.

#### 3.2 Installation/ application

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts:
  - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
  - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.

.3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.

.4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative before placing of concrete.

.5 Confirm locations and sizes of sleeves and openings shown on drawings.

.3 Anchor bolts:

.1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.

.2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.

.4 Finishing and curing:

.1 Finish concrete to CSA A23.1/A23.2.

.2 Use procedures as reviewed by Departmental Representative to remove excess bleed water. Ensure surface is not damaged.

.3 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

.4 Finish concrete floor to CSA A23.1/A23.2 Class A.

.5 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.

.6 Minimum curing of concrete elements shall be 3 days at a minimal temperature of 10 degrees Celsius.

.7 Curing methods shall conform to A23.1.

.5 Joint fillers:

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.

.2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form joints as indicated.

.4 Install joint filler.

.5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.6 Dampproof membrane:

- .1 Install dampproof membrane under concrete slabs-on-grade inside building.
- .2 Lap dampproof membrane minimum 150 mm at joints and seal.
- .3 Seal punctures in dampproof membrane before placing concrete.
- .4 Use patching material at least 150 mm larger than puncture and seal.

**3.3 Field quality control**

.1 Site tests: conduct tests as follows:

- .1 Concrete pours.
- .2 Slump.
- .3 Air content.
- .4 Compressive strength at 7 and 28 days.
- .5 Air and concrete temperature.

.2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory hired by the Contractor for review to CSA A23.1/A23.2.

- .1 Ensure testing laboratory is certified to CSA A283.

.3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.

.4 As needed, Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.5 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

.6 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 02 41 16.01 - Structure demolition
- .3 Section 09 30 13 - Ceramic tiling
- .4 Section 09 91 23 - Paint

### 1.2 References

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-25.20-95, Surface sealer for floors
- .2 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

### 1.3 Performance

- .1 Product quality and work quality: According to general product requirements.
- .2 Submit a written statement certifying that the different treatment products used are compatible and do not affect the properties of the floor coverings or the adhesives used for their application.

### 1.4 Data Sheets

- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted.*
- .2 Data Sheets:
  - .1 Submit the required data sheets and manufacturer's documentation relating to the treatment products used. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing
    - .1 Submit two (2) data sheet samples required for WHIMS, in accordance with section 01 35 29.06 - Health and safety requirements The WHMIS data sheets for concrete surface treatment products must meet the requirements from Health Canada and Employment and Social Development Canada; These records must indicate the VOC content in g/L.
  - .2 Include instructions for the application of concrete floor treatment products.



## **1.5 Conditions for implementation**

- .1 Temporary lighting
  - .1 Provide a lighting source with at least 1200 W per area of 40 square meters of treated area, which should be placed 2.5 m above the surface.
- .2 Power supply
  - .1 Provide sufficient power to operate the equipment normally used during construction.
- .3 Workspace:
  - .1 Protect the workspace against rain and the other unfavourable weather conditions.
- .4 Temperature
  - .1 Maintain an ambient temperature of at least 10 degrees Celsius and a relative humidity higher than 40%, for a seven (7) day period before implementation, during the completion of work and for at least 48 hours after the completion thereof.
- .5 Moisture content
  - .1 The moisture content of the concrete support must be within the limits prescribed by the floor covering manufacturer.
- .6 Safety
  - .1 Comply with the safety requirements of the Workplace Hazardous Materials Information System (WHMIS) with respect to the use, handling, storage and disposal of hazardous materials.
- .7 Ventilation
  - .1 Ensure continuous ventilation during and after the coating's application.

## **1.6 Waste management and disposal**

- .1 Separate and recycle waste in accordance with the regulations in section 02 41 16.01 - *Structure demolition*.
- .2 Place substances that correspond with the definition of toxic or hazardous waste in designated containers.
- .3 Ensure that empty containers for disposal are sealed and stored properly, out of the reach of children.
- .4 Use biodegradable chemical hardeners that do not or minimally release VOCs.
- .5 Eliminate excess amounts of chemicals and finished products in accordance with federal, provincial and municipal regulations.
- .6 Eliminate the waste produced by floor stripping in an environmentally friendly manner.

## **1.7 Floor preparation**

- .1 Work prescribed and subject to this section:
  - .1 Apply a cement-based self-levelling product before the installation of any flexible floor covering.
  - .2 Repair all the floor surfaces damaged by demolition work.
  - .3 Level depressions, fill floor cavities affected by the work.
  - .4 Level and repair all surfaces that will require an architectural finish
- .2 Specific regulations:
  - .1 Certain sectors affected the demolition work require major or minor repairs to be connected with adjacent surfaces. These areas must be repaired and/or levelled with a repair product.
- .3 Holes to be drilled through existing walls or partitions:
  - .1 When drilling is required in existing walls for new doors or openings, fill and level the adjacent surfaces, depending on the thickness of the walls, floors and the framing profile. Each situation is unique.

## **2. PRODUCTS**

### **2.1 Performance requirements**

- .1 Product quality work completion quality: In accordance with section 01 61 00 - *Common product requirements*.
- .2 Submit a written statement certifying that the different treatment products used are compatible and do not affect the properties of the floor coverings or the adhesives used for their application.

### **2.2 Product for concrete repair**

- .1 A two-component polymer-modified, cementitious, shrinkage-compensated and rapid set, corrosion inhibitor resurfacing mortar with high resistance and low permeability, with the following characteristics:
  - .1 Compressive strength of 50.0 MPa at 28 days (CAN/CSA-A5/ASTM C109)),
  - .2 Tensile strength of 5.5 MPa (ASTM C496)
  - .3 Static modulus at 28 days of 26 GPa (ASTM C469)
  - .4 Bond strength of 19.0 MPa at 28 days (ASTM C882)
  - .5 Bond strength superior to concrete (CAN/CSA-A23.2-6B)
  - .6 Ion chloride permeability AASHTO T277 of 375 Coulombs at 14 days

- .2 Fiber-reinforced, one-component rapid set mortar for vertical surfaces and ceilings with the following characteristics:

- .1 Compressive strength of 34.0 MPa at 28 days (CAN/CSA-A5)
- .2 Bending strength of 5.5 MPa at 28 days (CAN/CSA 23.2-8C)
- .3 Tensile strength of 2 MPa at 28 days (CAN/CSA-A23.2-6B)
- .4 Tensile strength of 3.1 MPa at 28 days (CASTM C307)
- .5 Static modulus at 28 days of 22.3 MPa (ASTM C469)
- .6 Bond strength of 10.3 MPa at 28 days (ASTM C882)

### **2.3 Leveling product under tile flooring**

- .1 A self-leveling, high strength cementitious and rapid set compound for interior concrete supports with the following characteristics:
  - .1 Compressive strength of 29.0 MPa at 28 days (ASTM C349)
  - .2 Bending strength of 7.24 MPa at 28 days (CAN/CSA 23.2-8C)
  - .3 Shear strength of 34.0 MPa at 28 days (CAN/CSA-A23.2-6B)

### **2.4 Mixtures**

- .1 Mixtures: According to the manufacturer's recommended proportions and applied in accordance with the manufacturer's instructions.

## **3. EXECUTION**

### **3.1 Surface examination**

- .1 Ensure that the support's condition and the application conditions are appropriate to apply the treatment products and that the levels are in accordance with the indications in the drawings.

### **3.2 Preparation of the concrete slabs**

- .1 Unless otherwise indicated, sand the sharp edges that are exposed.
- .2 Use mechanical removal methods to rid the surfaces of any treatment products or materials from the existing surface.

### **3.3 Application**

- .1 Apply the floor treatment product according to manufacturer's written instructions.

### **3.4 Protection**

- .1 Protect the finished work according to the manufacturer's instructions.

### **3.5 Interconnection**

- .1 Perform all necessary demolition and repair work between the new and existing.

**END OF SECTION**

## **1. GENERAL**

### **1.1 REFERENCE STANDARDS**

- .1 ASTM International Inc.
  - .1 ASTM A 36/A 36M, Standard Specification for Carbon Structural Steel.
  - .2 ASTM A 193/A 193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature or High-Pressure Service and Other Special Purpose Applications.
  - .3 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .4 ASTM A 325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - .5 ASTM A 325M, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength.
  - .6 ASTM A 490M, Standard Specification for High-Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-85.10-99, Protective Coatings for Metals.
- .3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturers Association (CPMA).
  - .1 Handbook of the Canadian Institute of Steel Construction.
  - .2 CISC/CPMA Standard 2-75, Quick-Drying Primer for use on Structural Steel.
- .4 Canadian Standards Association (CSA International)
  - .1 CSA G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16, Limit States Design of Steel Structures.
  - .4 CAN/CSA-S136, North American Specifications for the Design of Cold Formed Steel Structural Members.
  - .5 CSA W47.1, Certification of Companies for Fusion Welding of Steel.

- .6 CSA W48, Filler Metals and Allied Materials for Metal Arc Welding.
- .7 CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .8 CSA W59, Welded Steel Construction (Metal Arc Welding).
- .5 Master Painters Institute
  - .1 MPI-INT 5.1, Structural Steel and Metal Fabrications.
  - .2 MPI-EXT 5.1, Structural Steel and Metal Fabrications.
- .6 The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International
  - .1 NACE No. 3/SSPC SP-6, Commercial Blast Cleaning.

## **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
- .2 Fabrication drawings:
  - .1 Submit fabrication drawings showing designed assemblies, components and connections are stamped and signed by qualified professional engineer licensed in the Province of Quebec, Canada.

## **2. PRODUCTS**

### **2.1 DESIGN REQUIREMENTS**

- .1 Design details and connections in accordance with requirements of CAN/CSA-S16 to resist forces, moments, shears and allow for movements indicated.
- .2 Shear connections:
  - .1 Select framed beam shear connections from an industry accepted publication such as "Handbook of the Canadian Institute of Steel Construction" when connection for shear only (standard connection) is required.
  - .2 Select or design connections to support reaction from maximum uniformly distributed load that can be safely supported by beam in bending, provided no point loads act on beam, when shears are not indicated.

## **2.2 MATERIALS**

- .1 Structural steel: to CSA-G40.20/G40.21 Grade as indicated.
- .2 Anchor bolts: to ASTM A 36/A 36M.
- .3 Bolts, nuts and washers: to ASTM A 325.
- .4 Welding materials: to CSA W48 Series, CSA W59 and certified by Canadian Welding Bureau.
- .5 Shop paint primer: to CISC/CPMA 2-75 solvent reducible alkyd, grey.
- .6 Hot dip galvanizing: galvanize steel, where indicated, to CAN/CSA-G164, minimum zinc coating of 600 g/m<sup>2</sup>.

## **2.3 FABRICATION**

- .1 Fabricate structural steel in accordance with CAN/CSA-S16.

## **2.4 SHOP PAINTING**

- .1 Unless otherwise stated, clean, prepare surfaces and shop prime structural steel in accordance with CAN/CSA-S16 except where members to be encased in concrete.
- .2 Clean members, remove loose mill scale, rust, oil, dirt and foreign matter. Prepare surface according to NACE No.3/SSPC-SP-6.
- .3 Painting of apparent steel elements: see section 09 91 23.

## **3. EXECUTION**

### **3.1 APPLICATION**

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

### **3.2 GENERAL**

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

### **3.3 CONNECTION TO EXISTING WORK**

- .1 Verify dimensions and condition of existing work, report discrepancies and potential problem areas to Departmental Representative.

### **3.4 MARKING**

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

### **3.5 ERECTION**

- .1 Erect structural steel, as indicated and in accordance with CAN/CSA-S16.
- .2 Field cutting or altering structural members: to approval of Departmental Representative.
- .3 Clean with mechanical brush and touch up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.

### **3.6 FIELD PAINTING**

- .1 Touch up damaged surfaces and surfaces without shop coat with primer to NACE No.3/SSPC-SP-6 except as specified otherwise. Apply in accordance: MPI Architectural Painting Specification Manual.
- .2 All apparent bolts, nuts and washers shall be painted on site following their installation with a paint system equivalent to those connections.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 - Common product requirements
- .3 Section 01 61 00 - Common product requirements
- .4 Section 01 74 11 - Cleaning
- .5 Section 01 74 21 - Construction and demolition waste management and disposal
- .6 Section 01 78 00 - Documents and items to submit upon work completion
- .7 Section 06 40 00 - Woodwork
- .8 Section 08 80 50 - Glazing (mirror)
- .9 Section 09 91 23 - Paint

### 1.2 References

- .1 American National Standards Institute/National Association of Architectural Metal Manufacturers (ANSI/NAAMM)
  - .1 ANSI/NAAMM MBG531-00, Metal Bar Grating Manual.
- .2 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A 53/A 53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .3 ASTM A 325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated, 830 MPa Minimum Tensile Strength [Metric].
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating
- .4 Canadian Standards Association (CSA) / CSA International)
  - .1 CAN/CSA - G40.20/G40.21 - 04 (R2009), General requirements for rolled or welded structural quality steel / Structural quality steel
  - .2 CAN/CSA-S157-05/S157.1-05 (2010), Strength Design in Aluminum
  - .3 CSAW59 - 03 (R2008), Welded steel construction (metal arc welding)(metric units).

- .4 CAN/CSA - G164 - M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 CAN/CSA - S16.1 - 01, Limit States Design of Steel Structures.
- .6 SCA W48 - 01, Filler metals and allied materials for metal arc welding (prepared in collaboration with the Canadian Welding Bureau).
- .5 National Association of Architectural Metal Manufacturers (NAAMM)
  - .1 AMP 510-92, Metal Stair Manual.
- .6 Steel Structures Painting Council (SSPC), Systems and Specifications Manual, Volume 2.
- .7 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - [current edition]
- .8 Environmental choice program
  - .1 PCE/CCD - 047a, Paintings, coatings.
  - .2 PCE/CCD - 048, Recycled aqueous suspension coatings.
- 1.3 Protection
  - .1 The protective coating must not be removed from the surfaces until the building's final clean-up is complete. Provide instructions for the removal of the protective coatings.
- 1.4 Documents/samples to be submitted
  - .1 Data Sheets
    - .1 Submit a PDF copy of the required technical data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 -*Documents and samples to be submitted. They must be included in the instruction manual indicated in section 01 78 00 - Documents and items to submit upon work completion*
    - .2 Submit a PDF copy of the applicable WHMIS (Workplace Hazardous Materials Information System) data sheets in accordance with section 01 33 00 - *Documents and samples to be submitted*. To indicate the content of the volatile organic compounds (VOC). *They must be included in the instruction manual indicated in section 01 78 00 - Documents and items to submit upon work completion*
    - .1 For finishing, coatings, paints and printing products.
  - .2 Workshop drawings
    - .1 Submit a PDF copy of the data sheets and workshop drawings in accordance with section 01 33 00 - *Documents and samples to be submitted*.
    - .2 The drawings must indicate the construction details, the dimensions of the steel sections and the thickness of the steel sheet.
    - .3 The workshop drawings submitted must be signed and sealed by an engineer licensed in the province of Québec, when required.

1.5 Quality assurance

- .1 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .2 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .3 Pre-Implementation Meeting: Conduct a meeting to review the work requirements, the manufacturer's installation instructions and the warranty terms provided by the manufacturer.

1.6 Transportation, storage and handling

- .1 Transport, store and handle the equipment and materials in accordance with section *01 61 00 - Common product requirements* and the written manufacturer's instructions.
- .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address
- .3 Storage and handling
  - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area as per the manufacturer's recommendations.
  - .2 Store architectural metal works as to protect them from marks, scratches and scrapes.
  - .3 Replace damaged materials and equipment with new materials and equipment.

1.7 Waste management and disposal

- .1 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .2 Recover and sort all paper packaging materials, plastic, polystyrene, corrugated cardboard and place them in the appropriate bins on-site for recycling in accordance with the waste management plan.
- .3 Send the unused metal materials to a metal recycling facility approved by the Departmental Representative.

2. PRODUCTS

2.1 Description

- .1 Architectural metal works and all assemblies must be designed to withstand the dynamic loads in which they may be subjected, both vertically and horizontally in accordance with the requirements of the Code de Construction du Québec, current edition.
- .2 The design details and construction for the stairs must comply with the requirements in NAAMM's Metal Stairs Manual.

## 2.2 Materials

- .1 Steel shapes: According to the CAN/CSA - G40.20/G40.21 standard, 300W grade.
- .2 Steel plate: According to the CAN/CSA - G40.20/G40.21 standard, 260W grade, with pattern as indicated.
- .3 Steel pipes: According to the ASTM A53/A53M standard, standard weight, class 40, galvanized finish on the outside and paint on the inside.
- .4 Steel tubes: According to the CAN/CSA - G40.20/G40.21 standard, 300W grade, square or round depending on the case, wall thickness of a 3 mm, dimensions according to the indications, galvanized finish on the outside and paint on the inside.
- .5 Welding materials: Compliant with the SCA W59 standard.
- .6 Bolts: Compliant with the ASTM A307 standard.
- .7 High strength bolts: Compliant with the ASTM A325M standard.

## 2.3 Assembly

- .1 The stairs must be assembled to comply with the requirements in NAAMM's Metal Stairs Manual.
- .2 The assemblies must be welded when possible; otherwise, they must be bolted. The apparent bolts must be embedded in countersunk holes, then cut flush with the nuts. Exposed fasteners must be of the same material, color and finish as the surfaces in which they are fitted.
- .3 The assemblies must be adjusted with precision; the exposed parts must be flush; the joints and miters must be tight. Risers must all be the same height.
- .4 The welds and exposed ends of the steel shapes must be grinded or filed down with care
- .5 The apparent architectural metal structures must be assembled in the workshop, in elements that are as long and complete as possible.

## 2.4 Finishing

- .1 Stainless steel, grade 304, in accordance with the ASTM A269 standard, "glossy" finish according to the specifications on the drawings.
- .2 Galvanization: by hot dipping, with a 600 g/m2 zinc coating, according to the CAN/CSA - G164 standard.
- .3 Zinc coating paint: zinc-rich paint, read-mixed, compliant with the CAN/CGSB - 1.181 standard.
- .4 All architectural metal structures, ladders, metal stairs, guardrails, required to be "painted" in the plans, must be finished according to the specifications of system No. 9 in section 09 91 23 - *Paint*.
  - .1 Surface preparation in the workshop. Industrial sand blasting according to the CGSB1-SP-6 standard.

- .2 Primary coat of paint as described in section *09 91 23 - Paint*.
- .3 Coordinate work with those in section *09 91 23 - Paint* and with the architecture and engineering drawings.

#### 2.5 Insulation

- .1 Aluminum surfaces must be coated with bituminous paint to be insulated from the following materials:
- .2 Metals of a different nature, with the exception of stainless steel, zinc and white bronze in small areas;
- .3 concrete, mortar and other masonry materials;
- .4 wood.

#### 2.6 Metal works, staircases, guardrails and handrails

- .1 Staircases, guardrails and handrails must be made in sections, tubes and steel plates in the forms and dimensions indicated in the plans.
- .2 Build the stair supports, handrails, guardrails and other metal structures as drawn in the plans.
- .3 The exposed ends of the guardrails and handrails must be sealed and welded.
- .4 End flanges must be used to secure the guardrails to the walls.
- .5 The railings must be attached to the stringers according to the indications.

#### 2.7 Existing metal elements

- .1 Existing architectural metal structures to be repaired are outlined in the plans.

### 3. EXECUTION

#### 3.1 Inspection

- .1 Verification of conditions: Before installing metal ladders and stairs, ensure that the condition of the surfaces / supports previously implemented in other sections or contracts is acceptable and allows work to be carried out in accordance with the manufacturer's written instructions.
  - .1 Inform the Departmental Representative of any unacceptable condition detected.
  - .2 Begin installation work only after the unacceptable conditions have been corrected and receiving written approval from the Departmental Representative.

#### 3.2 Assembly

- .1 Unless otherwise specified, perform welding work in accordance with the CSA W59 standard.
- .2 Assemble the metal works to be square, true and level, aligned and adjusted with precision and ensure that the joints and crossovers are tight.

- .3 Provide and install appropriate anchors, approved by the Departmental Representative, such as studs, staples, anchor rods, expansion bolts, expansion shields, and toggle bolts.
- .4 The exposed fastenings must be compatible with the materials they pass through or are attached to and in the same finish.
- .5 Provide the components required for the work to be carried out by other trades, in accordance with the nomenclature and shop drawings submitted.
- .6 Assemble the elements on-site using bolts according to the CSA S16 standard.
- .7 Deliver the parts embedded in the concrete and built into the masonry to the appropriate location.
- .8 Retouch the rivets, spot welds, bolts and burnt or scraped surfaces with primer once assembly is complete.
  - .1 Primer: VOC content no greater than 250 g/L.
- .9 Retouch the galvanized surfaces at locations that were burned during on-site welding with a zinc-rich primer.
  - .1 Primer: VOC content no greater than 250 g/L.

### 3.3 Installation of structures

- .1 The stairs must be installed to comply with the requirements in NAAMM's Metal Stairs Manual.
- .2 Install true and alignment structures, in the exact locations indicated; According to the architectural plans. Attach the components to the frame using bolts, anchor plates and other assembly elements.
- .3 Return the parts embedded in the concrete and built into the masonry to the appropriate trades.
- .4 Unless otherwise specified, perform welding work in accordance with the CSA W59 standard.
- .5 Retouch the rivets, spot welds, bolts and burnt or scraped surfaces with primer once assembly is complete.

### 3.4 Clean-up

- .1 Clean the metal structures as soon as possible after implementation to remove the dust generated by construction work or by the surrounding environment.
- .2 When the implementation is complete, remove surplus materials, waste, tools and barriers used to protect the equipment from the site.

### 3.5 Protection

- .1 Protect the materials and elements against all damage during construction work.
- .2 Repair the damages caused by adjacent equipment and materials during the installation of metal structures.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Reference standards**

- .1 American Wood-Preservers' Association (AWPA)
  - .1 AWPA M2, Standard for Inspection of Treated Wood Products.
  - .2 AWPA M4, Standard for the Care of Preservative-Treated Wood Products.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA O80 Series, Wood Preservation.
  - .2 CSA O80.20-1.1, This Standard applies to the fire-retardant treatment of lumber by pressure processes.
  - .3 CSA O80.27-1.1, This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes.
  - .4 CSA O80.201, This Standard covers hydrocarbon solvents for preparing solutions of preservatives.
  - .5 .CSA O322, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.
- .3 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
  - .1 SCAQMD Rule 1113, Architectural Coatings.

### **1.2 Action and informational submittals**

- .1 Quality assurance submittals:
  - .1 Submit certificates in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 For products treated with preservative by pressure impregnation submit following information certified by authorized signing officer of treatment plant:
    - .1 Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment.
    - .2 Moisture content after drying following treatment with water-borne preservative.
    - .3 Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

## **2. PRODUCTS**

### **2.1 Materials**

- .1 Preservative: to CSA-O80 Series, chemical, for stained finish.
- .1 SCAQMD Rule #1113, Architectural Coatings.

## **3. EXECUTION**

### **3.1 Application: preservative**

- .1 Treat exterior beams, columns and walkway elements to CSA O80 Series O80.1 using ACQ preservative to obtain minimum net retention of 6.4 kg/m<sup>3</sup> of wood.

### **3.2 Application: field treatment**

- .1 Comply with AWP A M4 and revisions specified in CSA O80 Series, Supplementary Requirements to AWP A M2.
- .2 Remove chemical deposits on treated wood to receive applied finish.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 74 11 - Cleaning
- .3 Section 06 40 00 - Woodwork
- .4 Section 07 21 16 - Blanket insulation
- .5 Section 07 26 00 - Sheet membrane air and vapour seal
- .6 Section 07 46 23 - Wood siding
- .7 Section 07 92 00 - Joint sealants
- .8 Section 09 21 16 - Gypsum board
- .9 Division 22 - Plumbing
- .10 Division 26 - Electricity.

### 1.2 References

- .1 American National Standards Institute/National Particleboard Association (ANSI/NPA).
  - .1 ANSI/NPA A208.1-2009, Particleboard.
- .2 ASTM International
  - .1 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2 ASTM A 653/A 653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
  - .3 ASTM C 578-11a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  - .4 ASTM C 1289-11, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
  - .5 ASTM C 1396/C 1396M-11, Standard Specification for Gypsum Board.
  - .6 ASTM D 1761-06, Standard Test Methods for Mechanical Fasteners in Wood.
  - .7 ASTM D 5055-11, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
  - .8 ASTM D 5456-11, Standard Specification for Evaluation of Structural Composite Lumber Products.

- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-11.3-FM87, Hardboard.
  - .2 CAN/CGSB-51.32-FM77, Breather membrane, water vapour permeability.
  - .3 CAN/CGSB-51.34-FM86, Vapor Barrier, Polyethylene Sheet for Use in Building Construction and its revision.
  - .4 CAN/CGSB-71.26-FM88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems
- .4 CSA international
  - .1 CAN/CSA-A123.2-03(R2008), Asphalt-Coated Roofing Sheets
  - .2 CAN/CSA-A247-FM86 (R1996), Insulating Fiberboard.
  - .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .4 CSA O112.9-10, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
  - .5 CSA O121-F08, Douglas Fir Plywood
  - .6 CAN/CSA O122-F06(R2011), Structural glued-laminated timber
  - .7 CSA O141-F05(R2009), Softwood Lumber
  - .8 CSA O151-F09, Canadian softwood plywood.
  - .9 CSA O153-FM1980(R2008), Poplar plywood.
  - .10 CSA O325-07, Construction sheathing.
  - .11 CSA O437 Series-93(R2011), Standards on OSB and Waferboard
  - .12 CAN/CSA-Z809-08, Sustainable forest management
- .5 The Truss Plate Institute of Canada
  - .1 Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses, 2007.
- .6 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S706-09, Standard for Wood Fibre Thermal Insulation for Buildings

### **1.3 Documents and samples to be submitted**

- .1 Submit the workshop drawings and data sheets compliant with section 01 33 00 – *Documents and samples to be submitted*
- .2 Workshop drawings
  - .1 The workshop drawings submitted must be signed and sealed by an engineer registered or licensed to work in Canada.

.3 Data Sheets:

- .1 Submit the required data sheets, manufacturer's instructions and documentation relating to wood products and accessories. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing.

**1.4 Quality assurance**

- .1 Wood Marking: The classification stamp of an organization recognized by the Canadian Lumber Standards Accreditation Board.
- .2 Plywood marking: Classification stamp compliant with the relevant CSA standards.
- .3 Plywood marking, OSB and structural intermediate wood composite panels: classification stamp compliant with the relevant CSA standards.

**1.5 Transportation, storage and handling**

- .1 Transport, store and handle the equipment and materials compliant with section *01 61 00 - Common product requirements* and the written manufacturer's instructions.
- .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address.
- .3 Storage and handling:
  - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area compliant with the manufacturer's recommendations.
  - .2 Replace damaged materials and equipment with new materials and equipment.

**1.6 Waste management and disposal**

- .1 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .2 Transport unused wood materials to a recycling facility approved by the Departmental Representative.
- .3 Do not incinerate wood that has been treated with preservatives.
- .4 Wood treated with preservatives must be separated from materials and equipment that will be recycled or reused.
- .5 Remove the ends, waste and treated sawdust to a landfill approved by the Departmental Representative.
- .6 Send unused wood preservatives to an authorized collection site for hazardous materials approved by the Departmental Representative.
- .7 It's strictly prohibited to dispose of unused preservatives in drains, waterways, in a lake, on the ground or any other location where it will pose a risk to health or the environment.

## **2. PRODUCTS**

### **2.1 Structural elements**

#### **.1 Description:**

- .1 Timber elements, Trusses, Structural timber components, CAN / CSA-Z809 or FSC or SFI certified
- .2 Structural glued-laminated timber must be compliant with CAN/CSA O122.
- .3 The beams with an I-section must be compliant with the ASTM D 5055 standard, Prefabricated Wood I-Joists.
- .4 Urea-formaldehyde free plywood panels, certified CAN/CSA-Z809 or FSC or SFI
- .5 Trusses for lightweight construction, or roof trusses, must be compliant with the requirements contained in the document entitled "Truss Design and Procedures for Light Metal Connected Wood Trusses", published by the Truss Plate Institute of Canada
- .6 Composite timber must be compliant with the ASTM D 5456 standard
- .7 Structural elements and boards: Compliant with NBC requirements.

### **2.2 Structural timber**

- .1 Structural timber: Unless otherwise specified, use softwood with S4S (bleached on 4 sides) finishing, with a moisture content not exceeding 19% and complies with the following standards and regulations:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules For Canadian Lumber
  - .3 SPF, quality No. 1-2 unless otherwise specified.
- .2 Furring, shims, nailing strips, nailing base, sub frames, furring strips and eaves boards, curb members, nailing bases for fascia boards and joists.
  - .1 S2S finishes are acceptable for concealed structures such as nailing bases.
  - .2 Boards: Standard or higher.
  - .3 Dimensioned lumber: Classified standard or higher.
  - .4 Posts and wood timber (square): Standard or higher.

### **2.3 Panels**

- .1 Exterior plywood (water-repellent): Compliant with the CSA O121 standard, DFP specification, SHG grade, type C.
- .2 Douglas Fir Plywood: Compliant with the CSA O121 standard, classified "construction".
- .3 Canadian softwood plywood: Compliant with the CSA O151 standard, classified "construction".

- .4 Poplar plywood: Compliant with the CSA O153 standard, classified “construction”, “standard” category.
- .5 Interior Mat-Formed Wood Particleboard: Compliant with the ANSI 208.1 standard.
- .6 Structural Mat-Formed Wood Particleboard (oriented strand board): Compliant with the CAN3-O437.0. standard.

## **2.4 Accessories**

- .1 SBS-modified bitumen membrane, flexible at low temperatures, impermeable to air, moisture and water, the primer and sealant compliant with ASTM E-2357 air barrier performance standard.
- .2 Air-tight compound: Polyurethane foam or closed-cell polyethylene.
- .3 Watertightness compounds: Compliant with the 07 92 00 - *Joint sealants* standard (Ensure that the product DOES NOT come into contact with oxidizing substances).
- .4 Wire nails, spikes and staples: Compliant with the CSA B111 standard.
- .5 Bolts: 12.5 mm diameter, unless otherwise specified, with nuts and washers.
- .6 Patented fastening devices: toggle bolts, expandable pads with screws, screws with sockets made of lead or inorganic fibers, powder-actuated tools, recommended by the manufacturer.
- .7 Joist brackets: Made of sheet steel at least one (1) mm thick, galvanized coating with a ZF001 designation.
- .8 H-clamps for roof coverings, with a suitable thickness to match the panels, in 6063-T6 extruded aluminum alloy and approved by the Departmental Representative.
- .9 Minor metal structural elements include, in particular, the composition of exterior walls, awnings, parapets and others described in the plans.

## **2.5 Finishes**

- .1 Galvanized metal: Fastening devices galvanized according to the CAN/CSA - G164 standard for the exterior structures, interior structures in very wet mediums, structures with pressure treated wood, fire retardant.

## **2.6 Wood treatment product if required**

- .1 Surface-applied preservative: A colorless, water-repellent preservative with a base of copper naphthenate or 5% pentachlorophenol solution.
- .2 The use of pentachlorophenol is limited to wood elements that are in contact with the ground and are susceptible to rot or attacking insects. If necessary, the wood treated with the pentachlorophenol must be coated with two layers of a suitable printing product.

- .3 Structures constructed of wood treated with pentachlorophenol and inorganic arsenic must not be used for food storage and the wood must not come into contact with drinking water.

### 3. EXECUTION

#### 3.1 Inspection

- .1 Verification of conditions: Before installing products, ensure that the condition of the surfaces / supports previously implemented in other sections or contracts is acceptable and allows work to be carried out in accordance with the manufacturer's written instructions.
  - .1 Perform a visual inspection of the surfaces.
  - .2 Inform the Departmental Representative of any unacceptable condition detected.
  - .3 Begin installation work only after the unacceptable conditions have been corrected and received written approval from the Departmental Representative.

#### 3.2 Installation

- .1 Proceed as per NBC requirements and in accordance with the requirements below.
- .2 Install true and alignment structures, according to the prescribed height ratings, levels and alignments.
- .3 Make the continuous elements from the longest pieces possible.
- .4 Install joist elements so that the camber is facing up.
- .5 Carefully choose the framing elements that will be left visible. Install panels so as to conceal classification markings and traces of deterioration, or remove these markings and traces of exposed surfaces by sanding.
- .6 Install the flooring support panels and the combined support and underlay boards of the floor coverings so the end joints are located on a solid support and are offset by at least 800 mm.
  - .1 Attach the support panels to the floor joists using mechanical fasteners and glue (glued / screwed). Make a continuous bead of glue on all joists and two (2) continuous beads on the joists that will be used to support the abutting joints of the panels compliant with the manufacturer's instructions.
- .7 Install wall facing panels according to the manufacturer's written instructions.
- .8 Install exterior (water-resistant) plywood roofing panels, dimensions as specified on drawings, compliant with the CSA O121 standard, DFP specification, SHG grade, type C in accordance with the NBC regulations.
- .9 Install the furring and shims required to create distance from the wall and support the cabinets, wall and ceiling finishing elements, coverings, borders, soffits, siding and other prescribed structures.
- .10 Install furring and shims to ensure the structures are flat and straight, with an acceptable deviation of 1:600.

- .11 Install nailing strips and the trim intended to support the frames and structures around the bays of the sub frames.
- .12 Install the furring strips and eaves boards, curb members, nailing bases for fascia boards, the tacking strips, besides the additional wooden supports required and secure them with galvanized fasteners.
- .13 Install nailing strips and the trim intended to support the frames and structures around the bays of the sub frames.
- .14 Plane, trim and lightly embed nailing rods in the roofs waterproofing for the roof drains.
- .15 To install the joists according to the directions.
- .16 Do work on particle boards without taking the necessary precautions. Use dust collectors and wear a superior-quality respiratory device.
- .17 Assemble, anchor, fix, fasten and brace the elements to the required strength and rigidity.
- .18 If necessary, countersink the holes so that the bolt heads do not protrude.
- .19 Use nailing discs for flexible coating materials, according to the material manufacturer's instructions.

### **3.3 Assembly**

- .1 Assemble, anchor, fix, fasten and brace the elements to the required strength and rigidity.
- .2 If necessary, countersink the holes so that the bolt heads do not protrude.

### **3.4 Electricity**

- .1 Provide and install the panels required for the installation of electrical equipment, as directed by the Departmental Representative. Use 19 mm thick plywood panels attached to a 19 mm x 38 mm frame, reinforced with elements of the same size, set at intervals of no more than 300 mm.
- .2 Refer to the plans for the scope of work, the number of walls and the number of rooms.

### **3.5 Nailing base**

- .1 Place a 19 mm plywood nailing strips inside the walls, 150 mm high, arranged in the number of rows required at 600 mm c / c maximum.
- .2 These strips will be used to attach all furnishings that are against the wall.
- .3 Verify the furnishings in each room to place the strips at the correct height and in sufficient quantity.

### **3.6 Clean-up**

- .1 Clean-up during work: Perform clean-up activities in accordance with section 01 74 11 - *Clean-up*.
  - .1 Ensure the locations are clean at the end of each working day.

- .2 Final clean-up: Remove the surplus equipment/materials, waste, tools and equipment in accordance with section 01 74 11 - *Cleaning*.
- .3 Waste management: Separate waste for their reuse/repurposing and recycling
- .4 Remove the recycling bins and containers from the site and dispose of materials at the appropriate facilities.

### **3.7 Protection**

- .1 Protect the materials and elements against all damage during construction work.
- .2 Repair damage caused by the installation of the carpentry elements to the adjacent equipment and materials.

**END OF SECTION**



## **1. GENERAL**

### **1.1 Summary**

#### **.1 Section content**

- .1 Materials and equipment required for the shop-fabricated wooden trusses.

### **1.2 Reference standards**

#### **.1 CSA International**

- .1 CAN/CSA O80 Series, Wood Preservation.
- .2 CSA O86 Consolidation, Engineering Design in Wood.
- .3 CSA O141, Softwood Lumber.
- .4 CSA S307, Load Test Procedure for Wood Roof Trusses for Houses and Small Buildings.
- .5 CSA S347, Method of Test for Evaluation of Truss Plates Used in Lumber Joints.
- .6 CSA W47.1, Certification of Companies for Fusion Welding of Steel.
- .7 CAN/CSA-Z809, Sustainable Forest Management.

#### **.2 Health Canada – Canadian Workplace Hazardous Materials Information System (WHMIS)**

- .1 Data sheets (DS)

#### **.3 National Lumber Grades Authority (NLGA)**

- .1 Standard Grading Rules for Canadian Lumber.

#### **.4 National Research Council Canada (NRC)**

- .1 Canadian Construction Materials Centre (CCMC), Registry of Product Evaluations.

.5 Truss Plate Institute of Canada (TPIC)

- .1 TPIC, Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses (Limit States Design).

**1.3 Design Requirements**

- .1 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for wood truss chords and webs in accordance with engineering properties in CSA O86.
- .2 Design light metal plate connected wood trusses in accordance with TPIC truss design procedures for truss joint designs to test engineering properties in accordance with CSA S347 and listed in CCMC Registry of Product Evaluations.
- .3 Design trusses, bracing and bridging in accordance with CSA O86.4
- .4 Limit live load deflection to 1/360th of span where [gypsum board] [plaster]ceilings are hung directly from trusses.
- .5 Limit live load deflections to [1/240th] [1/180th]of span unless otherwise specified or indicated.
- .6 Provide camber for trusses as indicated.

**1.4 Quality assurance**

- .1 Qualifications:
- .1 Fabricator for trusses to show evidence of quality control program such as provided by regional wood truss associations, or equivalent.
- .2 Fabricator for welded steel connections to be certified in accordance with CSA W47.1.

**1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets 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 Quebec, Canada.

- .2 Indicate special structural application and specification as according to local authorities having jurisdiction.
- .3 Indicate TPIC Truss Design Procedure and CSA O86 Engineering Design in Wood and specific CCMC Product Registry number of the truss plates
- .4 Indicate species, sizes, and stress grades of lumber used as truss members. Show pitch, span, camber, configuration and spacing of trusses. Indicate connector types, thicknesses, sizes, locations and design value. Show bearing details. Indicate design load for members.
- .5 Submit stress diagram or print-out of computer design indicating design load for truss members. Indicate allowable load and stress increase.
- .6 Indicate arrangement of webs or other members to accommodate ducts and other specialties.
- .7 Show location of lateral bracing for compression members.
- .8 Instructions: submit manufacturer's installation instructions.

## **1.6 Delivery, storage and handling**

- .1 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area. Provide bearing supports and bracings. Prevent bending, warping and overturning of trusses.

## **2. PRODUCTS**

### **2.1 Materials**

- .1 Lumber: conform to following standards:
  - .1 CSA O141.
  - .2 NLGA (National Lumber Grading Association), Standard Grading Rules for Canadian Lumber.
- .2 Fastenings: to CSA O86.

### **2.2 Fabrication**

- .1 Fabricate wood trusses in accordance with reviewed shop drawings.
- .2 Provide for design camber and roof slopes when positioning truss members.
- .3 Connect members using metal connector plates.

### **2.3 Source quality control**

- .1 Identify lumber by grade stamp of an agency certified by Canadian Lumber Standards Administration Board.

## **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 ERECTION**

- .1 Erect wood trusses in accordance with reviewed shop drawings.
- .2 Handling, installation, erection, bracing and lifting in accordance with manufacturer's instructions.
- .3 Make adequate provisions for handling and erection stresses.
- .4 Exercise care to prevent out-of-plane bending of trusses.
- .5 Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing and decking are installed.
- .6 Install permanent bracing in accordance with reviewed shop drawings, prior to application of loads to trusses.
- .7 Do not cut or remove any truss material without approval of DEPARTMENTAL Representative.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 - Health and safety requirements
- .3 Section 01 35 43 - Environmental procedures
- .4 Section 01 61 00 - Common product requirements
- .5 Section 01 74 11 - Cleaning
- .6 Section 01 74 21 – Construction and demolition waste management and disposal
- .7 Section 06 40 00 - Carpentry
- .8 Section 07 92 00 - Joint sealants
- .9 Section 09 91 23 - Paint.

### 1.2 References

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A208.1-09, Particleboard.
  - .2 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.
  - .3 ANSI/HPVA HP-1-10, American National Standard for Hardwood and Decorative Plywood.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Quality Standards, 1st edition, 2009.
- .3 ASTM International
  - .1 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-11.3-M87, Hardboard.
- .5 CSA international
  - .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
  - .2 CSA O121-08, Douglas Fir Plywood
  - .3 CSA O141-05(R2009), Softwood Lumber
  - .4 CSA O151-09, Canadian softwood plywood.

- .5 CSA O153-M1980 (R2008), Poplar plywood.
  - .6 CAN/CSA-Z809-08, Sustainable forest management
- .6 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .7 National Lumber Grades Authority (NLGA)
  - .1 2008 Standard Grading Rules For Canadian Lumber
- .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .9 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2010-2014 standard.
- .10 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies
  - .2 CAN/ULC-S105-09, Standard specification for fire door frames
- 1.3 Documents/samples to be submitted for approval/information
  - .1 Data Sheets
    - .1 Submit the required data sheets, manufacturer's instructions and documentation relating to plywood panels and accessories. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing.
    - .2 Submit two (2) data sheet samples required for WHIMS, in accordance with section 01 35 29.06 - *Health and safety requirements* and 01 35 43 - *Environmental procedures*.
  - .2 Workshop drawings
    - .1 The drawings must show construction details, jointing and fixing, profile details and other relative details.
    - .2 The drawings must indicate the materials, finishes, thicknesses and hardware.
  - .3 Samples
    - .1 Submit the samples for each joinery element for review and acceptance.
    - .2 The samples will be given to the Contractor, who will incorporate them into the structure.
    - .3 Submit two (2) 300 mm samples.

- .4 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
  - .5 Test reports and evaluation reports: Submit test reports on composite wood components issued by recognized independent laboratories certifying that the products, materials and equipment meet the requirements for both the physical characteristics and performance criteria.
    - .1 Wood Certification: Submit the certified wood vendor's Chain of Custody certificate number certified CAN/CSA-Z809 or FSC or SFI.
      - .1 In the case of FSC-certified wood, submit the certified manufacturer's Chain of Custody certificate number.
    - .2 Low-emitting materials
      - .1 Submit a list of adhesives and sealants used inside the building indicating that these products meet the limits and restrictions for their VOC content and chemical composition.
      - .2 Submit a list listing all composite wood products used in the building, specifying that they do not contain any added urea-formaldehyde resin and list all laminate adhesives used in the building stating that they do not contain urea-formaldehyde.
- 1.4 Quality assurance
- .1 Wood Marking: The classification stamp of an organization recognized by the Canadian Lumber Standards Accreditation Board (CLSAB).
  - .2 Sustainable development certification
    - .1 Certified wood: Submit a list of wood products used that meets the CAN / CSA-Z809 or FSC or SFI standards.
  - .3 Marking of plywood, particleboard and oriented strandboard (OSB) panels and wood-based composite panels in accordance with the relevant CSA and ANSI standards.
  - .4 Wood frames and panels with a fire-resistance rating must be certified by an organization accredited by the Standards Council of Canada and must be labeled in accordance with the CAN/ULC-S104 and CAN/ULC-S105 standards.
- 1.5 Transportation, storage and handling
- .1 Transport, store and handle the equipment and materials in accordance with section 01 61 00 - *Common product requirements* and the written manufacturer's instructions.
  - .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address.
  - .3 Storage and handling
    - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area as per the manufacturer's recommendations.

- .2 Store wooden joinery elements and wood derived products as to protect them from marks, scratches and scrapes.
- .3 Replace damaged materials and equipment with new materials and equipment.
- .4 Packaging Waste Management: Recover packaging waste for reuse / repurposing and the recovery of pallets, crates, padding and other packaging materials by their manufacturer in accordance with the waste management plan compliant with section 01 74 21 - *Construction and demolition waste management and disposal*.

## 2. PRODUCTS

### 2.1 Materials / Equipment

- .1 Wood panelling for walls:
  - .1 Softwood plywood: White pine boards (bleached on four (4) sides), S4S finish, moisture content of not more than 19% and compliant with the standards and rules outlined below.
    - .1 Dimensions: 130 mm wide X 16 mm thick
    - .2 Profile: V-joints
    - .3 CSA O141.
    - .4 CAN/CSA-Z809 or FSC or SFI certified products.
    - .5 Standard grading rules For Canadian lumber published by the National Lumber Grade Authority (NLGA).
    - .6 AWMAC regulations: Wood of “premium” quality (choice), with moisture content in accordance with the regulations.
    - .7 Wood with a mechanical resistance rating is acceptable.
  - .2 Hardwood: A moisture content of no more than 19%, in accordance with the standards and regulations outlined below.
    - .1 Regulations from the National Hardwood Lumber Association.
    - .2 AWMAC regulations: Wood of “premium” quality (choice), with moisture content in accordance with the regulations.
    - .3 CAN/CSA-Z809 or FSC or SFI certified products.
  - .3 Wood-based panels: Free of urea-formaldehyde.
    - .1 CAN/CSA-Z809 or FSC or SFI certified wood.
    - .2 Douglas Fir Plywood: Compliant with the CSA O121 standard, classified “construction” “standard” category.
    - .3 Canadian softwood plywood: Compliant with the CSA O151 standard, classified “construction”, “standard” category



- .4 Hardwood plywood: Compliant with the ANSI / HPVA HP-1 standard.
- .5 Poplar plywood: Compliant with the CSA O153 standard, classified "construction", "standard" category.

## 2.2 Accessories

- .1 Nails and staples: in accordance with CSA B111, galvanized in accordance with ASTM A 123 / A 123M for exterior structures, interior structures in wet areas and with treated woodwork, with stainless steel finish for the other structures.
- .2 Wood screw: Stainless steel, the type and size suitable for the destination.
- .3 Cleats: n/a
- .4 Joint-sealing adhesives and compounds: According to section 07 92 00 - *Joint sealants*.

## 3. EXECUTION

### 3.1 Inspection

- .1 Verification of conditions: Before installing joinery elements in wood and wood derived products, ensure that the condition of the surfaces / supports previously implemented in other sections or contracts is acceptable and allows work to be carried out in accordance with the manufacturer's written instructions.
- .2 Perform a visual inspection of the surfaces/supports in the presence of the Departmental Representative.
- .3 Inform the Departmental Representative of any unacceptable condition detected.
- .4 Begin installation work only after the unacceptable conditions have been corrected and written approval received from the Departmental Representative.

### 3.2 Installation

- .1 Except where otherwise indicated, carpentry work must be carried out in accordance with AWMAC quality standards.
- .2 Draw and trim elements so that they fit properly with adjacent surfaces and walls, recesses and pits, as well as pipes, columns, sanitary and electrical appliances, power outlets, and with any other object that protrudes, penetrates or traverses.
- .3 Make the joints to conceal the recessed elements.

### 3.3 Construction

- .1 Attaching elements
  - .1 Position the level, true and square joinery materials, firmly secure or attach.
  - .2 Select fasteners suitable for the dimensions and nature of the elements to be assembled. To use patented devices, according to the manufacturer's recommendations.

- .3 Bury the finishing nail heads to prepare for patching cavities. When screws are used, make smooth countersinks and insert wooden plugs that match the material of the element to be attached.
      - .4 Replace joinery items with hammer marks or other damage.
    - .2 Trim
      - .1 Abut and counter-profile the inner joints of the baseboards for tight connections. Make miter joints where the baseboards and jambs are at right angles.
      - .2 Secure the baseboards and the frame securely against the wall, to eliminate any gaps between the wall.
      - .3 Assemble the baseboards by making half-wood joints cut with a bevel of 80 degrees if required.
      - .4 Install one-piece moldings around windows and doors without splices.
    - .3 Interior and exterior frames
      - .1 Position the frames so that the studs are level and the crossbeams and sills/shelves are level, then secure in place.
    - .4 Wall panelling
      - .1 Attach the boards for the wall paneling and borders using concealed fasteners.
    - .5 Shelves
      - .1 Install the shelves on the furring strips according to the directions.
- 3.4 Installation of trim
  - .1 Trim
    - .1 Exterior trim
      - .1 Category: Superior (without knots).
      - .2 Solid wood: Variety: Larch.
    - .2 Interior trim
      - .1 Category: Superior (without knots).
      - .2 Solid wood: White pine variety.
- 3.5 Install panels for the studs and crossbeams
  - .1 Panels for the studs and crossbeams
  - .2 Solid wood.

3.6 Installation of shelves

- .1 Solid wood, white pine, superior grade, 25 mm thick.

3.7 Clean-up

- .1 Clean-up during work: Perform clean-up activities in accordance with section 01 74 11 - *Cleaning*.
- .2 Ensure the locations are clean at the end of each working day.
- .3 Final clean-up: Remove the surplus equipment/materials, waste, tools and equipment in accordance with section 01 74 11 - *Clean-up*.
- .4 Waste management: Separate waste for their reuse/repurposing and recycling in accordance with section 01 74 21 - *Construction and demolition waste management and disposal*
  - .1 Remove the recycling bins and containers from the site and dispose of materials at the appropriate facilities.

3.8 Protection

- .1 Protect the materials and elements against all damage during construction work.
- .2 Repair damage caused by the installation of the joinery elements to the adjacent equipment and materials.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 - Health and safety requirements
- .3 Section 01 61 00 - Common product requirements
- .4 Section 01 74 11 - Cleaning
- .5 Section 01 74 21 – Construction and demolition waste management and disposal
- .6 Section 05 51 29 – Architectural metal structures
- .7 Section 06 10 00 - Carpentry
- .8 Section 06 20 00 - Joinery
- .9 Section 07 92 00 - Joint sealants
- .10 Section 08 80 50 - Glazing (mirror)
- .11 Section 09 91 23 - Paint

### 1.2 References

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A208.1-09, Particleboard.
  - .2 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.
  - .3 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.
- .2 ASTM International
  - .1 ASTM E 1333-10, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
  - .2 ASTM D 2832-92(R2011), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
  - .3 ASTM D 5116-10, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 (2009).

- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable
- .5 Canadian Standards Association (CSA)
  - .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
  - .2 CSA O112.10-08, Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).
  - .3 CSA O121-08, Douglas Fir Plywood
  - .4 CSA O141-05(R2009), Softwood Lumber
  - .5 CSA O151-09, Canadian softwood plywood.
  - .6 CSA O153-M1980(R2008), Poplar plywood.
  - .7 CAN/CSA-Z809-08, Sustainable forest management
- .6 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates (HPDL).
- .7 National Hardwood Lumber Association (NHLA)
  - .1 Rules for the Measurement and Inspection of Hardwood and Cypress 2011.
- .8 National Lumber Grades Authority (NLGA)
  - .1 2008 Standard Grading Rules For Canadian Lumber

### **1.3 Documents/samples to submit**

- .1 Data Sheets
  - .1 Submit the required data sheets, manufacturer's instructions and documentation relating to the proposed cabinetmaking structures. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing
  - .2 Submit two (2) data sheet samples required for WHIMS, in accordance with section 01 35 29.06 - *Health and safety requirements*
- .2 Workshop drawings
  - .1 Submit the workshop drawings required in accordance with section 01 33 00 - *Documents and samples to submit*.
  - .2 The drawings must show construction and assembly details, attachments, profiles and other relative details.
  - .3 The drawings must indicate the materials, finishes, thicknesses and hardware.

- .4 The drawings must indicate the location of the required openings in the utility connection storage furniture, typical and specific installation conditions, connections, accessories and attachments and the locations for the visible attachment devices.
- .3 Product samples and data sheets
  - .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted*.
  - .2 Submit a sample of each color specified in the drawings.
- .4 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

#### **1.4 Quality assurance**

- .1 Wood Marking: The classification stamp of an organization recognized by the Canadian Lumber Standards Accreditation Board.
- .2 Sustainable development certification
  - .1 Certified wood: Submit a list of wood products used that meets the CAN / CSA-Z809 or FSC or SFI standards.
- .3 Marking of plywood, particleboard and oriented strandboard (OSB) panels and wood-based composite panels in accordance with the relevant CSA and ANSI standards.

#### **1.5 Transportation, storage and handling**

- .1 Transport, store and handle the equipment and materials in accordance with section 01 61 00 - Common product requirements *and the written manufacturer's instructions*.
- .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address
  - .1 To protect the works prefabricated against moisture and the damage during and after delivery.
  - .2 Store prefabricated structures in ventilated rooms protected from moisture or variations in extreme temperature.
- .3 Storage and handling
  - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area compliant with the manufacturer's recommendations.
  - .2 Store woodworking structures to protect them from marks, scratches and scrapes.
  - .3 Replace damaged materials and equipment with new materials and equipment.
- .4 Packaging Waste Management: Recover packaging waste for reuse / repurposing in accordance with the waste management plan compliant with section 01 74 21 - *Construction and demolition waste management and disposal*.

## **1.6 Conditions of the premises**

- .1 Prior to manufacturing the furniture, the manufacturer will report on all the dimensions on-site of previously executed structures and make the corrections required for the work to be executed in accordance with the drawings and construction site conditions. No supplement will be allocated after the award of the contract unless a change is authorized in writing by the Departmental Representative.

## **1.7 Protection**

- .1 Protect adjacent surfaces, existing structures and structures previously carried out against any marks or damage that may be caused by the work in this section.

## **1.8 Coordination**

- .1 Coordinate the work in this section with those of the other trades in respect to both the dimensions and timing of work

## **1.9 Warranty**

- .1 Submit a written warranty to the architect that the work in this section will be free from defects in both materials and workmanship for a period of two (2) years from the date of final acceptance of work.
- .2 Repair or remove and replace any defective materials or works at the Contractor's expense and to the Architect's satisfaction.
- .3 The warranty will be on a form acceptable by the architect

# **2. PRODUCTS**

## **2.1 Materials**

- .1 Agglomerate of wood particles and resins, formed under pressure, "high density" grade, of indicated thickness, shaped in the workshop.
  - 1. Meet the Class 3 or C ULC 723-10 (ASTM E84) requirements concerning the Flame Spread Index (between 76 and 200) and the Smoke Development (maximum 450).
  - 2. Raw particles with no added formaldehyde meeting the requirements of ANSI A208.1-2009/Category m2 and FSC certified.
- .2 Douglas fir plywood: Compliant with the FSC ACNOR 0121-M1978 standard, category of choice with sanded faces.
- .3 Laminate backer sheets: supplied by the manufacturer, white finishing sheets, color white, at least 0.5 mm.
- .4 Adhesive for laminate: urea resin adhesive compliant with the ACNOR 0 112.5-M1977 standard or according to manufacturer's recommendations.
- .5 Fasteners:
  - .1 Nails and staples: Compliant with the ACNOR B111-1974 standard, standard finish.
  - .2 Wood screws: Compliant with the ACNOR B35.4-1972 standard.

- .3 Lag bolts and strips: Dimensions appropriate to the structure and according to the builder's recommendations.
- .6 Metal sections: See description in the plan.
- .7 Stainless steel: shade 304, 0.91 mm thick, profiled according to indications in the plan.
- .8 Hardware (for furniture) compliant with the ONGC 69-GP-8M standard. See plans and article 2.7 of this section hardware elements' description.
- .9 Joint-sealing compounds: According to section 07 92 00 - *Joint sealants*, color matching laminate or transparent plastic as indicated.

## **2.2 Laminate: Shaped in the workshop**

- .1 Compliant with appendix "A" of the CAN3-A172-M79 standard.
- .2 Obtain the required dimensions before shaping the elements that must be placed in contact with appliances, equipment and other materials.
- .3 Ensure that the colors and patterns of continuous laminate are the same over the entire surface.
- .4 Glue the laminate sheet to the core panel in accordance with the adhesive manufacturer's instructions. Ensure that the profile of the laminate and the core panel coincide to obtain perfect adhesion over the entire surface. Use sheets in one piece up to 3000 mm in length and do not make seams less than 610 mm from the sink opening.
- .5 Apply a laminate backing or sheet to the back of the core panel.
- .6 Apply a liner sheet in the cupboards.
- .7 COLORS:
  - .1 ST1: FORMICA #8168-58 (GREY SPLATTER), matte finish.
  - .2 ST2: FORMICA #949-SP (WHITE), sculpted.

## **2.3 Manufacturing of integrated furniture - general information**

- .1 Manufacture cabinets, shelves, etc. In accordance with the AWMAC selection standards and drawings. They will be prefabricated modular types.
- .2 Supply and install all counters and cupboards, including all required hardware. The door, drawer, shelf, etc. arrangements will be indicated in the plans.
- .3 Place nails and screws, apply a solid wood filler to damaged surfaces, then sand until a smooth, ready-to-finish surface is obtained.
- .4 Install the door fittings, drawers, etc. in the factory. Unless otherwise specified, recess the suspension rails.
- .5 Unless otherwise specified, the cupboard shelves must be adjustable.
- .6 Open the access doors, removable panels for plumbing fixtures, fittings, accessories, outlet boxes and other appliances to ensure their proper operation.



- .7 When assembling the items to be delivered at the factory, take into account the handling challenges for each structure and the clearance for each building.
- .8 There must be removable backs, console panels or access doors where there is piping and wiring.
- .9 There must be openings for sanitary appliances, recessed rooms, electrical appliances, socket outlets and other accessories.
- .10 The parts must be assembled in the factory and delivered in components that are easy to handle and in a format that can pass through building's openings.
- .11 The contractor must provide a nailing base for the storage shelves and a nailing base where required for attaching the various pieces of furniture.

## **2.4 Counters, cabinets and built-in furniture**

- .1 Unless otherwise specified, the frames will be in 16 mm thick particleboard, laminate finish.
- .2 Countertop:
  - .1 Except for the coffee counter, all counter tops must be made of 19 mm plywood covered with grade 304 stainless steel, satin finish.
- .3 Back: laminate on 16 mm thick particleboard, except when indicated otherwise.
- .4 Baseboards: 19 mm thick plywood, cut to insert the baseboard provided and installed by the floor covering installer. COORDINATE THE HEIGHT OF THE BASE OF THE BUILT-IN FURNITURE WITH THE BASEBOARDS OF THE FLOOR COVERING.
- .5 Shelves:
  - .1 16 mm melamine panels. The shelves will be supported at 915 mm c/c minimum, edge banding in 3 mm solid PVC.
  - .2 All "mobile" pieces of furniture will rest on recessed metal levellers.

## **2.5 Drawers**

- .1 Drawers manufactured in compliance with the AWMAC quality standards and with the following requirements.
- .2 Front: 16 mm melamine panels, covered in laminate, edge banding and rivets in 3 mm solid PVC.
- .3 Sides and back: 16 mm thick melamine panels, color matching the cabinets.
- .4 Base: 16 mm thick melamine panels, color matching the cabinets.

## **2.6 Hardware**

- .1 All products identified by a company name can be replaced by an equivalent, but must be approved by the departmental representative.
- .2 The hardware used will be of the highest quality in their respective class; It will be chosen according to its function and its durability.

- .3 Counters and cabinets: In addition to the hardware items already identified in the drawings, provide the parts described below.
  - .1 Handles: "U" shape, stainless steel, diameter of 10mm, projection of 35mm, overall length of 185mm, fixation of 125mm center to center.
  - .2 Concealed hinges: Made from steel, chrome finish, hinge opening angle of 170°, equipped with a soft-closing mechanism, coordinate for doors near to a wall or another obstacle.
  - .3 Full extension drawer slide, 50 kg load capacity: Made from cast steel, steel ball bearing; made with end stops, white Euro epoxy finish.
  - .4 Bumpers: Recessed plastic.
  - .5 L-shaped shelf pin: metal, with anti-tip retainer, nickel finish, to screw.
  - .6 Lock: Rim lock with strikeplates for doors of cupboards, 25 mm cylinder diameter, nickel finish, with (4) blank keys. Coordinate their numbering with the Departmental Representative; the keys for the cylinder locks will be on the master key of the Departmental Representative.
  - .7 (2) Hardware kits for Dutch door:
    - .1 Solid wood door: hardwood or wood veneer 1/8" (3 mm) thick, laminated longitudinally with hot pressing using a type 1 structural adhesive, everything complaint with ASTM D545693 (LVL FSC) or laminated strand lumber (LSL), which may include a piece of 7/8" (22 mm) hardwood, for a total width of 1 3/16" (30 mm): Grade to paint.
    - .2 (2) hinges 5-BB 41/2 X 4 X 652
    - .3 (1) Storeroom lock: ND-80-LD x sparta x 626
    - .4 (1) Core Corbin 626 finish
    - .5 (1) Automatic wall holder WS-45 X 626 from Ives
- .4 **Perforations**
  - .1 Perform all drill holes and cuts required for the installation of mechanical and electrical services, sinks, pipes, wires, switches, electrical outlets, telephones, computers, covered wires and others.

### 3. EXECUTION

#### 3.1 Installation

- .1 Place and secure all structures and components to be level and square.
- .2 Draw and trim the appropriate contours for the elements on adjacent walls so that they fit into the corners and around pipes, columns, sanitary and electrical appliances, sockets or other recessed parts.
- .3 Adjust the hardware pieces with precision and fasten according to the manufacturer's instructions.

- .4 Provide robust fasteners to firmly secure wall-mounted cabinets.
- .5 To use lag bolts and strips for the countertop joints. Space the joints up to 406 mm between axes and do not place within 75 mm from the edges. The joints must be tight and flush.
- .6 Make the cuts required for inserts, grates, electrical appliances, sockets or other recessed objects. Round the re-entrant corners, chamfer the edges and seal the core panel sections exposed by the cuts.
- .7 Carefully apply a thin line of sealant (clear silicone) over the joint separating the laminate splashboard and the adjacent wall covering.
- .8 Apply a bituminous coating on wood frame elements that come into contact with structures containing cement, plaster or other water-based binder.
- .9 Once the installation is complete, install and adjust the fittings for the cabinet doors, drawers and shelves made of wood or laminate.
- .10 Prepare surfaces that require a filler, stain or varnish, or paint.

### 3.2 Clean-up

- .1 Clean-up during work: Perform clean-up activities in accordance with section 01 74 11 - *Cleaning*.
  - .1 Ensure the locations are clean at the end of each working day.
- .2 Final clean-up: Remove the surplus equipment/materials, waste, tools and equipment in accordance with section 01 74 11 - *Cleaning*.
  - .1 Clean drawers, cabinet interior, exterior surfaces, joinery and cabinetry structures.
  - .2 Remove excess glue from surfaces
  - .3 After the work is completed, retouch the damaged or scuffed furniture.
  - .4 To wipe furnishing to remove fingerprints and other marks; ensure everything is clean
- .3 Waste management: Separate waste for their reuse/repurposing and recycling in accordance with section 01 74 21 - *Construction and demolition waste management and disposal*

### 3.3 Protection

- .1 Protect the structures from damage until the final inspection.
- .2 Protect the materials and elements against all damage during construction work.
- .3 Repair damage caused by the installation of the cabinetwork elements to the adjacent equipment and materials.

### **3.4 Furniture**

- .1 Furniture list (see architectural plans).

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 - Health and safety requirements
- .3 Section 01 74 11 - Cleaning
- .4 Section 01 74 21 - Construction and demolition waste management and disposal
- .5 03 30 00 - Cast-in-place concrete
- .6 Section 07 21 16 - Blanket insulation

### 1.2 References

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing, and for Roof Coatings
  - .2 CAN/CGSB-37.3-M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing
  - .3 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement
  - .4 CGSB 37-GP-6Ma-83, Asphalt, Cutback, Unfilled, for Dampproofing
  - .5 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing
  - .6 CGSB 37-GP-11M-76(R1984), Application of Cutback Asphalt Plastic Cement
  - .7 CGSB 37-GP-6Ma-83, Application of Unfilled Cutback Asphalt for Dampproofing
  - .8 CGSB 37-GP-15M-76(R1984), Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Water Proofing,
  - .9 CAN/CGSB-37.16-M89, Filled, Cutback Asphalt for Dampproofing and Waterproofing
  - .10 CAN/CGSB-37.28-M89,, Reinforced, Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and Waterproofing
  - .11 CGSB 37-GP-36M-76, Application of Filled Cutback Asphalts for Dampproofing and Waterproofing
  - .12 CGSB 37-GP-37M-77, Application of Hot Asphalt for Damp-proofing or Waterproofing

- .2 Canadian Standards Association (CSA) / CSA International)
    - .1 CAN/CSA-A123.4-04 (R2008), Asphalt for Use in Construction of Built-Up Roof Coverings and Waterproofing Systems
  - .3 Health Canada
    - .1 Workplace Hazardous Materials Information System (WHMIS)
      - .1 Data sheets (DS).
  - .4 National Research Council Canada (CNRC) / Institute for Research in Construction (IRC)
    - .1 Canadian Construction Materials Centre (CCMC).
- 1.3 Data Sheets
- .1 Submit the required data sheets, manufacturer's instructions and documentation. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing. Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted*.
  - .2 Submit the data sheets required under the Workplace Hazardous Materials Information System (WHMIS) in accordance with section 01 35 29.06 - *Health and safety requirements*.
  - .3 The data sheets for asphalt waterproofing must indicate the following:
    - .1 product characteristics;
    - .2 performance criteria;
    - .3 implementation methods;
    - .4 constraints.
  - .4 Provide manufacturer's instructions when work requires special handling, installation / implementation and cleaning procedures.
- 1.4 Quality assurance
- .1 Perform the work in accordance with the printed manufacturer's requirements and this specification. Inform the designer if there are any discrepancies before starting work.
  - .2 Keep a copy of the manufacturer's documentation on-site for the duration of the work.
  - .3 When work begins and throughout the duration of the work, ensure the manufacturer's representative has access to the waterproofing membrane on-site.
  - .4 The materials used in this Section, including primers, sealants and membranes, bitumen-based protection panels, composite drainage panels and expansion joint membranes must be fully compatible and supplied and / or produced by the same manufacturer.
  - .5 You must submit copies of the valid membrane manufacturer's ISO certification, including the manufacture of the membrane, primer, sealants, adhesives and bitumen-based protection panels.

1.5 Transportation, storage and handling

- .1 Transport, store and handle materials in accordance with the manufacturer's instructions.
- .2 Store materials in a dry place sheltered from bad weather and as not to touch the ground.
- .3 Store materials on supports to prevent deformation.
- .4 Remove only the quantity of material from storage that will be used on the same day.
- .5 Store materials in accordance with the manufacturer's written instructions.

1.6 Waste management and disposal

- .1 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .2 Recover and sort all paper packaging materials, plastic, polystyrene, corrugated cardboard and place them in the appropriate bins on-site for recycling in accordance with the waste management plan.
- .3 Send waterproofing membranes, sealants and bitumen impregnated products to a recycling facility approved by the Departmental Representative.

1.7 Conditions for implementation

- .1 No installation work must be performed in wet weather or in adverse weather conditions and on built surfaces that are frozen or wet.
  - .1 Maintain the ambient temperature and the water repellent's surface temperature above 5 degrees Celsius during the 24 hour period prior to the water repellent application, during the implementation and for the 24 hours following.
- .2 Comply with the safety requirements of the Workplace Hazardous Materials Information System (WHMIS) with respect to the use, handling, storage and disposal of bituminous products, sealants, primers and impregnated and caulking products.

2. PRODUCTS

2.1 Materials

- .1 Self-adhesive seal for waterproofing the foundations:
  - .1 Self-adhesive membrane composed of modified bitumen with SBS polymers and a woven coated polyethylene on the surface. The self-adhesive backing is coated with a detachable silicone film.
  - .2 Primer layers: Primer to promote adhesion of self-adhesive membranes to porous substrates at temperatures above -10°C (14 ° F). It is composed of synthetic SBS rubbers, resins known for their adhesion and volatile solvents. It can also be used as a primer on wood, metal or concrete surfaces.
  - .3 Sealing putty: Black sealing putty with a base of SBS modified bitumen, fibers, mineral materials and solvent.

### 3. EXECUTION

#### 3.1 Quality of work execution

- .1 Condition the membrane at room temperature, above 5 degrees Celsius:
  - .1 below its flash point;
  - .2 at or below the blow-molding temperature;
  - .3 in the viscosity range of temperatures, rather than implementation.

#### 3.2 Preliminary work

- 1. All surfaces must be sound, dry, clean and free of oil, grease, dust, excess mortar, gel or other contaminants. Fill the grooved areas of substrate to obtain a homogeneous plane.
- 2. The fresh concrete must cure for at least 7 days and must be dry before applying the waterproofing membranes. Light structural concrete must cure for at least 14 days.
- 3. Use a primer coat suitable for the waterproofing membrane as recommended by the manufacturer depending on the air / surface temperature at the time of application.
- 4. Any cracks in the concrete from 1.5 to 3 mm in width must be pretreated with a liquid membrane coating of 1.5 mm (60 mil) wide centered on the crack. A strip of waterproofing membrane 150 mm wide centered on the crack can also be applied. Leave 75 mm for the end coverings.
- 5. Reverse horizontal to vertical transition zones must be pretreated with a 19 mm liquid membrane seal placed vertically and horizontally from the angle. Apply a waterproofing membrane strip of at least 225 mm centered in the joint.
- 6. All external corners must be pretreated with a sealing membrane strip of at least 225 mm centered at the joint.
- 7. When three or more planes come into contact, reinforce with pieces of the waterproofing membrane backing sheets in accordance with the manufacturer's instructions.

#### 3.3 Application of self-adhesive waterproofing membrane

- .1 Apply a waterproofing membrane of 2400 mm long or less to the prepared substrate (apply a double coat for horizontal application).
- .2 Overlap by 65 mm on each side and at the ends. Align and remove the protection film. Press firmly in place. Immediately roll all overlays with a worktop roller for caulking. If several lengths are required on a vertical surface, apply with a shingle.
- .3 Finish the membrane using a sealing compound for end joints or a termination bar, for the strips or counter flashing as indicated. Refer to the manufacturer's standard operating drawings.
- .4 All 300 mm overlaps with a 90 degree plane change must be caulked with a sealant for end joints.



3.4 Clean-up

- .1 Clean-up during work: Perform clean-up activities in accordance with section 01 74 11 - *Cleaning*.
  - .1 Ensure the locations are clean at the end of each working day.
- .2 Final clean-up: Remove the surplus equipment/materials, waste, tools and equipment in accordance with section 01 74 11 - *Clean-up*.
- .3 Waste management: Separate waste for their reuse/repurposing and recycling in accordance with section 01 74 21 - *Construction and demolition waste management and disposal*

3.5 Protection

- .1 Protect the materials and elements against all damage during construction work.
- .2 Repair the damages caused by adjacent equipment and materials during waterproofing applications

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 - Health and safety requirements
- .3 Section 01 74 21 - Construction and demolition waste management and disposal
- .4 Section 06 10 00 - Carpentry
- .5 Section 07 26 00 - Sheet membrane air and vapour seal
- .6 Section 09 21 16 - Gypsum board

### 1.2 References

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C208-95(2001), Specification for Cellulosic Fiber Insulating Board.
  - .2 ASTM C591-01, Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
  - .3 ASTM C612-04, Standard Specification for Mineral Fibre Block and Board Thermal Insulation.
  - .4 ASTM C726-05, Standard Specification for Mineral Fiber Roof Insulation Board.
  - .5 ASTM C728-05, Standard Specification for Perlite Thermal Insulation Board.
  - .6 ASTM C1126-04, Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.
  - .7 ASTM C1289-05a, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
  - .8 ASTM E96/E96M-05, Standard Test Methods for Water Vapour Transmission of Materials.
- .2 Canadian Gas Association (CGA)
  - .1 CAN/CGA-B149.1-05, Natural gas and propane installation code
  - .2 CAN/CGA-B149.2-05, Propane storage and handling code
- .3 Canadian General Standards Board (CGSB)
  - .1 CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation
- .4 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S604-M91, Standard for Factory-Built Type A Chimneys.

- .2 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
- .3 CAN/ULC-S702-97, Standard for Mineral Fibre Thermal Insulation for Buildings
- .4 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)  
Data sheets (DS)

### 1.3 Documents and samples to submit

- .1 Data Sheets
  - .1 Submit a PDF copy of the required data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 – *Documents and samples to submit*.
  - .2 Submit the data sheets required under the Workplace Hazardous Materials Information System (WHMIS), which must comply with this system according to section 01 33 00 – *Documents and samples to be submitted*. The data sheets must specify the VOC emission rate for insulation and adhesives.
- .2 Manufacturer's Instructions
  - .1 Submit the installation instructions provided by the manufacturer.

### 1.4 Quality assurance

- .1 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .2 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .3 Health and safety: take the necessary measures in workplace health safety compliant with section 01 35 29.06 - *Health and Safety*.

### 1.5 Waste management and disposal

- .1 Separate waste for their reuse/repurposing and recycling compliant with section 01 74 21 - *Construction and demolition waste management and disposal*
- .2 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .3 Recover and sort all packaging materials and place them in the appropriate bins on-site for recycling in accordance with the waste management plan.

## 2. PRODUCTS

### 2.1 Insulation

- .1 Rigid insulation in extruded polystyrene foam panels (FOR USE BELOW GROUND): compliant with the CAN/ULC-S701 standards, type 4, and thickness as indicated.
  - .1 Thermal resistance per inch (25 mm), ASTM C518 @ 75°F (24 °C) average temp.,  $\pi^2 \bullet h / \text{BTU } (^\circ\text{C} \bullet \text{m}^2 / \text{W})$  min., R value (RSI): 5.0 (0.88)
  - .2 Compressive strength: ASTM D1621, psi (kPa), min 30 (207)
  - .3 Water absorption, ASTM D 2842, % per volume, max. 0.7
  - .4 Water vapour transmission, ASTM E96, perm (ng/Pa•S•m<sup>2</sup>), max: 1.5
  - .5 Maximum operating temperature, °F (°C): 165 (74)
  - .6 Coefficient of linear thermal expansion, ASTM D 696, po/po/°F (mm/m/°C):  $3.5 \times 10^{-5}$  / (6.3 X 10<sup>-3</sup>)
- .2 Rigid insulation / vapour barrier for walls and ceilings for interior applications: 25 mm thick expanded polystyrene panels with graphite particles and laminated with an aluminized membrane.
  - .1 Thermal resistance per inch (25 mm), ASTM C518 @ 75°F (24 °C) average temp.,  $\pi^2 \bullet h / \text{BTU } (^\circ\text{C} \bullet \text{m}^2 / \text{W})$  min., R value (RSI): 4.6 (0.81)
  - .2 Compressive strength: ASTM D1621, psi (kPa), min 35 (240)
  - .3 Water absorption, ASTM D 2842, % per volume, max. 3
  - .4 Water vapour transmission, ASTM E96, perm (ng/Pa•S•m<sup>2</sup>), max: 1.0 (0.017)
  - .5 Maximum operating temperature, °F (°C): 167 (75)
  - .6 Coefficient of linear thermal expansion, ASTM D 696, po/po/°F (mm/m/°C):  $3.5 \times 10^{-5}$  / (6.0 X 10<sup>-5</sup>)
  - .7 Vapour barrier missivity, ASTM C-1371: 0,05
- .3 Intermediate insulation coating for external application:: Laminated insulation panel 28.6 mm thick composed of a type II expanded polystyrene panel, laminated on a fiberboard panel. Compliant with the following standards:
  - .1 CAN/ULC-S701-11, Type II
  - .2 CAN/ULC-S706-09, Type II Class 3 Grade 1
  - .3 CCMC #12044-L
  - .4 CCMC #12895-L
  - .5 ASTM C518 (Thermal resistance): RSI-0.71 (R4.03)
  - .6 ASTM E96 (Water vapour transmission)

.7 Fiberboard: less than 2000 ng/(Pa-S-m2)

.8 Polystyrene: less than 200 ng/(Pa-S-m2).

## 2.2 Adhesives

- .1 Adhesive (for polystyrene insulation) **installed with a trowel**: latex-based adhesive, compatible with extruded, non-flammable polystyrene insulation and solvent free. Compliant with the CGSB 71-GP-24M standard, type 2.

## 2.3 Accessories

- .1 50 mm through-type fasteners, 50 mm thick, cold-rolled carbon steel and perforated 0.8 mm thick, underside with adhesive coating; steel rod annealed 2.5 mm in diameter, of appropriate length for the thickness of the insulation; "Fixed" washers with a diameter of 50 mm.
- .2 Nails: Galvanized steel, measuring 25 mm more than the thickness of the insulation, compliant with the SCA B111 standard.
- .3 Staples: Legs at least 12 mm long.
- .4 Tape: Type recommended by the manufacturer.

# 3. EXECUTION

## 3.1 General Information

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations or specifications, including technical bulletins and installation instructions specified in product catalogs and on the carton's packaging, in addition to the indications in the data sheets for the EXECUTION OF WORK QUALITY
- .2 Only install insulation on dry supports.
- .3 Install insulation to provide continuous thermal protection to the building's elements and spaces.
- .4 Carefully adjust insulation around electrical boxes, fittings, and piping.
- .5 Carefully cut and trim the insulation so that it completely fills the space. Ensure joints are tight and offset vertical joints. Use only insulation panels with edges that have no chips or breaks. Use the largest possible panels to minimize the number of joints required.
- .6 If multiple layers of insulation are required, offset vertical and horizontal joints.
- .7 Do not cover the insulation until the work has been inspected and approved by the Departmental Representative.

## 3.2 Place insulation in exterior wall panels

- .1 Apply a layer of adhesive to the insulation panels, compliant with the manufacturer's recommendations.

- .2 In addition to gluing, insulate mineral fiber insulation with fasteners and washers, at least 2 per 600 mm x 1200 mm panel. Ensure the joints are tight between the panels and cut the tie rod at 3 mm from the washer.
- .3 Do not glue the joints of the insulation panels that coincide with the expansion or insulation joints. Before placing the insulation, seal these joints with a continuous strip of polyethylene, 150 mm wide and 0.15 mm thick, glued with a compatible adhesive.

### 3.3 **Insulation for the foundation walls and slab**

- .1 Insulate the foundation walls with tongue and groove insulation sheets, height and thickness specified in the architectural plans.
- .2 Surface preparation: Surfaces must be flat, clean, dry and free of contaminants that may reduce adhesion. Roughcast concrete and masonry surfaces to create a smooth surface.
- .3 Apply the adhesive with a V-notch ceramic trowel with 3 mm teeth
- .4 Place the panels vertically against the inside peripheral foundation walls. Add mechanical fasteners every 610 mm c/c.

### 3.4 **Clean-up**

- .1 When work is complete, remove the surplus equipment/materials, waste, tools, equipment and safety barriers from the site.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 74 21 - Construction and demolition waste management and disposal
- .3 Section 06 10 00 - Carpentry
- .4 Section 09 21 16 - Gypsum board

### 1.2 References

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
  - .2 ASTM C665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - .3 ASTM C1320-05, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .2 Canadian Gas Association (CGA)
  - .1 CAN/CGA-B149.1-05, Natural gas and propane installation code
  - .2 CAN/CGA-B149.2-05, Propane storage and handling code
- .3 Canadian Standards Association (CSA) / CSA International
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S604-M1991, Standard for Factory-Built Type A Chimneys
  - .2 CAN/ULC-S702-1997, Standard for Mineral Fibre Thermal Insulation for Buildings

### 1.3 Documents/samples to be submitted

- .1 Data Sheets
  - .1 Submit the required technical data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 -*Documents and samples to be submitted*.
- .2 Manufacturer's Instructions
  - .1 Submit the installation instructions provided by the manufacturer.

1.4 Quality assurance

- .1 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .2 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

1.5 Waste management and disposal

- .1 Separate waste for their reuse/repurposing and recycling compliant with section 01 74 21 - *Construction and demolition waste management and disposal*
- .2 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .3 Recover and sort all packaging materials in paper, plastic, polystyrene, corrugated cardboard and place them in the appropriate bins on-site for recycling in accordance with the waste management plan.

2. PRODUCTS

2.1 Insulation

- .1 THERMAL INSULATION ON INTERMEDIATE FACING (THERMAL BRIDGE BREAKS): Semi-rigid mineral wool batt insulation, 32 mm x 1219 mm x 2438 mm, made from basalt and steel slag, moisture-repellent and compliant with the following standards:
  - .1 ASTM C 612 (Mineral Fiber Block and Board Thermal Insulation) IVB standard
  - .2 CAN/ULC S702 Type I
  - .3 CAN/ULC S102 flame spread value = 0 and smoke developed value = 10
  - .4 CAN4-S114 - non-combustibility
  - .5 ASTM C1104 (water vapour sorption 0.05%
  - .6 ASTM E96 (water vapour) 1768 ng/Pa.s.m<sup>2</sup>
  - .7 ASTM C665: corrosiveness
  - .8 ASTM C 518 (C177) thermal resistance RSI=0.70 (R4)
  - .9 ASTM C1338 (fungi)
  - .10 ASTM C209 water absorption 1.2%
  - .11 ASTM C165 compressive resistance: 28 KPa at 10% / 75 KPa at 25%
- .2 THERMAL INSULATION BETWEEN THE WOODEN STUDS: Semi-rigid mineral insulation, 387 mm x 1194 mm x 140 mm, made from basalt and steel slag, moisture-repellent and compliant with the following standards:
  - .1 CAN/ULC S702 Type I



- .2 CAN/ULC S102 flame spread value = 0 and smoke developed value = 10
- .3 CAN4-S114 - non-combustibility
- .4 ASTM C356, ASTM C665, and WITH standards ASTM C 518 (C177) and SCA A101 RSI factor indicated
- .3 ACOUSTIC INSULATION: made with basalt and steel slag, batts or blanket: Non-combustible, water resistant, Chemically inert; non-corrosive, CFC or HCFC free, sag resistant, compliant with the standard
  - .1 CSA A101 type 1, with the environmental choice designation in the thickness indicated
  - .2 CAN/ULC S702 Type I
  - .3 CAN/ULC S129 smoulder resistance = 0.09%
  - .4 CAN/ULC S102 flame spread value = 0 and smoke developed value = 10
  - .5 CAN4-S114 - non-combustibility
  - .6 ASTM E 136 - non-combustibility
  - .7 ASTM C423 Sound absorption

.8 **Absorption coefficients at frequencies of**

Thickness	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	NRC
24.4 mm	0,14	0,25	0,65	0,90	1,01	1,01	0,70
38.1 mm	0,18	0,44	0,94	1,04	1,02	1,03	0,85
50.8 mm	0,28	0,60	1,09	1,09	1,05	1,07	0,95
72.2 mm	0,52	0,96	1,18	1,07	1,05	1,05	1,05
101.6 mm	0,86	1,11	1,20	1,07	1,08	1,07	1,10

- .4 Accessories
  - .1 Fasteners
    - .1 Fasteners: 50 mm through-type fasteners, 50 mm thick, cold-rolled carbon steel and perforated 0.8 mm thick, underside with adhesive coating; steel rod annealed 2.5 mm in diameter, of appropriate length for the thickness of the insulation; "Fixed" washers with a diameter of 50 mm.
  - .2 Nails: Galvanized steel, measuring 25 mm more than the thickness of the insulation, compliant with the CSA B111 standard.
  - .3 Staples: Legs at least 12 mm long.
  - .4 Tape: Type recommended by the manufacturer.

### 3. EXECUTION

#### 3.1 Manufacturer's Instructions

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations or specifications, including technical bulletins and installation instructions specified in product catalogs and on the carton's packaging, in addition to the indications in the data sheets.

#### 3.2 Placing insulation

- .1 Install insulation to provide continuous thermal protection to the building's elements and spaces compliant with the ASTM C1320 standard.
- .2 Carefully adjust insulation around the elements to recover, in addition to around the electrical boxes, pipes, air ducts and intersecting frames.
- .3 Not to compress the insulation to fit into the areas to be insulated.
- .4 Leave a space of at least 75 mm between the insulation and all elements that emit heat, e.g. lighting, and at least 50 mm between the insulation and type A chimney walls compliant with the CAN/ULC - S604 standard, and type B or L exhaust ducts compliant with the CAN/CGA - B149.1 and CAN/CGA - B149.2 standards.
- .5 Do not cover the insulation until the work has been inspected and approved by the Departmental Representative.

#### 3.3 Clean-up

- .1 When work is complete, remove the surplus equipment/materials, waste, tools, equipment and safety barriers from the site.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 – Health and safety requirements
- .3 Section 01 74 11 - Cleaning
- .4 Section 06 10 00 - Carpentry
- .5 Section 07 62 00 - Sheet metal flashing and trim
- .6 Section 07 92 00 - Joint sealant
- .7 Section 08 11 16 - Aluminum doors and frames

### 1.2 References

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction
  - .2 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet for Use in Building Construction
- .2 ASTM E 2357: Standard test method for determining air leakage of air barrier assemblies.
- .3 ASTM E 2178: Standard test method for air permeance of building materials.
- .4 ASTM E 283: Standard test method for determining the rate of air leakage through exterior windows, curtains wall, and doors under specified pressure differences across the specimen.
- .5 ASTM E 96: Water vapour transmission of materials.
- .6 ASTM C 920: Standard specification for elastomeric joints sealants.
- .7 ASTM C 1193: Standard guide for use of joint sealants
- .8 ASTM D 1709 - 09 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method
- .9 ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials
- .10 ASTM E 154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs
- .11 ASTM E 1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

- .12 ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
- .13 ASTM F 1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
- .14 ASTM E 84: Test method for surface burning characteristics of building materials.
- .15 ICC-ES AC 38: Acceptance criteria for water resistive barriers.
- .16 ICC-ES AC 38: Acceptance criteria for roof underlayments.
- .17 ICC-ES AC 38: Acceptance criteria for roof underlayment for use in severe climates.
- .18 AMMA 2400: Standard practice for installation of windows with a mounting flange in stud frame construction.
- .19 ASTM E 2112: Standard practice for installation of exterior windows, doors and skylights.
- .20 AMMA 711-05: Specification for self-adhering flashing used for installation of exterior wall fenestration products.
- .21 AATCC – American association of textiles chemists and colorists.
  - .1 Test method 127 water resistances: hydrostatic pressure test.
- .22 TAPPI
  - .1 Test method T-410; Grams of paper and paperboard) weight per unit area
  - .2 Test method T-460; Air resistance (gurley hill method).

### **1.3 Documents/samples to be submitted for approval/information**

- .1 Data Sheets:
  - .1 Submit the required data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 -*Documents and samples to be submitted*. The data sheets must indicate:
    - .1 product characteristics;
    - .2 performance criteria;
    - .3 constraints
  - .2 Submit the data sheets required under the Workplace Hazardous Materials Information System (WHMIS).
  - .3 Quality assurance
    - .1 Certificates: Submit the documents signed by the manufacturer. Certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

- .2 Instructions: Submit the installation instructions provided by the manufacturer and comply with the manufacturer's requirements, recommendations and written specifications, including any technical bulletins, handling, storage and installation instructions and specifications

#### **1.4** Quality assurance

- .1 Health and safety: take the necessary measures in workplace health safety compliant with section 01 35 29.06 - *Health and Safety requirements*.

#### **1.5** Product storage, protection and handling

- .1 Refer to the manufacturer's instructions for proper storage and handling of air / vapour barrier materials.
- .2 Deliver materials and materials in their packaging with the manufacturer's seal and label intact.
- .3 Store the material and equipment so they are not damaged or contaminated.
- .4 Store materials and equipment in a dry area protected from frost, dirt and damage.

#### **1.6** Waste management and disposal

- .1 Rather than transporting the wood waste to a landfill, place in the appropriate recycling bins installed on-site.
- .2 Send materials that can be reused to the nearest construction material recovery facility.
- .3 Send adhesives, coatings and sealant and caulking products to a collection site for special waste.

#### **1.7** Coordination

- .1 Ensure the perfect continuity of the air and water vapour waterproofing system. Ensure that the products in the system are compatible with the products that they come into contact with.

#### **1.8** Warranty

- .1 Provide a 5-year manufacturer's warranty on components and their implementation.

### **2. PRODUCTS**

#### **2.1** Plastic vapour retarder under concrete slab

- .1 Specification based on the performance: The vapor retarder membrane must be manufactured from virgin polyolefin resins and meet the following minimum requirements when tested according to the ASTM E 1745 standard:
  - .1 Tensile strength (ASTM E 154, Section 9): 84 lb/in.
  - .2 Impact resistance (ASTM D 1709): 4394 g.

- .3 Water-Vapour Transmission (ASTM E 154, Sections 7, 8, 11, 12, 13), by ASTM E 96, Method B or ASTM F 1249).
  - .1 As received: 0,0093 perm.
  - .2 After wetting and drying: 0.0122 perm.
  - .3 Resistance to Plastic Flow and Elevated Temperature: 0.0121 perm.
  - .4 Effect of Low Temperatures on Flexibility: 0.0138 perm.
  - .5 Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0123 perm.
  - .6 Impact resistance (ASTM D 1709): 4394.
- .4 Accessories:
  - .1 Connection tape: High density polyethylene pressure sensitive adhesive tape. Minimal width: 100 mm.
  - .2 Manifold clamps: Make the pipe collar from the vapour barrier material with the pressure sensitive adhesive tape according to the manufacturer's instructions.
- .2 Application of the vapour retarder:
  - .1 Surface preparation:
    - .1 Prepare surfaces according to the manufacturer's instructions.
    - .2 Level, ram or roll the earth or aggregate below the base of the slab.
  - .2 Inspection
    - .1 Examine surfaces where the membrane will be applied. Inform the Departmental Representative if the surfaces are not acceptable. Do not start surface preparation or application until the unacceptable conditions are corrected.
  - .3 Application:
    - .1 Installation must be carried out according to the manufacturer's instructions and ASTM E 1643-98.
    - .2 Unroll the vapour barrier by placing the largest side parallel to the pouring direction.
    - .3 Overlap the vapor barrier on the footing barriers and seal the foundation walls.
    - .4 Overlap the connections along 150 mm and seal with the manufacturer's tape.
    - .5 Seal all protruding objects (including hoses) with the manufacturer's protective sheath for the hose.

- .6 No protrusion of the vapour barrier is permitted except for reinforcing steel and permanent technical equipment.
- .7 Repair the damaged areas by covering them with cut pieces of vapour barrier, taking care to make 150 mm overlaps and adhering the four sides with tape.

## 2.2 Air barrier membrane

- .1 Self-adhesive air barrier membrane, made with a cross-laminated polyethylene film. Designed to serve as a water and air barrier in a rain shield system when installed outside the intermediate wall siding and behind the exterior siding. Compliant with the ASTM E 96 standards, value of 33 perms.
  - .1 Water vapour transmissions: 234 g/m<sup>2</sup> / 24 hours
  - .2 Water vapour transmission, ASTM E96, method A: 1914 ng/Pa.m<sup>2</sup>.s
  - .3 Average dry breaking strength ASTM D 5034: 245 N MD
  - .4 Accelerated-aged ICC-ES AC 48 25 cycles: pass
  - .5 Cycling and elongation ICC-ES AC 48.100 cycles with -29°C (- 20°F): pass
  - .6 Flame spread rating ASTM E 84: 5, class A
  - .7 Air permeance (ASTM E 2178): pass

## 2.3 Vapour barrier membrane

- .1 Vapour barrier membrane Aluminium sheets: ULC approved, compliant with the CAN/CGSB-51.33 standard, type 1, out of bright aluminium, 95% light reflective, attached with an adhesive.
- .2 Waterproofing membrane around openings:
  - .1 The window frames must have a air barrier membrane and vapour barrier installed on-site intended to provide waterproofing by sealing the air barrier and vapor barrier system constructed as follows:
    - .1 Material: Self-adhesive air barrier membrane, SBS-modified bitumen, flexible at low temperatures, impermeable to air, moisture and water, the primer and sealant compliant with ASTM E-2357 and ASTM E-2178, of which the thickness is controlled in the factory. Excellent adhesion to prepared substrates such as concrete, concrete blocks, primed steel, mill finish aluminum, anodized aluminum, galvanized steel, gypsum and plywood panels. Self-healing when penetrated with self-tapping screws.
    - .2 Material width: Sufficient to ensure the waterproofing of the building's air barrier and vapour barrier with the required characteristics for air tightness and migration of water vapour, from the interior of the building towards the exterior.
  - .3 Sealant: Compatible with the vapour barrier used and recommended by the barrier's manufacturer. Compliant with section 07 92 00 - *Joint sealants*.

2.4 Accessories.

- .1 Joint sealing tape: Recommended by the manufacturer.
- .2 Sealant: Compatible with the vapour barrier used and recommended by the barrier's manufacturer. Compliant with section 07 92 00 - *Joint sealants*
- .3 Staples: Legs at least 6 mm long.

3. EXECUTION - MEMBRANE INSTALLATION

3.1 Surface preparation

- .1 Surfaces that will have the **self-adhesive** membrane applied must be free of oil, dust, frost and water in large quantities.

3.2 General Information

- .1 Check that the utility lines have been installed and inspected before installing the air / vapour barrier.
- .2 Always install the vapour barrier on the warm side of the exterior walls to form a continuous barrier.
- .3 Use the largest possible sheets to minimize the number of joints required.
- .4 Ensure that the sheets form a continuous barrier. If necessary, repair the perforations and tears with a sealing tape before concealing the structure.

3.3 Application

- .1 Refer to the manufacturer's standard quote for detailed application information.
- .2 Materials should be tempered at room temperature for ease of application.

3.4 Clean-up

- .1 Perform cleaning activities in accordance with section 01 74 11 - *Cleaning*.
- .2 When the installation work and performance control are complete, remove the surplus equipment/materials, waste, tools, and equipment and safety barriers from the site.

3.5 Lap joints

- .1 Seal the lap joints as indicated below:
  - .1 Attach the first sheet to the support.
  - .2 Apply a continuous bead of sealant to the edge of the first sheet, which must coincide with a rigid support element.
  - .3 Overlap the adjacent sheet to a width of at least 150 mm and press firmly against the bead of sealant.



- .4 Secure the vapor barrier to a wooden support by means of staples placed on the overlapping joints through the bead of sealant.
- .2 Ensure that the bead of sealant is continuous. Smooth the folds and ripples that form on the sheet where it overlaps the seal.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 – Health and safety requirements
- .3 Section 01 74 21 - Construction and demolition waste management and disposal
- .4 Section 06 10 00 - Carpentry
- .5 Section 07 26 00 - Sheet membrane air and vapour seal
- .6 Section 07 62 00 - Sheet metal flashing and trim
- .7 Section 07 92 00 - Joint sealants
- .8 Section 09 91 23 - Paint.

### 1.2 References

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A135.6-06, Hardboard Siding Standard
- .2 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM D 5116-10, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-11.3-M87, Hardboard.
  - .2 CAN/CGSB-11.5-M87, Hardboard, Precoated, Factory Finished, for Exterior Cladding
  - .3 CAN/CGSB-11.6-M87, Installation of Exterior Hardboard Cladding
  - .4 CAN/CGSB-51.32-M77, Breather membrane, water vapour permeability.
- .4 Canadian Standards Association (CSA) / CSA International)
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .2 CSA O121-08, Douglas Fir Plywood
  - .3 CSA O151-09, Canadian softwood plywood.
  - .4 CAN/CSA-Z809-08, Sustainable forest management A document-guide.
- .5 Environmental Choice Program (ECP)
  - .1 DCC-045-95, Sealants and Caulking Compounds.

- .6 National Lumber Grades Authority (NLGA)
  - .1 Classification rules for Canadian softwood established by the Standard Grading Rules For Canadian Lumber (NLGA) 2010
- 1.3 Warranty
  - .1 The manufacturer of the wood facing will provide a written and signed document, submitted in the name of the Departmental Representative, certifying the performance of said product produced for twenty-five (25) years against the appearance of wood decay (rot).
  - .2 This warranty will cover the removal and the replacement of the defective products, including the labour. The warranty must be full and complete for the entire warranty period specified. No letter from the manufacturer modifying its standard warranty will be accepted and the certificate must reflect these requirements.
- 1.4 Documents / samples to be submitted for approval / information
  - .1 Data Sheets
    - .1 Submit the required data sheets, manufacturer's instructions and documentation relating to wooden siding. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing
    - .2 Submit the data sheets required for WHIMS, in accordance with section 01 35 29.06 - *Health and safety requirements*. The data sheets must indicate the VOC emission rate of the sealant and caulking products during the application and curing period.
  - .2 Product samples
    - .1 Submit eight (8) samples of 140 mm X 305 mm of siding materials in the prescribed form, colors predetermined by the Departmental Representative (see subparagraph 2 below).
    - .2 To determine the final color of the facing, the contractor must make the prototypes (test of completion) on the specified wood facing and type. For this purpose, provide at least eight (8) prototypes whose test colors will be determined by the Departmental Representative in the manufacturer's standard range.
    - .3 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted*.
  - .3 Manufacturer's Instructions
    - .1 Submit the installation instructions provided by the manufacturer.
- 1.5 Quality assurance
  - .1 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

- .2 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
    - .1 Regional materials and equipment: Provide evidence that the project incorporates regional products and materials / equipment.
    - .2 Wood Certification: Submit the certified wood vendor's (or manufacturer) Chain of Custody certificate number certified CAN/CSA-Z809 or FSC or SFI.
  - .3 Pre-Implementation Meeting: Conduct a meeting to review the work requirements, the manufacturer's installation instructions and the warranty terms provided by the manufacturer.
- 1.6 Transportation, storage and handling
- .1 Transport, store and handle materials in accordance with the manufacturer's instructions.
  - .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address.
  - .3 Storage and handling:
    - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area compliant with the manufacturer's recommendations.
    - .2 Store wooden siding to protect them from marks, scratches and scrapes.
    - .3 Replace damaged materials and equipment with new materials and equipment.
  - .4 Packaging Waste Management: Recover packaging waste for reuse / repurposing in accordance with the waste management plan compliant with section 01 74 21 - *Construction and demolition waste management and disposal*.

## 2. PRODUCTS

### 2.1 Materials / Equipment

- .1 Wooden plank panelling: Compliant with the classification rules for Canadian softwood established by the Standard Grading Rules For Canadian Lumber (NLGA) 2010
  - .1 Tongue and groove vertical facing: larch wood, superior category (without knots), primer applied in factory, textured and width same as existing coating.
  - .2 Finish: See section 09 91 23 - *Paint*.
- .2 Intermediate coating membrane: Compliant with the CAN/CGSB-51.32 standard and section 07 26 00 - *Sheet membrane air and vapour seal*
- .3 Accessories: visible fittings, closing parts, coronation of normal production parts, finish matching the wall covering.
- .4 Fasteners: Nails compliant with the CSA B111 standard, in hot-dip galvanized steel, dimensions according to requirements', with spiral rod finish.
- .5 Sealing product: Refer to section 07 92 00 - *Joint sealant*

### 3. EXECUTION

#### 3.1 Inspection

- .1 Verification of conditions: Ensure that the condition of the surfaces / supports previously implemented in other sections or contracts is acceptable and in accordance with the manufacturer's written instructions.
- .2 Perform a visual inspection of the surfaces/supports in the presence of the Departmental Representative.
- .3 Inform the Departmental Representative of any unacceptable condition detected.
- .4 Begin installation work only after the unacceptable conditions have been corrected.

#### 3.2 Manufacturer's Instructions

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations or specifications, including technical bulletins and installation instructions specified in product catalogs and on the carton's packaging, in addition to the indications in the data sheets.

#### 3.3 Placement (vertical)

- .1 Install the wooden panelling in accordance with CGSB 11-GP-6M and the manufacturer's instructions.
- .2 Install the flashing, the trim for the flashing and support, wood starter strips, re-entrant corner pieces, bordures and flashing for the door and window sill.
- .3 Place wooden board siding in straight lengths and aligned along the furring strips at 300 mm maximum distance between centers and secure with two nails at each attachment point.
- .4 It's forbidden to make intermediate butt joints. If this is not possible, shift the end joints by at least 800 mm and spread evenly over the wall surfaces.
- .5 cut the butt joints at a 45 degree angle towards the exterior. Seal the cut ends.
- .6 Leave a space of 5 mm between the siding and the plaster fillings and accessories of the window bay and door. Caulk with a joint-sealing compound.

#### 3.4 Clean-up

- .1 When work is complete, remove the surplus equipment/materials, waste, tools, equipment and safety barriers from the site.
- .2 Clean the facing with soapy water. Retouch the damaged finish of the floors with touch-up paint.

#### 3.5 Protection

- .1 Protect the materials and elements against all damage during construction work.
- .2 Repair damage caused by the installation of the wood siding to the adjacent equipment and materials.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 – Health and safety requirements
- .3 Section 01 74 21 - Construction and demolition waste management and disposal
- .4 Section 06 10 00 - Carpentry
- .5 Section 07 62 00 - Sheet metal flashing and trim
- .6 Section 07 92 00 - Joint sealants

### 1.2 References

- .1 Aluminum Association (AA)
  - .1 DAF-45-R03, Designation System for Aluminum Finishes - 9th Edition.
  - .2 ASM-35-October 2000, Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.
- .2 ASTM International
  - .1 ASTM A 167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A 240/A 240M-11a, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .3 ASTM A 653/A 653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM A 792/A 792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
  - .5 ASTM B 32-08, Standard Specification for Solder Metal.
  - .6 ASTM B 370-11, Standard Specification for Copper Sheet and Strip for Building Construction.
  - .7 ASTM D 523-89(2008), Standard Test Method for Specular Gloss.
  - .8 ASTM D 822-01(R2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 The Canadian Green Building Council (CaGBC)
  - .1 LEED Canada-NC, version 1.0-2004, LEED (Leadership in Energy and Environmental Design) : Green building rating system for new construction and major renovations (including the 2007 addendum).

- .2 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design) : Green building rating system for new construction and major renovations 2009.
- .3 LEED Canada-CI, version 1.0-2007, LEED (Leadership in Energy and Environmental Design) : Commercial Interiors Green Building Rating System.
- .4 LEED Canada-BE : E and E 2009, LEED (Leadership in Energy and Environmental Design) : Existing green Building Rating System: Operations and Maintenance 2009
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement
  - .2 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound
  - .3 CAN/CGSB-51.32-M77, Breather membrane, water vapour permeability.
  - .4 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential
- .5 CSA International
  - .1 Of the CSA-S136 standard for the calculation of Cold-Formed Steel Structural Members
  - .2 Standards 10M and 20M of the Canadian Sheet Steel Building Institute (CSSBI);
  - .3 CSA A123.3-05(2010), Asphalt Saturated Organic Roofing Felt.
- .6 Department of Justice Canada (JUS)
  - .1 Canadian Environmental Protection Act (CEPA 1999).
- .7 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
  - .1 Data sheets (DS).
- .8 National Research Council Canada (NRCC) / Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)
  - .1 CCMC-2011, Registry of Product Evaluations
- .9 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act (TGD)
- 1.3 Documents/samples to be submitted for approval/information
  - .1 Data Sheets
    - .1 Submit the required data sheets, manufacturer's instructions and documentation relating to sheet metal siding. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing.
    - .2 Proof showing that the manufacturer is approved by the CCMC, with the manufacturer's approval number

- .3 Submit the data sheets required for WHIMS, in accordance with section 01 35 29.06 - *Health and safety requirements*

## .2 Workshop drawings

- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted.*
- .2 Indicate installation details for pre-finished roofing sheets, including joints, type and location of supports, fasteners, flashing, gutters, miter joints and all other metal components related to the roof installation. Include the underlayment in the roof
- .3 The drawings must bear the signature and seal of a professional engineer attesting of the capacity of the metal panels to support the specified loads

## .3 Samples

- .1 Submit one (1) 100mm x 200mm sample of each type of available sheet or plate metal

## 1.4 Warranty

- .1 Provide a written, signed and delivered warranty on behalf of the owner, stating that the metal roofing systems will remain in place and remain watertight for a period of 10 years from the date of substantial completion of work. The warranty will be for a period of ten (10) years covering the total cost of repairs to defects in materials and workmanship and associated damage.

## 1.5 Design requirements

- .1 The manufacturing and installation of the metal roofing system must meet the following requirements:
  - .1 The correct roof load;
  - .2 If the roofing system is to be designed as a shearing membrane, the "Q" shear stress and the "F" flexibility factors calculated during the design must be indicated in the structural plans.
  - .3 The deflection of the roof system must not exceed 1/240 of the range for the specified load.
  - .4 Thermal movement: Thermal movements due to variations in ambient and surface temperatures must be allowed to prevent buckling, component overloading, failure of fittings and other detrimental effects. The calculations must be based on the surface temperature of the materials from solar heat gain and heat loss at night.
    - .1 Temperature variation (range): 20 °C, ambient; 40 °C, surface of the materials
  - .5 Water penetration resistant
  - .6 Corrosion resistant
  - .7 Can withstand loads imposed by the snow retention system (ice dam).



1.6 Transportation, storage and handling

- .1 Transport, store and handle the equipment and materials in accordance with section 01 61 00 - General requirements for products and the written manufacturer's instructions.
- .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address.
- .3 Storage and handling
  - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area compliant with the manufacturer's recommendations.
  - .2 Store siding sheets as to protect them from marks, scratches and scrapes.
  - .3 Replace damaged materials and equipment with new materials and equipment.
  - .4 Packaging Waste Management: Recover packaging waste for reuse / repurposing and the recovery of pallets, crates, padding and other packaging materials by their manufacturer.
- .4 Packaging Waste Management: Recover packaging waste for reuse / repurposing in accordance with the waste management plan compliant with section 01 74 21 - *Construction and demolition waste management and disposal*

2. PRODUCTS

2.1 Plate or sheet metal

- .1 Pre-finished Galvalume plate steel:
  - .1 High performance silicone polyester (SMP) pre-treated Galvalume steel sheets.
  - .2 Color: Coordinate the color of the prefinished sheet metal and metal accessories the same as existing.
  - .3 Specular gloss: 30 units, with an acceptable maximum variation of 5 units of more or less, according to the ASTM D523 standard.
  - .4 Thickness:
    - .1 Minimal nominal thickness of 0.71 mm (24 gauge).
  - .5 Resistance to accelerated weathering with a degree of chalking of 8, discoloration of up to 5 units and erosion of less than 20%: according to the ASTM D822 standard, under the following test conditions.
    - .1 Exposure time to severe weather: 10,000 hours.
    - .2 Exposure time to moisture: 10,000 hours.

2.2 Accessories

- .1 Protective coating: Alkali-resistant bituminous paint.
- .2 Plastic cement: Compliant with the CAN/CGSB-37.5 standard.

- .3 Membrane underlayment: 1.0 mm thick, self-adhesive, elastomeric bitumen based with an anti-slip polyethylene surface, to be installed for the edge strips and valleys, in addition to the entire roof surface and with the following characteristics:
  - .1 Tensile strength ASTM D1970: 15 KN/M
  - .2 Elongation at Break ASTM 1970: 52/24%
  - .3 Tear Resistance ASTM D1970: 375 / 400 N
  - .4 Resistance to Static Puncture ASTM D5602: 400 N
  - .5 Peel Resistance of Adhesives ASTM D1876: 2000 N/m
- .4 Primer: Applied directly on the wooden substrate of the roof.
- .5 Section for the roof vent flashing: Isolated with urethane, compliant with CSA B272-93, 20 year warranty, aluminum finish type 1100-T 1.6 mm thick, removable lid.
- .6 Fastening system:
  - .1 A fastening system that adapts to the temperature and designed to allow thermal expansion and contraction of the exterior roof sheet. Staples must be made from steel, minimum 0.61 mm, with a galvanized steel coating of Z275 or superior.
  - .2 Roof fasteners: As specified by the manufacturer to withstand upward forces due to wind and lateral loads from sliding snow.
- .7 End caps: Provide end caps along the entire length of the roof panel with non-skinning waterproofing material that is non-hardening on the unexposed side. The caps must be mechanically sealed on the lateral joints of the panel. Z275 galvanized sheet steel (zinc-coated) compliant with the ASTM A653M standard, 230 grade for structural quality having a nominal thickness of 0.87 mm at the core. Finish and color must match the roofing sheet.
- .8 Flashing: Compliant with section 07 62 00 - *Sheet metal flashing and trim*. Made from the same materials as the roofing sheet. Custom built to fit with the architectural details, if required.
- .9 Closings: Metal or foam closures, adapted to the type of profile selected, according to the manufacturer's recommendations.
- .10 Gutters and downpipe (industrial): See section 07 62 00 - *Sheet metal flashing and trim*
- .11 Ice dam: Provide ice dams to prevent snowfall / ice in public or public areas. Composed of three (3) 16 mm diameter galvanized steel tubes, embedded in brackets mechanically attached to the cover bracket.
  - .1 Ice dam support: Composed of galvanized steel plates 6 mm thick, welded. The support must be bolted with the covering decking (sheathing) Provide reinforcement under the decking to allow for effective bolting.
- .12 Waterproofing products: See section 07 92 00 – *Joint sealants*.

### 2.3 Shaping

- .1 Manufacture roofing components, including fascias and soffits, in addition to all flashing according to the dimensions, profile types, gauges and other details in the workshop drawings.
- .2 Manufacture all roofing components in the factory, ready for installation on-site.
- .3 Provide the longest sheet metal and accessories possible to minimize the number of joints.

## 3. EXECUTION

### 3.1 Inspection

- .1 Review the work of other sections, including those in this section.
- .2 Ensure that the condition of the surfaces / supports previously implemented in other sections or contracts is acceptable and allows work to be carried out in accordance with the manufacturer's written instructions.
- .3 Inform the Minister's Representative of any unacceptable condition detected.
- .4 Begin installation work only after the unacceptable conditions have been corrected.

### 3.2 Placing

#### .1 Roof materials

- .1 Underlayment: Install the fully bonded underlayment to the solid substrate according to manufacturer's recommendations. Ensure that all the joints overlap and are properly sealed. Secure with insulating layers on adjacent surfaces to ensure leakproof construction. Make a continuous seal around all openings in the insulated metal roofing system.
- .2 Fastening system: Fasten the Tradition staples as per the manufacturer's recommendation, to adjust with the substrate.

#### .2 Installation of the roof panels

- .1 Install the prefinished exterior roof panels on the support clips according to the manufacturer's recommended construction method. Ensure that the lateral covering of the metal roofing sheet is retained by staples and that the appropriate sheet metal cover is maintained.
- .2 Install a sealed cap on all lateral siding as shown in the approved workshop drawings. Apply waterproofing material as required. Adjust the sealed cap as required to protect against all water infiltration.
- .3 When indicated on the approved workshop drawings, attach the ends of the sheet siding compliant with the manufacturer's detailed instructions to form a watertight seal. The visible fasteners must be in a color that matches the roofing sheet.
- .4 Provide notched and formed closures with weatherproof joints at slope changes, in addition to the ridge and eaves as required.

- .5 Install all counter flashing for the gutters, vents as indicated in the workshop drawings. Use concealed fasteners whenever possible. The visible fasteners must be in a color that matches the roofing sheet.

### 3.3 Gutters

- .1 Secure the gutter to the cover bracket with screws, washers and expansion shields installed at a maximum center distance of 1200 mm along the axis of the covering.
- .2 At the roof edge, extend the gutter covering at least 150 mm under the metal covering and finish with a 20 mm clamp secured in place with tabs.
- .3 Staple the bottom of the sheet or plate steel to the edge strip to form a loose 20 mm wide joint.

### 3.4 Clean-up

- .1 Clean the exposed panel surfaces according to the manufacturer's instructions.
- .2 Repair surface defects using an top quality enamel with a color that matches the sheet (the Minister's Representative must authorize the execution of retouching and approve the final result).
- .3 Replace the damaged panels and components that, in the opinion of the Minister's Representative, cannot be repaired in a satisfactory way.

### 3.5 Protection

- .1 Protect the materials and elements against all damage during construction work.
- .2 Repair damage caused by the installation of the metal sheets to the adjacent equipment and materials.

## 4. SPECIFIC INFORMATION

### 4.1 Apparatuses on the roof

- .1 Refer to the plans from the Minister's Representative for all roof exits, plumbing vents and exhaust vents.

**END OF SECTION**

## 1. GENERAL

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 35 29.06 – Health and safety requirements
- .3 Section 07 26 00 - Sheet membrane air and vapour seal
- .4 Section 07 46 23 - Wood siding
- .5 Section 07 61 16 – Sheet metal siding
- .6 Section 07 92 00 - Joint sealants

### 1.2 References

- .1 The Aluminum Association Inc. (AA)
  - .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
  - .2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials (ASTM International)
  - .1 ASTM A 167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A 240/A 240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
  - .3 ASTM A 606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
  - .4 ASTM A 653/A 653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .5 ASTM A 792/A 792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - .6 ASTM B 32-04, Standard Specification for Solder Metal.
  - .7 ASTM B 370-03, Standard Specification for Copper Sheet and Strip for Building Construction.
  - .8 ASTM D 523-89(1999), Standard Test Method for Specular Gloss.
  - .9 ASTM D 822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian Roofing Contractors Association (CRCA)
  - .1 Specifications, Roofing 1997.

- .4 Canadian General Standard Board (CGSB)
  - .1 CAN/CGSB-37.5-M89, Fluxed bitumen plastic mastic.
  - .2 CAN/CGSB-51.32-M77, Coating membrane, water vapor permeable.
  - .3 CAN/CGSB-93.1-M85, Aluminum alloy pre-finished sheet, for residential buildings.
- .5 Canadian Standard Association (CSA International)
  - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt
  - .2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.
  - .3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- 1.3 Documents / samples to be submitted for approval / information
  - .1 Submit the workshop drawings required in accordance with section 01 33 00
  - .2 Data Sheets
    - .1 Submit the required data sheets, manufacturer's instructions and documentation relating to flashing. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing
    - .2 Submit the data sheets required under the Workplace Hazardous Materials Information System (WHMIS) in accordance with section 01 35 29.06 - *Health and safety requirements*
  - .3 Workshop drawings
    - .1 No object
  - .4 Samples
    - .1 Submit two 50 mm x 50 mm samples for each sheet color, finish and type.
- 1.4 Management and waste disposal
  - .1 Remove from site all packing materials and send them to appropriate recycling facilities.
- 2. PRODUCTS
  - 2.1 Pre-finished steel sheets
    - .1 Pre-finished steel sheets:
      - .1 High performance silicone polyester (SMP) pre-finished steel sheets.
      - .2 Color: Coordinate the color of metal flashings and fittings with those of metal cladding and glass units.
      - .3 Specular gloss: 30 units, with an acceptable maximum variation of 5 units of more or less, according to the ASTM D523 standard.

.4 Flashing thickness

.1 Unless indicated otherwise, All architectural flashings, cornices and visible and non-visible flashings must have a minimal nominal thickness of 0.71 mm (24 gauge).

.5 Resistance to accelerated weathering with a degree of chalking of 8, discoloration of up to 5 units and erosion of less than 20%: according to the ASTM D822 standard, under the following test conditions.

.1 Exposure time to severe weather: 10,000 hours.

.2 Exposure time to moisture: 10,000 hours.

.2 Pre-finished aluminum alloy sheet:

.1 Finish coating: Applied in factory, compliant with the CAN/CGSB-93.1 standard and the additional following requirements

.1 Colors : Harmonized with adjacent finishes

.2 PERMANODIQUE (color selected by the Departmental Representative)

.3 Matching finish with the adjacent cladding,

.4 Alloy: 5005, Excellent machinability, weldability and corrosion resistance. Anodized quality.

.1 Minimal yield strength: 100 MPa

.2 Thickness: 1.0 mm (18 gauge)

2.2 Trims

.1 Protective coating: Anti-base bituminous paint.

.2 Plastic compound : according to the CAN/CGSB 37.5 standard

.3 Underlay for metal flashings: breather type sheathing membrane according to CAN/CGSB-51.32 standard.

.4 Waterproofing products: as required in section 07 92 00.

.5 Mounting strips: in the same material and of the same look than the metal sheets used, at least 50 mm, of the same width and thickness than the metal sheets to be used.

.6 Fasteners: in the same material as the metal sheets, according to the CSA B111 standard, length and thickness suitable to the metal flashings.

.7 Gutters, leaf guards and downpipes:

.1 Industrial gutters:

.1 Construction: Galvanized steel, pre-painted, 22 gauge

- .2 Interior support: 16 to 305 mm gauge c/c
- .3 Dimensions: 125 mm X 125 mm
- .2 Anti-shock / ridged downpipes:
  - .1 Construction: 3 mm galvanized steel
  - .2 Finishes: Electrostatic paint
  - .3 Leaf guard: Aluminium
- .8 Washers: in the same material as the metal sheets, 1 mm thick, with rubber gaskets.
- .9 Touch-up paint: as recommended by the manufacturer of the pre-painted metal panels.

### 2.3 Forming

- .1 Metal flashings and other metal elements must be formed according to the details of the FL series of the Canadian Roofing Contractors Association (CRCA) and indications.
- .2 The aluminium flashing and other aluminium sheet elements must be formed in accordance with the requirements of the Aluminum Association, formulated in the AAI document - Aluminum Sheet Metal Work in Building Construction
- .3 Parts must be formed in lengths of 2400 mm at the most. It is important to anticipate, at the joint, the necessary gap for dilatation.
  - .1 It is important to anticipate, at the joint, the necessary gap for dilatation.
- .4 Exposed edges must be folded 12 mm on the lowest side. Angles must be mitered and sealed.
  - .1 Angles must be mitered and sealed with a joint-sealing compound.
- .5 Elements must be square, level and formed with precision, according to the prescribed dimensions, free of deformities or other defects likely to affect their appearance or efficiency.
- .6 Metal surfaces to be embedded in concrete or mortar should be coated with a protective coating.

### 2.4 Metal Flashings

- .1 Flashings, copings and caps must be formed according to the prescribed profiles, with pre-finished steel sheet specified in Article 2.1.1.

### 2.5 Sealing sleeves

- .1 Sealing sleeves must be formed with pre-finished steel sheets as prescribed in article 2.1.1. Sleeves must have a projection of at least 75 mm over the finished roof and must have a continuous flange of 100 mm free of open angles. Joints must be riveted. Diameter of the sleeves must be at least 50 mm more than the diameter of the elements penetrating through the roof.



### 3. EXECUTION

#### 3.1 Installation

- .1 Install steel elements according to the details of the drawings of the FL series of the CRCA and as indicated.
- .2 Hide fasteners, except where the Architect allows them to be left exposed.
- .3 Install an underlay before installing the steel elements. Attach it well and run 100mm lap joints.
- .4 Provide counter-flashings to asphalt coated flashings installed at meeting points between roofing, parapet wall edges, existing built structures or any other vertical surfaces. Make single staple joints and attach them well to the mounting strips and according to the notices.
- .5 Close the end joints and seal them with sealant.
- .6 Insert metal flashings under the cap flashings in order to form a tight joint.
- .7 With a sealant, seal the flashings into the cap flashings.
- .8 Install formed flashings where prescribed, around the elements penetrating through the roof.

#### 3.2 Specific information

- .1 Corrosion barrier
  - .1 To install the corrosion barrier between the steel and aluminium: TREMTAPE Neoprene ribbon.

#### 3.3 Mouldings

- .1 The perimeter contour moldings, T moldings and other trim moldings must be made from enamelled steel, bent to the desired thickness, inserted into the steel siding. Various models will be required including "J" and "T", exterior corner, interior corner and others. Samples must be presented.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 78 00 - Documents and items to submit upon work completion
- .3 Section 01 61 00 - Common product requirements
- .4 Section 06 10 00 - Carpentry
- .5 Section 07 61 16 – Sheet metal siding
- .6 Section 07 46 23 - Wood siding
- .7 Section 08 11 16 - Aluminum doors and frames
- .8 Section 08 50 00 - Glazing
- .9 Section 09 21 16 - Gypsum board
- .10 Section 09 91 23 - Paint.

### 1.2 References

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM C 919-08, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (April 1976 edition, Incorporating Amendment No. 1)
  - .2 CAN/CGSB-19.13-M87, Sealing Compound, One Component, Elastomeric, Chemical Curing.
  - .3 CGSB 19-GP-14M-76, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (confirmed April, 1976)
  - .4 CAN/CGSB-19.17-M90, One-Component, Acrylic Emulsion Base Sealing Compound.
  - .5 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound
- .3 General information 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 Data sheets (DS)

- .5 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials
  - .2 CAN/ULC-S114, Fire test for determination of Non-combustibility in building materials
  - .3 CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies
- 1.3 Documents/samples to be submitted for approval/information
  - .1 Data Sheets
    - .1 Submit the required documents and samples in accordance with section 01 33 00 - Documents and samples to be submitted. *The manufacturer's data sheets must include the following:*
      - .1 the caulking products;
      - .2 primers;
      - .3 Sealants (all types), including their compatibility with each other.
  - .2 Samples
    - .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted.*
    - .2 Submit two samples for each sheet color, finish and type offered.
    - .3 If necessary, for the purpose of matching with adjacent materials, submit dried sealant samples that will be visible for each color offered.
  - .3 Manufacturer's Instructions
    - .1 The instructions submitted must relate to each product offered.
- 1.4 Documents and samples to be submitted at the completion of work
  - .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and items to submit upon work completion*
  - .2 Operation and maintenance records: Provide operating and maintenance instructions, which will be incorporated into the operation and maintenance manual.
- 1.5 Transportation, handling and storage
  - .1 Transport, store and handle the equipment and materials in accordance with section 01 61 00 - *Common product requirements*
  - .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address

.3 Storage and handling:

- .1 Transport and store materials in their original packaging, with the manufacturer's seal and label intact. Protect materials from water, moisture and frost; Do not place them directly on the ground or floor.

1.6 Waste management and disposal

- .1 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .2 Fold the metal banding strap, flatten and place in designated areas for recycling.

1.7 Conditions for implementation

.1 Ambient conditions:

.1 Use sealants only under the following conditions

- .1 The ambient and substrate temperatures are within the product manufacturer's set limits or above 4.4 degrees Celsius.
- .2 The substrate is dry.
- .3 The manufacturer's recommendations concerning the temperatures, relative humidity and moisture content of the substrate appropriate for the sealants to be applied and dried and the special instructions for their use, must be respected

.2 Joint width:

- .1 Use sealants only when the width of the joint is greater than that established by the product manufacturer for the applications indicated.

.3 Substrate:

- .1 Apply sealants only after the substrate has been cleared of all contaminants that may prevent the adhesion of products.

1.8 Environmental requirements

- .1 Meet the Workplace Hazardous Materials Information System (WHMIS) requirements for the use, handling, storage and disposal of hazardous materials and the labeling and supply of data sheets recognized by Health Canada.
- .2 The manufacturer's recommendations concerning the temperatures, relative humidity and moisture content of the substrate appropriate for the sealants to be applied and dried and the special instructions for their use, must be respected.

## 2. PRODUCTS

### 2.1 Fires top products - Description / application

- .1 FOR SEALING EXPANSION OR STATIC CONSTRUCTION JOINTS: Silicone elastomer fire sealant that allows maximum movement in firewall joints and pipe penetrations, FM approved, compliant with the CAN/ULC-S102 and CAN/ULC-S114 standards.
  - .1 Extension/compression capability: 25%
  - .2 Smoke development: 5
  - .3 Flame spread: 0
  - .4 Service temperature range: -40 degrees C / 160 degrees C
  - .5 Color: red
  - .6 Sound transmission: 50 (according to the ASTM E 90-99 standard)

### 2.2 Sealing compounds - general

- .1 Caulking that releases strong odors, that contain toxic chemicals or that are not certified as a mold-resistant types must not be used in air treatment systems.
- .2 In the case of sealants with a certified primer and only the primer specified must be used.

### 2.3 Sealing compounds - description

- .1 Sealants must be on the list of approved products, compiled by the Board of sealant product approvals, from the CGSB. In the case of sealants that are certified with a primer, only the primer specified must be used
  - .1 Sealant for exterior application: High performance one-component, low-modulus and moisture-curing sealant. Compliant with the ASTM C920 S standard, Grade NS, Class 100/50, Use NT, M, G, A and O.
    - .1 Compliant with the CAN/CGSB 19-M87, MCG-2-40-B-N standard
    - .2 Tensile strength: 1.38 MPa
    - .3 Tear strength: 0.7 KN/m
  - .2 Sealant for windows and curtain walling: Single-component polyurethane hybrid, low-modulus and moisture-curing sealant.
  - .3 Finishing sealant for indoor use only (to paint): Siliconized acrylic latex sealant compliant with the CAN/CGSB 19-M87 and standard ASTM C-834 Type OP standards.
  - .4 Acoustic sound sealant for dry partitions, single-component, non-skinning, compliant with the CAN/CGSB 19.21 M87 (QPL #60963-H) standard:

- .5 Sealants for wet areas: Siliconized acrylic latex sealant compliant with the STM C 920 standard Type S, Grade NS, use NT, G, A, and O, in addition to the CAN/CGSB-19.13-M87 standard. Forms a flexible rubber when exposed to moisture present in the air
- .2 Primers: Type recommended by the sealant manufacturer.
- .3 Joint sealant rope:
  - .1 General information: General: Compatible with primers and sealants, 30-50% oversized.
  - .2 Polyethylene, urethane, neoprene or vinyl: Extruded cell foam, Shore A hardness 20, breaking strength 140 to 200 kPa.
  - .3 Anti-slip product: plastic tape with single-sided bonding, which does not adhere to sealants.
- .4 Joint cleaner: xylol, Methyl ethyl ketone or non-corrosive product recommended by the sealant's manufacturer and compatible with the materials forming the joint.

### 3. EXECUTION

#### 3.1 Protection of structures

- .1 Protect structures installed by third parties from dirt or other contamination.

#### 3.2 Surface preparation

- .1 Verify the dimensions of the joints to be made and the condition of the surfaces to obtain a suitable width-to-depth ratio for the application of the sealant rope and sealants.
- .2 Rid joint surfaces of unwanted material, including dust, rust, oil, grease and other foreign material that could affect the quality of the work.
- .3 Do not apply sealants to joint surfaces that have been treated with a pore filler, curing agent, water repellent or other type of plaster unless prior testing has confirmed the compatibility of these materials. Remove existing coatings from surfaces if necessary.
- .4 Ensure that the joint surfaces are dry and free of frost.
- .5 Prepare surfaces according to the manufacturer's directions.

#### 3.3 Primer application

- .1 Before the primer and caulking are applied, hide adjacent surfaces to prevent contamination when required.
- .2 Apply the primer RECOMMENDED BY THE MANUFACTURER to the joints' lateral surfaces immediately before the sealant is applied in accordance with the manufacturer's instructions.

#### 3.4 Placing the sealant rope

- .1 Apply anti-fastening tape to the required locations in accordance with the manufacturer's instructions.

- .2 By compressing by about 30%, apply the sealing rope according to the depth required and joint profile.

### 3.5 Application

- .1 Apply the components in strict adherence with the sealant manufacturer's instructions.

### 3.6 Implementation

#### .1 Sealant application

- .1 Implement the sealant in accordance with the manufacturer's written instructions.
- .2 To make clean joints, place masking tape on the edges of the surfaces to be welded.
- .3 Apply the sealant in a continuous smooth bead.
- .4 Apply the sealant with a caulking gun with the appropriate nozzle size.
- .5 The pressure used must be high enough to fill the empty spaces and perfectly seal the joints.
- .6 Make the joints to form a continuous seam free from edges, creases, sags, air pockets and coated dirt.
- .7 Before a skin is formed on the joints, shape the exposed surfaces to make a slightly concave profile.
- .8 Remove surplus sealant as the work progresses and at the end of the work.

#### .2 Drying

- .1 Ensure the drying and hardening of the sealants in accordance with the product manufacturer's instructions.
- .2 Do not cover joints with sealant until they are completely dry.

#### .3 Clean-up

- .1 Immediately clean the adjacent surfaces and leave the structures clean and in perfect condition.
- .2 As work progresses, remove surplus sealant using the recommended cleaning agents.
- .3 Remove the masking tape at the end of the initial sealant set time.

## 4. EXECUTION - FIRESTOP JOINTS

### 4.1 General Information

- .1 Read the data sheet and product label for safe use and obtain health information before handling.
- .2 Refer to the corresponding illustration in the UL / ULC fire resistance directory or the HILTI firewall guide for complete installation information

4.2 Application of aerosol for firestop joints

- .1 Clean the opening. Remove debris, dirt, oil, wax, and grease from surfaces to which the spray is applied. The surface must be free of moisture and frost.
- .2 Install the required thickness of the prescribed fil material to achieve the degree of fire resistance desired. Follow the manufacturer's recommendations.
- .3 Ensure that the product comes into contact with all surfaces and overlaps the surrounding surfaces.

4.3 Firebreak sealant application

- .1 Clean the opening. Remove debris, dirt, oil, wax, and grease from surfaces to which the spray is applied. The surface must be free of moisture and frost.
- .2 Install the required thickness of the prescribed fil material to achieve the degree of fire resistance desired. Allow for sufficient depth, apply the firestop sealant to the depth required to achieve the protection desired. Ensure that the product comes into contact with all surfaces to obtain optimal adherence.
- .4 Level the firestop sealant so it has a smooth appearance.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 61 00 - Common product requirements
- .3 Section 01 74 21 – Construction and demolition waste management and disposal
- .4 Section 07 92 00 - Joint sealants
- .5 Section 08 71 00 - Door hardware
- .6 Section 09 91 23 - Paint.

### 1.2 References

- .1 American Society for Testing and Materials (ASTM International)
  - .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 CAN/CGSB-81.1-M, Doors insulated with steel
  - .4 CAN/CGSB-81.1-M, Sliding doors
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-G40.20-04/G40.21-04, General requirements for rolled or welded structural quality steel / Structural quality steel
  - .2 CSA W59 - 03, Welded steel construction (metal arc welding).
- .4 Canadian Steel Door Manufacturer's 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 CAN4-S104-M, Standard Method for Fire Tests of Door Assemblies
  - .2 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials
  - .3 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
  - .4 CAN/ULC-S702-97, Standard for Mineral Fibre Thermal Insulation for Buildings
  - .5 CAN/ULC-S704-01, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
  - .6 CAN/ULC S106-M, Standard Method for Fire Tests of Window and Glass Block
  - .7 CAN4-S105M-M85, Fire Door Frame CAN4-S104 satisfying the requirements of the CAN4-S104 standard.
- 1.3 Description of structures
  - .1 Design requirements
    - .1 The frames installed in the outer walls must be designed so that the door and frame elements can expand and contract freely when their surfaces are subject to temperatures ranging from -35 degree C to 35 degree C.
    - .2 The maximum deflection of the steel bay fastening elements under a wind load of 1.2 kPa must not exceed 1/175 of the span
    - .3 Fire-rated doors and frames: Certified by an organization accredited by the Standards Council of Canada, in accordance with the requirements of CAN4-S104 in respect to the prescribed or indicated fire ratings and degrees, and bears the organization's label.
- 1.4 Documents / samples to be submitted for approval / information
  - .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to be submitted.*
  - .2 Submit the required data sheets in accordance with section 01 33 00 - Documents and samples to be submitted.

- .3 Submit the workshop drawings required in accordance with section 01 33 00 - *Documents and samples to be submitted*.
  - .1 The workshop drawings must indicate each type of door offered, the nature of the materials used, the thickness of the bare metal, the mortise joints, the reinforcement parts, the location of the anchors and visible fasteners, the openings intended for windows, louvers, the hardware layout and the degree of fire resistance, in addition to the finishes.
  - .2 The workshop drawings must indicate each type of frame offered, the nature of the materials, thickness of the bare metal, the glazing bead, the reinforcement parts, the location of the anchors and visible fasteners, in addition to the types of finishes, reinforcements.
  - .3 The workshop drawings must include a list of doors with markers and numbers corresponding to those used in the drawings and the list of doors.
  - .4 Submit test results, technical data and instructions for installation of the doors.

#### 1.5 Requirements

- .1 Fire-rated doors and frames: Certified by an organization accredited by the Standards Council of Canada, in accordance with the requirements of CAN4-S104 and NFPA 252 in respect to the prescribed or indicated fire ratings and degrees, and bears the organization's label.
- .2 Fire-rated frames must be provided in the case of openings to be closed by elements with a fire-resistance rating, in accordance with the list or nomenclature established. The products must be tested in accordance with the CAN/ULC-S101, CAN4 - S104, ASTM E152 or NFPA 252 standards, certified by a nationally recognized organization and provide a factory inspection service and be manufactured according to the details specified in the monitoring procedures and factory inspection manuals issued by the certification authority and supplied to the various manufacturers.

#### 1.6 Transportation, storage and handling

- .1 Transport, store and handle the equipment and materials in accordance with section 01 61 00 - *Common product requirements*
- .2 Waste management and disposal
  - .1 Separate waste for their reuse/repurposing and recycling compliant with section 01 74 21 - *Construction and demolition waste management and disposal*

#### 1.7 Warranty

- .1 Product warranty from the manufacturer: Submit, for acceptance by the Departmental Representative, the manufacturer's warranty for steel doors and frames as follows:
  - .1 The warranty must cover the total cost of repairs to defects in materials and workmanship and associated damage.
  - .2 Warranty period: Ten (10) years from the date of substantial completion of work, under no circumstances may the limited warranty begin after six months from the date of shipment. In addition, the construction of welded door corners must include a limited lifetime warranty for the duration of the door under normal use.

## 2. PRODUCTS

### 2.1 Materials and equipment

- .1 Steel Sheet, Zinc-Coated by the Hot-Dip Process: Compliant with the ASTM A653M standard, with ZF75 zinc-coating; minimal thickness of bare metal compliant with the CSDMA, table 1 - Thickness for Component Parts standard
- .2 Profiles, reinforcement parts: made of steel according to CSA standard G40.20 / G40.21, grade 44W, zinc plated ZF75 according to ASTM A653M.

### 2.2 Adhesives

- .1 Doors with stapled joints: Fire-resistant adhesive / sealant with polychloroprene (neoprene) base with incorporated resin filler, high viscosity.

### 2.3 Primer paint

- .1 Rust-proof paint compliant with the standard CAN/CGSB - 1.181 standard.

### 2.4 Paint

- .1 The steel doors and frames must be painted on-site in accordance with section 09 91 23 - *Paint*. The weatherstripping must not be covered with paint. Finished surfaces must be free from scratches or other imperfections.

### 2.5 Accessories

- .1 Shock absorbers for doors: One dowel, made from rubber neoprene.
- .2 The glazing beads must be manufactured with shaped sections of at least 16 mm high; they must be well adjusted, joined at the angles and fastened to the frame elements with sheet metal screw with a flush oval head.
- .3 Metal putty: according to the manufacturer's specifications.
- .4 Firebreak certification labels: Fastened with metal rivets.
- .5 Joint-sealing compound: compliant with section 07 92 00 - *Joint sealant*.
- .6 Complete the glass installation, as indicated, and provide the glazing beads required.
  - .1 The glass must be retained by means of removable stainless steel glazing beads with glass tape and sealant and fastened with stainless steel screws, with flush heads enabling the glass to be assembled by dry pressing and simple pressure.
  - .2 The exterior glazing beads must be type inviolable.

### 2.6 General information for frame manufacturing

- .1 The frames must be manufactured in accordance with CSDMA standards.
- .2 The frames must be manufactured according to the indicated maximum frontal dimensions and profiles.

- .3 Exterior frames with thermal break: 2 mm (cal. 14) Z-075 thickness, welded, with thermal bridge break (see section 08 71 00 - *Door Hardware*)
- .4 Interior frames: 1.6 mm (cal. 16) thick, welded. (see section 08 71 00 - *Door Hardware*)
- .5 The frames must be cut, reinforced, drilled and tapped as required to accommodate the mortised and gutted hardware and electronic hardware required using the templates provided by the finishing hardware's supplier. The frames must be strengthened if necessary to accommodate the surface mounting hardware parts.
- .6 Provide all appropriate reinforcements to accommodate hardware.
- .7 The mortises must be protected with steel mortise covers.
- .8 The frames of single doors must be equipped with three dampers and double doors with two shock absorbers installed on the upper crossbeam.
- .9 No manufacturer identification plate must be placed on the frames and panels.
- .10 Unless otherwise indicated, the fasteners must be concealed.
- .11 The frames must be retouched with primer paint where the zinc coating has been damaged during manufacturing.
- .12 Insulate the exterior frames with polyurethane insulation.
- .13 The anchor tube preparations and 3 screws per jamb of 2.134 mm, drilled to receive a minimum anchor of 9.525 mm with a 15-875 mm head. The preparation to receive the screw heads 15-875 mm will be punched and not countersunk. **The model's fastening anchor will be supplied to the general contractor by the door and frame supplier (section 08 71 00 - *Door hardware*).**

## 2.7 Frame anchorage

- .1 Appropriate devices for attaching frames to walls and floors must be provided and installed.
- .2 Wall anchors must be placed immediately above or below each hinge bracket on the stud on the hinged side and directly opposite the stud casements.
- .3 The studs with a rebate height of 1520 mm or less must be fitted with 2 anchors; An additional anchor must be provided for each segment or segment portion of an additional 760 mm.
- .4 The anchors that will be embedded in window frames made before the door frame installation, must be placed at 150 mm from the top and bottom of each stud, then at 660 mm maximum from center to center.

## 2.8 Welded frames

- .1 Welding must be carried out in accordance with the CSA W59 standard.
- .2 The frame elements must be assembled with precision, mechanically or miter, and then be firmly welded together, the weld placed on the section's inner wall.

- .3 The butt joints between the mullion elements, transom studs, central crossbeams and thresholds and supports must be accurately counter-profiled.
- .4 The welded joints and angles must be ground until a flat surface, lined with metal filling putty and sanded to give a smooth and uniform finish.
- .5 The floor anchors must be securely fastened to the inside of each stud.
- .6 Two temporary spacers must be welded to each frame to keep them upright during transport.

## 2.9 General information for door manufacturing

- .1 The doors must be flat, hinged and have an opening that allows for the installation of a window or louvres, as indicated.
- .2 Exterior doors made of steel: 18 gauge (1.2 mm), they must have a core insulated with polyurethane foam.
- .3 Interior doors made of steel: 18 gauge (1.2 mm), out of steel must have a honeycomb core.
- .4 The longitudinal edges of the doors must be welded. The longitudinal joint must be ground until a flat surface, lined with metal filling putty and sanded to give a smooth and uniform finish.
- .5 The doors must be cut, reinforced, drilled and tapped as required to accommodate the mortised and gutted hardware and electronic hardware required using the templates provided by the finishing hardware's supplier.
- .6 Openings greater than or equal to 12.7 mm in diameter must be drilled in the factory, except those intended to accommodate mounting bolts and through bolts, which must be drilled on-site when the hardware is installed.
- .7 Doors must be reinforced where hardware protrudes. The exterior doors must be equipped with a flush steel closure profile at the top. The interior doors must have a recessed inverted side, spot welded section at the top and bottom.
- .8 The doors must be retouched with primer paint where the zinc coating has been damaged during manufacturing.
- .9 Fire-rated doors must be provided in the case of openings to be closed by elements with a fire-resistance rating, in accordance with the list or nomenclature established. The products must be tested in accordance with the CAN4 - S104, ASTM E152 or NFPA 252 standards, certified by a nationally recognized organization and provide a factory inspection service and be manufactured according to the details specified in the monitoring procedures and factory inspection manuals issued by the certification authority and supplied to the various manufacturers.
- .10 No manufacturer identification plate must be placed on the doors.

2.10 Doors and frames with thermal bridge break

.1 Exterior steel doors:

- .1 Steel door insulated with Polyurethane R15, top closed with a welded steel cap with filling compound and welded steel talus, deflected, for the full height of the door.
- .2 Steel sheet Z-075 - 18 gauge (1.2 mm) welded at 300 mm c/c.
- .3 Provide an appropriate reinforcement to accommodate hardware.
- .4 See the specification section 08 71 00 - *Door Hardware* for additional information.
- .5 The window moldings will be model STC-PN-101 and with the required tolerances allowing the assembly of the appropriate glass and moldings to perfectly touch both sides of the door.
  - .1 The glass for the doors will be set in a neoprene band.
  - .2 The glass in the firebreak doors will be set in a U-shaped asbestos strip around the perimeter.

3. EXECUTION

3.1 Installation - General information

- .1 Unless otherwise indicated, install firebreak doors and frames with the appropriate approval label in accordance with the NFPA 80 standard.
- .2 Install the doors and the frames in accordance with the CSDMA installation guide.

3.2 Installation of frames

- .1 Install the elements to be plumb, square, level and at the appropriate height.
- .2 Secure the anchors to the adjacent building elements.
- .3 Hold frames firmly in place with braces until they are installed. Install temporary wooden spacers horizontally in thirds of the opening to keep the width of the frames consistent. Install a vertical forestay under the top rail in the center of the bay when the width of the bay is greater than 1200 mm. Remove the wooden spacers once the racks are in place.
- .4 Leave the clearances necessary for bending to prevent framing loads from being transmitted to the frames.
- .5 Caulk the edges of the frames between the frames and the adjacent elements.
- .6 Ensure the continuity of the vapour barrier.

3.3 Installation of doors

- .1 Install doors and hardware using the supplied templates in accordance with the manufacturer's instructions and prescriptions in 08 71 00 - *Door Hardware*.

- .2 Provide a uniform spacing between the doors and the frame studs and between the doors and the finished floor and the sill, as follows:
    - .1 Hinge side: 1.0 mm.
    - .2 Bolt and lintel side: 1.5 mm.
    - .3 Non-combustible finished floor and carpeting threshold and threshold strip: 13 mm.
  - .3 Adjust the moving parts so that the doors function smoothly.
  - .4 Install the shutters.
- 3.4 Retouching
- .1 Retouch the surfaces that have been damaged during installation with a primer paint.
  - .2 Cover the exposed surface of the anchors of the frames and the surfaces with imperfections in the metal filler, then sand until a smooth and even finish is obtained.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 78 00 – Documents and items to submit upon work completion
- .3 Section 06 10 00 - Carpentry
- .4 Section 07 21 16 - Blanket insulation
- .5 Section 07 26 00 - Sheet membrane air and vapour seal
- .6 Section 07 92 00 - Joint sealants
- .7 Section 01 74 11 - Cleaning
- .8 section 08 71 00 - Door hardware

### 1.2 References

- .1 Aluminum Association (AA)
  - .1 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 Architectural American Manufacturers Association (AAMA).
  - .1 AAMA 609-93, Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.
  - .2 AAMA 609/610-09, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
- .3 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .4 Canadian General Standards Board (CGSB)
  - .1 CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-12.1-M90, - Tempered or Laminated Safety Glass
  - .3 CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings
- .5 Canadian Standards Association (CSA) / CSA International)
  - .1 CSA G40.20/G40.21-04 (R2009), General requirements for rolled or welded structural quality steel / Structural quality steel
  - .2 CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 **Documents/samples to be submitted for approval/information**

.1 Data Sheets

- .1 Submit the required data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 -*Documents and samples to submit.*

.2 Workshop drawings

- .1 Submit the workshop drawings required in accordance with section 01 33 00 -*Documents and samples to be submitted.*
- .2 The drawings must indicate the nature of the materials and the profile of the elements and components for each type of door and frame in full-size details; They must also show or indicate the following:
  - .1 The details of the interior moldings and the junction with the exterior adjacent structures on the outside;
  - .2 The details of the junction between the multiple structures;
  - .3 elevation views of the structures;
  - .4 the bare thickness of the components;
  - .5 The type of visible facing and the surfaces covered, the fastening method of the accessories;
  - .6 the placement of the weatherstripping;
  - .7 the type and placement of each door assembly;
  - .8 The arrangement of the hardware and clearances required.
- .3 Submit details from the manufacturers' catalogs illustrating the profiles, dimensions and assembly method for each door and frame type offered.
- .4 Submit data sheets for all door hardware.

.3 Inspection reports carried out by the manufacturer

- .1 Reports of on-site inspections by the manufacturer: Submit, within three (3) days after the completion of the inspections prescribed in PART 3 ON-SITE QUALITY CONTROL, the manufacturer's written reports indicating that the work meets the specified criteria

1.4 **Quality assurance**

- .1 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .2 All wiring work required for the installation of access control systems must be coordinated with an authorized electrician.

- .3 Meetings prior to installation: Conduct pre-installation meetings to verify work requirements, substrate conditions, the manufacturer's installation instructions and manufacturer's warranty requirements.

- .1 Submit the installation instructions provided by the manufacturer.

#### 1.5 Documents and samples to be submitted at the completion of work

- .1 Provide instructions for the cleaning and maintenance of finished aluminum surfaces and attach them to the manual referred to in section 01 78 00 - *Documents and items to submit upon work completion*
- .2 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- .3 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

#### 1.6 Transportation, storage and handling

- .1 Storage and protection of the doors and frames
  - .1 Packaging, shipping, handling and unloading: Deliver materials in the manufacturer's original containers, unopened, and undamaged with the identification labels intact
  - .2 Cover the finished surfaces with a temporary protective covering. Remove the protective covering once the assembly is complete. The material selected must be removed perfectly without residue.
  - .3 The protective covering must not be removed from the surfaces until the building's final clean-up is complete. Store materials to protect them from the elements. Handle entry doors and components to prevent damage. Protect entry doors from damage that may be caused by components, construction or other work that may cause damage prior, during and after the installation of entrances

#### 1.7 Warranty

- .1 Product warranty form the manufacturer: Submit, for acceptance by the Departmental Representative, the manufacturer's warranty for the entry system for aluminum doors and frames as follows:
  - .1 The warranty must cover the total cost of repairs to defects in materials and workmanship and associated damage.
  - .2 Warranty period: Ten (10) years from the date of substantial completion of work, under no circumstances may the limited warranty begin after six months from the date of shipment. In addition, the construction of welded door corners must include a limited lifetime warranty for the duration of the door under normal use.

#### 1.8 Waste management and disposal

- .1 Sort and recycle waste
- .2 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.

- .3 Recover and sort all paper packaging materials, plastic, polystyrene, corrugated cardboard and place them in the appropriate bins on-site for recycling in accordance with the waste management plan.
- .1 Transport to the nearest recycling facility instead of transporting the metal waste to a landfill.

## 2. PRODUCTS

### 2.1 Design requirements

- .1 Requirements for the entryways performance:
  - .1 Air infiltration: For single entry entrance doors with off-centre or hinged pivots in closed and locked position, the specimen shall be tested in accordance with standard E 283 of ASTM standard with a differential pressure of 6.24 lb/sq. in. (300 Pa) for single doors and 1.567 lb/sq. ft. (75 Pa) for pairs of doors. For a 915 x 2134 single entry frame and entrance door, the infiltration level must not exceed 0.50 cu. ft. per square foot. For a frame and a pair of 1830 x 2134 entrance doors, the infiltration level must not exceed 1.0 cu. ft. /m per square foot.
  - .2 Structural strength: The corner strength test must be carried out in accordance with the test procedure composed of the load and certified by an independent testing laboratory to ensure weld compliance and corner integrity. (The test procedure and the certified test results can be obtained by request
  - .3 Doors and frames installed in exterior walls must be designed so that:
    - .1 Their elements can expand and contract freely at operating temperatures ranging from -35 to 39 degrees Celsius;
    - .2 The maximum deflection of the mullions must not be more than 1/175 of the clearance in tests carried out according to ASTM E330 under a wind load of 1.2 kPa; Submit the certificates of the tests carried out;
    - .3 They allow for movement between their component elements;
    - .4 They allow for movement between their component elements and framing of the bay or support;
  - .2 The glass thickness and dimensions of the panes must not exceed the limit of the values indicated in the CAN/CGSB-12.20 standard.
  - .3 The door units must have an air and water vapour sealing system, which is mainly aligned with the inner pane and weatherstripping.

### 2.2 Materials

- .1 Extruded aluminum sections: AA 6063-T5 alloy, anodized quality, according to the Aluminum Association
- .2 Aluminum sheet: AA 1100 alloy, anodized quality, according to the Aluminum Association
- .3 Steel reinforcement parts: compliant with the CAN/CSA-G40.20/G40.21 standard, grade 304.
- .4 Fasteners: made from stainless steel, with the finish matching the element to be fastened

- .5 Insulation coating: epoxy resin based solution resistant to alkalis
  - .6 Glass: safety glass compliant with the CAN/CGSB-12.1 standard.
    - .1 The window trim made from extruded EPDM elastomer or thermoplastic elastomer
    - .2 Install adjustment shims to better center the glass in the door opening.
    - .3 Weatherstrip: by applying simple pressure in the case of glass without putty. Weatherstrips installed on the exterior side: tamperproof
  - .7 Sealing product: Refer to section 07 92 00 - *Joint sealants*
- 2.3 Insulated aluminium doors
- .1 Doors: made from hollow extruded sections of at least 3 mm wall thickness, designed to provide thermal efficiency and increased robustness for high traffic application.
  - .2 Dimensions and tolerances:
    - .1 Thicknesses: 58 mm
    - .2 Door posts: nominal width of 100 mm
    - .3 Top rail: nominal width of 100 mm
    - .4 Mid rail: Nominal width of 180 mm
    - .5 Bottom rail: nominal width of 180 mm
  - .3 Thermal PVC barrier integrated into the door
  - .4 25 mm filler panel
  - .5 Construction of welded corners with double attachment
  - .6 Corner joints mechanically interlocked: reinforced for greater robustness
  - .7 Exterior doors: with thermal bridge break
- 2.4 Accessories
- .1 Fasteners: Must be made from aluminium, stainless steel or plated steel when visible
  - .2 Anchor devices in aluminum around the perimeter When steel anchors are used, place insulation between steel and aluminum materials to prevent galvanic action
  - .3 Hardware: Except for certain accessories described in the section 08 71 00 - *Door hardware*, the hardware sets must be provided according to section 08 71 00 - *Door hardware* but installed according to section 08 11 16 *Aluminium doors and frames*–.
  - .4 Sealed joints: Refer to section 07 92 00 - *Joint sealants*
- 2.5 Aluminium frames
- .1 Extruded profiles: 50 mm x 115 mm (nominal dimensions) x 3 mm wall thickness, designed to receive glass without weatherstripping

- .2 Type: with thermal bridge break and insulated
  - .3 Installation of glass: centered
  - .4 Manufacture using screw and flutes, fasteners resistant to shearing or type B
- 2.6 Manufacturing
- .1 The doors and the frames must come from the same manufacturer.
  - .2 The doors and the frames must be manufactured according to maximum frontal dimensions and the sections indicated. In the case of insulating glass, the window groove must be at least 25 mm wide.
  - .3 If necessary, doors and frames must be equipped with reinforced constructional steel.
  - .4 The joints of the elements must be tightened and maintained by mechanical means.
  - .5 The fastening parts must be concealed.
  - .6 To be able to receive the hardware parts, the doors, the frames and the reinforcement parts must be mortised, reinforced, bored and tapped at the required places, using the gauges prescribed in section 08 71 00 - *Door hardware*.
  - .7 Aluminum surfaces that come into direct contact with dissimilar metal surfaces, concrete surfaces or masonry surfaces must be covered with an insulating coating.
- 2.7 Finishes
- .1 The aluminum components must be finished in accordance with "Designation System for Aluminium Finishes - 1980" published by the Aluminium Association
    - .1 Mullion finish:
      - .1 Anodic finish in accordance with the AA-M12C22A44, the DAF-45 from the Aluminum Association and the AAMA 611 standards.
      - .2 Colors: ANODIZED ANOSPEC (0.7 mils / 18 microns).
    - .2 Finish for flashing and aluminum accessories: Finish with a fluoropolymer base compliant with the *AAMA 2604 standard*.

### 3. EXECUTION

- 3.1 Inspection
- .1 Verification of condition on the construction site: Verify that substrate conditions (previously installed under other sections) are acceptable for product installation in accordance with the manufacturer's instructions. Verify that the dimensions of the openings can accommodate the storefront system and that the bottom rail is level, in accordance with the acceptable tolerances specified by the manufacturer.
  - .2 Measures on the building site: Verify current measurements and openings by measuring on-site prior to manufacturing; Indicate the measurements recorded on the workshop drawings. Coordinate the measurements taken on-site and the production schedule with the progress of work to prevent delays in construction.

### 3.2 Manufacturer's Instructions

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations or specifications, including technical bulletins and installation instructions specified in product catalogs and on the carton's packaging, in addition to the indications in the data sheets.

### 3.3 Installation

- .1 Install the entry system in accordance with the manufacturer's instructions and the specification for storefronts and entries in the AAMA manual.
- .2 Fasten to the structure to allow sufficient adjustments to accommodate construction tolerances and other irregularities.
- .3 Install fasteners and spacers to permanently secure the system to the building structure.
- .4 Install the level, angle, plumb and alignment system without warps or distortions. Maintain tolerances on the assembly dimensions in alignment with adjacent work.
- .5 Put the thresholds in place in a layer of putty and attach.
- .6 Adjustment: Adjust the operating hardware to ensure smooth operation.
- .7 Install doors and hardware using the supplied templates in accordance with the manufacturer's instructions.
- .8 Adjust the moving parts so that the doors function smoothly.
- .9 Leave the clearances necessary for deformation to prevent framing loads from being transmitted to the frames.

### 3.4 Glass

- .1 Install the glass in accordance with section 08 80 50 - *Glazing*. Refer to the section glass and windows
- .2 References: ANSI Z97.1, CPSC 16 CFR 1201 and the GANA Glazing Manual

### 3.5 Caulking

- .1 Seal the joints to obtain weatherproof structures on the outside and airtight and watertight on the inside.
- .2 Apply the waterproofing products compliant with section 07 92 00 – *Joint sealant* The sealant must be concealed within the aluminum structures, except where the Departmental Representative authorizes that they are left visible.

### 3.6 Clean-up

- .1 Clean the aluminium structures in accordance with the specifications of document AAMA 609.1 - Voluntary Guide Specification for Cleaning and Maintenance of Architectural Anodized Aluminum.
- .2 Once the installation of doors and frames is complete, the site must be cleaned to remove dirt and accumulated debris from construction and the environment.
- .3 Clean the aluminum surfaces with a damp cloth and an approved non-abrasive cleaner.

- .4 Remove all traces of primer, caulking, waterproofing, epoxy resin and filler. Clean the doors and frames.
  - .5 Clean glass surfaces with an approved non-abrasive cleaner.
  - .6 When work is complete, remove the surplus equipment/materials, waste, tools, and equipment and safety barriers from the site.
- 3.7 Continuous threshold
- .1 Apply a door threshold and a continuous threshold to the glass parts adjacent to the doors.
  - .2 Threshold composite width and depth to be determined with the Departmental Representative on-site.
  - .1 Ensure that the threshold covers the entire top surface of the foundation wall by extending over the inner concrete slab. Provide threshold extensions.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 74 11 - Cleaning
- .3 Section 01 78 00 - Documents and items to submit upon work completion
- .4 Section 06 10 00 - Carpentry
- .5 Section 07 21 16 - Blanket insulation
- .6 Section 07 26 00 - Sheet membrane air and vapour seal
- .7 Section 07 92 00 - Joint sealants
- .8 Section 09 21 16 - Gypsum board

### 1.2 References

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM E 119-12, Standard Test Methods for Fire Tests of Building Construction and Materials
- .2 National Fire Protection Association (NFPA)
  - .1 NFPA 252 (2012), Standard Methods of Fire Tests of Door Assemblies
- .3 Underwriters Laboratories of Canada (ULC)
  - .1 UL 10B (2009), Fire Test Specifications for Door Assemblies
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/ULC S104 (2010), standard Method for Fire Tests of Door Assemblies

### 1.3 Documents/samples to submit

- .1 Submit the required data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 - *Documents and samples to submit*.
- .2 Workshop drawings
  - .1 Submit the workshop drawings required in accordance with section 01 33 00 - *Documents and samples to be submitted*.

.2 The drawings must indicate the dimensions and provide a description of the components and fasteners, a description of the frames and finishes and illustrate the construction details.

.3 Manufacturer's Instructions

.1 Submit the installation instructions provided by the manufacturer.

#### 1.4 Quality assurance

.1 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

#### 1.5 Documents and samples to be submitted at the completion of work

.1 Provide instructions for the maintenance of hardware parts, including all relevant details, spare parts lists and warnings against the use of harmful methods and maintenance materials and attach them to the manual indicated in section 01 78 00 - *Documents and items to submit upon work completion*.

#### 1.6 Transportation, storage and handling

.1 Transport, store and handle materials in accordance with the manufacturer's instructions.

.2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address

.3 Storage and handling

.1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area as per the manufacturer's recommendations.

.2 Store access doors to protect them from marks, scratches and scrapes.

.3 Apply a temporary protective covering to finished surfaces. Remove the covering once the structures are in place.

.1 Use an easy to remove covering according to the manufacturer's instructions.

.2 Do not remove the protective coating before the final cleaning of the building is complete.

.4 Replace damaged materials and equipment with new materials and equipment.

## 2. PRODUCTS

### 2.1 Access door

.1 Certification: ULC: 105-A

.2 Construction: Cold-rolled 16 gauge steel for the frame and satin-coated 20 gauge steel for door

.3 Nominal dimensions: 600 mm X 1200 mm

.4 Accessories:

- .1 Hinge: Piano type
- .2 Sealant: neoprene
- .3 Locking: flat-head screwdriver
- .4 Finish: High quality primer powder

.5 **NOTE: The access door positioning will be coordinated on the construction site**

2.2 Manufacturing

- .1 Components must be free of warping, cambering or other apparent defects and must be insulated. The angles and the joints must be welded.
- .2 The access doors must be assembled according to the instructions.
- .3 The trim must be continuous to ensure perfect waterproofing.
- .4 Hardware and fasteners must be galvanized and coated with a primer coat applied in the workshop so that they are ready to be painted on-site.

3. EXECUTION

3.1 Manufacturer's Instructions

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations or specifications, including technical bulletins and installation instructions specified in product catalogs and on the carton's packaging, in addition to the indications in the data sheets.

3.2 Installation

- .1 General: install access doors so the equipment and devices can be clearly seen and to have access for operation, inspection, adjustment and maintenance without the need for special tools. Coordinate work so as not to interfere with the work of the other subcontractors.
- .2 Install plumb, level, and alignment components.
- .3 Secure prefabricated frames to the framework.
- .4 Apply a layer of insulation coating on aluminum and copper surfaces that come into contact with different materials.
- .5 Secure the access doors to the frame and seal.

3.3 Clean-up

- .1 When work is complete, remove the surplus equipment/materials, waste, tools, equipment and safety barriers from the site compliant with section 01 74 11 – *Cleaning*.

3.4 Protection

- .1 Protect the materials and elements against all damage during construction work.
- .2 Repair damage caused by the installation of the joinery elements to the adjacent equipment and materials.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 78 00 - Documents and items to submit upon work completion
- .3 Section 06 10 00 - Carpentry
- .4 Section 07 21 16 - Blanket insulation
- .5 Section 07 92 00 - Joint sealants
- .6 section 08 71 00 - Door hardware
- .7 Division 26 - Electricity (for the power supply)

### 1.2 References

- .1 Canadian Standard Association (CSA)
  - .1 CSA G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.105-M91, Quick Drying Primer
  - .2 CGSB 1-GP-121M-77, Coating, Vinyl, Pretreatment, for Metals (Vinyl Wash Primer)
  - .3 CAN/CGSB - 1.213 - 95, Etch Primer (Pretreatment Coating) for Steel and Aluminum
  - .4 CGSB 1-GP-181M-77, Ready-Mixed Organic Zinc-Rich Coating
- .3 American Society for Testing and Materials (ASTM)
  - .1 ASTM A 366M-85, Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
  - .2 ASTM A 526M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
  - .3 ASTM D 523-89, Test Method for Specular Gloss.
  - .4 ANSI/DASMA204 American National Standards Institute Specifications for rated fire rolling doors published by Door & Access Systems Manufacturers Association International
  - .5 ASTM A123 Zinc hot-dipped galvanized coatings on iron and steel products
  - .6 ASTM A229 Steel wire, oil-tempered for mechanical springs
  - .7 ASTM A-653-94 Steel sheet, zinc-coated galvanized by the hot-dipped process, commercial quality.

- .8 ASTM D 822-89, Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus
- .9 ASTMA1008/A1008M-02e1, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
- .10 ASTM D523-99 (R1999), Test Method for Specular Gloss.
- .11 ASTM D822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .4 National Fire Protection Association (NFPA)
  - .1 NFPA 80, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- .5 Underwriters Laboratories of Canada (ULC)
  - .1 UL10B Underwriters Laboratories (UL) Fire Tests of Door Assemblies
  - .2 CAN4-S104-M, Standard Method for Fire Tests of Door Assemblies
  - .3 CAN/ULC-S101, Fire Endurance Tests of Building Construction and Materials
  - .4 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
  - .5 CAN/ULC-S702, Standard for Mineral Fibre Thermal Insulation for Buildings
  - .6 CAN/ULC-S704, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced
  - .7 CAN/ULC S106-M, Standard Method for Fire Tests of Window and Glass Block
  - .8 CAN4-S105M-M85 (1992), Fire Door Frame CAN4-S104 satisfying the requirements of the CAN4-S104 standard.
- .6 The Aluminum Association Inc. (AA)
  - .1 Aluminum Association Designation System for Aluminum Finishes-1980.

### 1.3 Calculation criteria

- .1 The outer doors and their rails must be designed to withstand a wind load of 10 kPa with a deflection in the horizontal plane not exceeding 1/240 of the width of the recess.
- .2 Doors must have a coefficient of thermal resistance RSI 2.84 (r-16,4).
- .3 Doors and their rails must be designed to withstand at least 100,000 maneuver cycles per year and have a minimum total service life of 10 years.

#### **1.4 Manufacturer's warranty**

- .1 Product warranty form the manufacturer: Submit, for acceptance by the Departmental Representative, the manufacturer's warranty for the products as follows:
  - .1 The warranty must cover the total cost of repairs to defects in materials and workmanship and associated damage.
  - .2 Warranty period: Ten (10) years from the date of substantial completion of work, under no circumstances may the limited warranty begin after six months from the date of shipment.

#### **1.5 Documents/samples to submit**

- .1 Data Sheets
  - .1 Submit the required data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 - *Documents and samples to submit*.
  - .2 Submit the applicable WHMIS (Workplace Hazardous Materials Information System) data sheets in accordance with section 01 33 00 - *Documents and samples to be submitted*. The data sheets must specify the VOC emission rate for following products:
    - .1 Caulking and sealing products, during the application and curing period.
    - .2 Materials and adhesives used for the manufacturing of the doors.
- .2 Workshop drawings
  - .1 Submit the workshop drawings required in accordance with section 01 33 00 - *Documents and samples to be submitted*.
  - .2 Workshop drawings must indicate the type, size and characteristics of the service doors, the type of material, the type of operating mechanisms, details for the glass, details of the hardware and accessories, in addition to the required clearances and electrical connections.
- .3 Manufacturer's Instructions
  - .1 Submit the installation instructions provided by the manufacturer.

#### **1.6 Documents/elements to submit at the completion of the work**

- .1 Provide instructions for the cleaning and maintenance of the folding door and attach them to the manual referred to in section 01 78 00 - *Documents and items to submit upon work completion*

#### **1.7 Quality assurance**

- .1 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

- .2 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

#### **1.8 Delivery, storage and handling:**

- .1 Deliver and store doors and accessories to prevent damage.
- .2 Replace damaged products at no additional cost, to the satisfaction of the Departmental Representative.

#### **1.9 Replacement materials and maintenance**

- .1 Provide the following replacement parts for EACH TYPE of hinged door:
  - .1 Panels: 1;
  - .2 Rollers: 2
  - .3 Weatherstripping: 1 set;
  - .4 Springs and cables: 1.
- .2 Store the materials in the designated location. Identify each item and ensure to refer to the appropriate door.

## **2. PRODUCTS**

### **2.1 Materials (doors)**

- .1 Enamelled steel sheet (pre-finished): commercial grade, compliant with the ASTM A 526M standard, zinc-coated 180 g / m<sup>2</sup>, according to the ASTM A-525-M standard.
  - .1 Thickness: 0.71 mm (24 gauge)
  - .2 Finish: Silicone polyester (SMP).
  - .3 Color: Selected by the Departmental Representative;
  - .4 Specular gloss: 30 units, with an acceptable maximum variation of 5 units of more or less, according to the ASTM D523 standard.
- .2 Bending sections: Insulated, articulated, and made of 6063-T6 aluminum extrusion elements of 1.9 mm and 2.7 mm at the hardware accessory assembly.
  - .1 Panels: 45 mm thick, with continuous rectangular frame.
    - .1 Glass sections: Sealed units made from tempered glass, suitable thickness for installation. Self-aligning glass clamps
    - .2 Full sections: Urethane insulated, made of hot-dip galvanized steel, pre-painted, multi-rib reinforced finish.



- .2 Thermal insulation: CFC-11-free polyurethane foam is injected at high pressure between the partition walls at a density of 2.3 lb / ft<sup>3</sup> (40.4 kg / m<sup>3</sup>). The total thermal resistance coefficient of the door section is R: 16.4 (RSI 2.8), or K factor = 0.062 (C=0.357). The insulation complies with CGSB 51-GP-21M and 51.26-M86.
- .3 Internal reinforcement plate for screwing: Made of 1.4 gauge steel, the plates are inserted inside the door panels to ensure proper attachment of the accessories: hinges, handles and central operator support.
- .4 Waterproofing: at the bottom of each door, the continuous weatherstripping consists of an aluminum profile and a semi-tubular rubber in EPDM. The weatherstripping at the head of the door is composed of an aluminum section and a 64 mm wide PVC weatherstripping. At the intersection of each panel, a PVC (flexible and rigid) interleaf weatherstrip ensures efficient thermal bridge and a double waterproofing that meets the following standards: a pressure of 0.075 kPa equivalent to a wind load of 25 M / h (40 km/h). The air infiltration measured according to the ASTM E-283 standard will be 0.033 liter/second per meter of joint between the door sections. At the jambs and lintel, weatherstripping made with an aluminum section and a double-edged strip of acrylic vinyl.
- .5 Assembly of the various elements: by arc or spot welding or by riveting (with coated rivets), or by means of adhesive and self-tapping screws according to the manufacturer's recommendations.

## **2.2 Robust industrial hardware**

- .1 Guiding rails: Made of galvanized steel, continuous, as specified on drawing configuration, 80 mm wide, galvanized steel 2.75 mm bare thickness.
- .2 Cables: Twisted cables, galvanized steel type for aircraft
- .3 Guide rail angles: in accordance with the ANSI/DASMA 108 standard, continuous, bolted, galvanized steel angles of 3.1 mm bare thickness, adjustable.
- .4 Guiding rail brackets: Steel angles perforated at 32 mm X 32 mm X 2.0 mm thick,
- .5 Rail guard: "Z" bar, 7 mm, factory painted, 1,500 mm high, horizontal sliding locking bolts, two per door.
- .6 Balancing springs: spiral torsion springs (100,000 CYCLES), manufactured from oil-hardened spring wires, stabilized, robust, with supports compliant with the manufacturer's specifications.
  - .1 Cable drum: Die-cast aluminum and flexible galvanized aviation cables.
  - .2 Shaft: 32 mm in diameter, spring-key and mounted on ball bearings, galvanized steel.
- .7 Upper roller guides: galvanized steel, 3.1 mm thick, adjustable.
- .8 Rollers: Hardened steel, oil lubricated, free lateral movement, ball bearing, 75 mm diameter, solid steel bandage
- .9 Top roller brackets: Galvanized steel, 3.13 mm thick, adjustable.

- .10 Hinges: Heavy duty, galvanized steel in accordance with the manufacturer's specification, 380 g/m<sup>2</sup>
- .11 Cables: Twisted cables, galvanized steel type for aircraft

### **2.3 Accessories**

- .1 Rail guards: Height of 1500 mm, shaped steel plate approximately 5 mm thick.
- .2 Pusher springs.
- .3 Operation and locking mechanisms.
  - .1 Horizontal Bar Locking Devices, with night latch and power switch.
  - .2 Device of operation: with key outside and handle inside.
- .4 Mechanical operation: Chain hoist in galvanized steel
- .5 Weatherstripping:
  - .1 Installed at the door bottoms: extruded neoprene weatherstripping, with double contact, full width.
  - .2 To install on the side and top bars of the door frames: Extruded weatherstripping and high-quality vinyl for intense cold, in accordance with the manufacturer's specifications.
- .6 Hardware parts made of ferrous metal: zinc-coated at least 380 g / m<sup>2</sup>, in accordance with CSA G164.

### **2.4 Safety**

- .1 A safety device for immobilizing the door upon detection of a break in the cable when the cable is closed; Maximum load of 500 kg.

### **2.5 Electric door openers**

- .1 Electric door opener systems must meet the following criteria:
  - .1 Driving shaft mounted on the ceiling;
  - .2 Control stations with contactors and relays;
  - .3 Photoelectric cell;
  - .4 Activation buttons;
  - .5 Install two door position contacts and the relays in the door opening to allow additional commands of the automatics supplied by the electrical division.
- .2 Electric motors and control devices:
  - .1 Electric motors 1/2 torque, control devices, control stations with push buttons, relays and other electrical equipment: approved by the CSA

- .2 Electrical power supply: 150 volt, see manufacturer's specifications
- .3 Mounting brackets: Galvanized steel, thickness and dimensions that meet the installation requirements
- .4 Minimal door operating speed: 200 mm/sec.
- .5 Automatic switch-on and switch-off lighting fixtures, equipped with a timer.
- .6 Control devices comprising a built-in motor reversing switch, a thermal protection device against overloads, a solenoid brake and two push buttons, three heating elements, command relays to place on-site according to requirements from the Departmental Representative, as appropriate.
- .1 Remote control stations with push buttons: surface-mounted
- .3 Manual operation of doors equipped with a central door opener
  - .1 The door opener must be connected to the door via a device that allows for quick uncoupling in case of failure of the power supply
- .4 Manual operation of doors equipped with a door opener with a driving shaft
  - .1 The door opener must be connected to the door allow for the disengagement of the opener's driving shaft and the manual operation of the door in case of failure of the power supply.

### **3. EXECUTION**

#### **3.1 Installation**

- .1 Install doors and associate hardware according to manufacturer's instructions.
- .2 Secure rails and door openers properly and fix the brackets to the load-bearing framework.
- .3 If necessary, touch up the areas where the galvanized finish has been damaged during assembly with primer
- .4 Install electrical motors, control devices, control stations with push buttons, relays and other electrical equipment required for the operation of the doors.
- .5 Lubricate springs and adjust moving parts to ensure smooth operation of doors.
- .6 Adjust weatherstripping to ensure proper weathertightness.
- .7 Steel firewall rolling doors must be tested in accordance with NFPA 80, attesting to their proper function at the time of installation.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 78 00 - Documents and items to submit upon work completion
- .3 Section 08 11 00 - Metal doors and frames
- .4 Section 08 11 16 - Aluminum doors and frames
- .5 Section 08 33 23 - Overhead coiling metal doors
- .6 Division 26, relative to electrical wiring for magnetic bolts and for releasing and locking devices.

### 1.2 References

- .1 Canadian Steel Door Manufacturer's Association (CSDMA)
  - .1 CSDMA/ACFPA, Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-69.17-M86(R1993), Bored and Preassembled Locks and Latches
  - .2 CAN/CGSB-69.18-M90/ANSI/BHMA A156.1-1981 - 1981, Butts and Hinges
  - .3 CAN/CGSB-69.19-93/ANSI/BHMA A156.3-1984, Exit Devices
  - .4 CAN/CGSB-69.20-M90/ANSI/BHMA A156.4-1986, Door Controls (Closers)
  - .5 CAN/CGSB-69.21-M90/ANSI/BHMA A156.5-1984, Auxiliary Locks and Associated Products
  - .6 CAN/CGSB-69.22-M90/ANSI/BHMA A156.6-1986, Architectural Door Trim
  - .7 CAN/CGSB-69.24-M90/ANSI/BHMA A156.8-1982, Door Controls (Overhead Holders)
  - .8 CAN/CGSB-69.26-96/ANSI/BHMA A156.10-1991, Power-Operated Pedestrian Doors
  - .9 CAN/CGSB-69.28-M90 /ANSI/BHMA A156.12-1986, Interconnected Locks and Latches
  - .10 CAN/CGSB-69.29-93/ANSI/BHMA A156.13-1987, Mortise Locks and Latches
  - .11 CAN/CGSB-69.30-93/ANSI/BHMA A156.14-1991, Sliding and Folding Door Hardware
  - .12 CAN/CGSB-69.31-M89/ANSI/BHMA A156.15-1981, Closer/Holder Release Devices
  - .13 CAN/CGSB-69.32-M90/ANSI/BHMA A156.16-1981, Auxiliary Hardware

- .14 CAN/CGSB-69.33-M90/ANSI/BHMA A156.17-1987, Self-Closing Hinges and Pivots
- .15 CAN/CGSB-69.34-93/ANSI/BHMA A156.18-1987, Materials and Finishes
- .16 CAN/CGSB-69.35-M89/ANSI/BHMA A156.19-1984, Power Assist And Low Energy Power Operated Doors
- .17 CAN/CGSB-69.36-M90/ANSI/BHMA A156.20-1984, Strap and Tee Hinges and Hasps

1.3 Documents/samples to submit

.1 Data Sheets

- .1 Submit the required data sheets, the workshop drawings and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 -*Documents and samples to submit*.
- .2 Submit the required data sheets, manufacturer's instructions and documentation relating to hardware for doors. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finishing

.2 List of hardware articles

- .1 Submit the list of hardware for doors required in accordance with section 01 33 00 -*Documents and samples to be submitted*.
- .2 List the required hardware items indicating the brand, model, material, function and finish, in addition to any other pertinent information.
- .3 The Departmental Representative will issue bulletins to all bidders and interested parties five days prior to bid opening

.3 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.

- .1 Any request for approval of equivalent products other than those requested in this call for quotes document, must be accompanied by a physical sample of the products requested in the specification, in addition to the price list and supporting data sheets for the products offered.
- .2 No substitution will be considered if it is submitted too late during the call for quotes period.
- .3 Proposals for equivalence and substitution of materials, accessories and equipment must be made in writing, using the following procedure

Bidders must submit their proposals in writing to the Departmental Representative, no later than 10 business days before the bid closing date, accompanied with the required samples. No substitution will be considered if it is submitted too late during the call for quotes period.

.1 Proposals must include the following information:

- 1. The reasons for the substitute proposal
- 2. Proof of equivalence in each particular case

3. Differences regarding warranty and delivery dates
4. A comparative chart between the specified product and the equivalent product, describing in particular:
  1. The construction
  2. Wear resistance
  3. Capacity
  4. Availability of the replacement parts
  5. Test certificates for operating cycles performed by an independent laboratory

#### 1.4 Inspection

- .1 When the work is complete, an inspection and verification must be carried out by the AHC / FDAI consultant, who will attest that all the doors, frames and hardware meet the contractual documents and that the installation of the assembled products meets the industry's regulations and manufacturer's guidelines
- .2 The hardware consultant will be available to the General Contractor during the work execution period to assist and answer questions
- .3 Prior to requesting an inspection of the hardware, the General Contractor must make their own inspection and confirm in writing on request
- .4 If, in the opinion of the consultant, the work appears to be complete, they will systematically carry out the first audit and, if necessary, an initial list of the work to be corrected will be issued.
- .5 Once the contractor has certified that all defects have been corrected, they will be verified by the consultant
- .6 If the work is not complete and the consultant must issue further lists and perform additional checks, these will be at the expense of the contractor until the work is certified by the consultant
- .7 The Contractor must also provide the Departmental Representative with the assistance required during such inspections.

#### 1.5 Materials / equipment to be submitted at the completion of work

- .1 Submit the required documents/elements samples in accordance with section 01 78 00 - Documents/Elements to submit at the completion of work
- .2 Operation and maintenance records: Provide operating and maintenance instructions for the hardware for the doors, which will be incorporated into the operation and maintenance manual.

- 1.6 Materials / equipment to be submitted
  - .1 Additional materials/equipment:
    - .1 Submit the additional materials in accordance with section 01 78 00 - *Documents and items to submit upon work completion.*
    - .2 Provide two sets of keys required for the maintenance of door closers, locks and accessories for the exit doors.
- 1.7 Quality assurance
  - .1 Requirements from regulatory organizations
    - .1 The hardware for exterior exit doors and doors mounted in fire walls, must be certified by an Canadian certification organization accredited by the Canadian by the Standards Council of Canada.
    - .2 The fire door openings must meet the **assemblies** NFPA-80 standard 2007 edition. A certificate of compliance will be provided to professionals and the client by an Intertek Certified Inspector attesting that these openings meet the annual inspection and maintenance requirements.
    - .3 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
    - .4 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
- 1.8 Transportation, storage and handling
  - .1 Transport, store and handle the equipment and materials in accordance with section 01 61 00 - Common product requirements and the written manufacturer's instructions.
  - .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address.
  - .3 Pack hardware, including fasteners, separately or in groups of similar articles and label each package according to the nature and purpose of the item
  - .4 Storage and handling
    - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area as per the manufacturer's recommendations.
    - .2 Store the hardware for doors to protect them from marks, scratches and scrapes.
    - .3 Protect finished surfaces with protective packaging.
    - .4 Replace damaged materials and equipment with new materials and equipment.
  - .5 Packaging Waste Management: Recover packaging waste for reuse / repurposing in accordance with the waste management plan compliant with section 01 74 21 - Construction and demolition waste management and disposal.

1.9 Coordination meeting:

- .1 Before work begins, a meeting will be held with the hardware supplier and the installation team, the general contractor, the electrical contractor and a representative from each related discipline, to properly coordinate all work related to doors, frames and hardware. This meeting will be chaired by the Departmental Representative.

2. PRODUCTS

2.1 Manufacturing

- .1 Manufacture and supply hardware according to the relevant ANSI / BHMA standard
- .2 In the absence of the ANSI / BHMA standard, the hardware must be able to perform its function and be of recognized use

2.2 Manufacturer's Instructions

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations or specifications, including technical bulletins and installation instructions specified in product catalogs and on the carton's packaging, in addition to the indications in the data sheets.
- .2 Provide manufacturers of doors and metal frames with installation templates and complete instructions that will enable them to prepare their products to accommodate the hardware items prescribed in this section.
- .3 Provide, with each hardware item, the manufacturer's installation instructions.
- .4 To meet project deadlines, the general contractor must indicate the name of the supplier of the doors, frames and hardware selected for the project in the bid request form. We ask that the general contractor award their contract within 5 days of signing their contract. The subcontractor will have 10 days to produce their workshop drawings, the professionals and their consultant will have 10 working days for the verification of drawings and data sheets

2.3 Fasteners

- .1 Only fasteners provided by the manufacturer will be used. Failure to comply with this requirement may jeopardize the warranty and void the approval labels, if applicable.
- .2 To provide the screws, bolts, expansion plugs and other fasteners required for the satisfactory fastening and proper operation of the hardware.
- .3 Visible fasteners must have the same finish as the hardware.
- .4 Where a pull handle is required on one side and a push plate on the other side of the doors, provide the necessary fasteners and install them so that the handle is secured through the door. Place the plate to hide the fasteners.
- .5 Use fasteners made of a material compatible with the material they pass through
- .6 Manufacture and supply hardware according to the relevant ANSI / BHMA standard In the absence of the ANSI / BHMA standard, the hardware must be able to perform its function and be of recognized use



### 3. INSTALLATION

- .1 Install hardware items to standardized positions in accordance with the Canadian Metric Guide for Steel Doors and Frames (Modular Construction) developed by the Canadian Steel Door Manufacturers Association.
- .2 If the installation is such that the stopper touches the handle, place the stopper so that it hits the bottom.
- .3 Only use fasteners provided by the manufacturer. Failure to comply with this requirement may jeopardize the warranty and void the accreditation seals, if applicable. Quick release fasteners, unless specifically supplied by the manufacturer, will not be accepted.
- .4 When requested by the Departmental Representative, remove the temporary rotors from the locks and replace them with permanent rotors and check the operation of all locks.

#### 3.2 Adjustments

- .1 Adjust hardware, maneuvering and control devices, in addition to door closers in such a way that they operate smoothly, are safe and provide a perfect seal when closed.
- .2 Lubricate hardware, maneuvering and control devices and all moving parts.
- .3 Adjust door hardware items to ensure perfect contact between doors and frames
- .4 Replace all items found to be inadequate, non-compliant, or damaged, defective or permanently stained.

#### 3.3 Clean-up

- .1 Once the installation is complete, the site must be cleaned to remove dirt and accumulated debris from construction and the environment.
- .2 Clean the hardware items with a damp cloth and a non-abrasive cleaner and polish them according to the manufacturer's instructions.
- .3 Remove the protective film from the hardware, if applicable.
- .4 When work is complete, remove the surplus equipment/materials, waste, tools, equipment and safety barriers from the site.

#### 3.4 Hardware parts

- .1 Manufacture and supply hardware according to the relevant ANSI / BHMA standard
- .2 In the absence of the ANSI / BHMA standard, the hardware must be able to perform its function and be of recognized use

#### 3.5 **Coordination meeting:**

- .1 Before work begins, a meeting will be held with the hardware supplier and the installation team, the general contractor, the electrical contractor and a representative from each related discipline, to properly coordinate all work related to doors, frames and hardware. This meeting will be chaired by the Departmental Representative.

### 3.6 Setting up

- .1 Ensure that all adjustments of the doors, frames and hardware work freely and adjustments are performed according to the manufacturer's instructions.

### 3.7 List of hardware articles

#### Group # 1

##### Opening #101

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Steel frame, 14 gauge, Z-075, welded, 1" face heads and jambs.  
Pair of wood doors 8600-MO series, cherry wood to paint.

6	Hinges 5BB1 4.5" x 4" x 652 FNB	Ives
2	Flush bolts #FB458 12" x 630	Ives
1	Dust Proof Strike #DP1 x 626	Ives
1	Lever lock #ND96-LD x Sparta x 626	Schlage
1	Cylinder deadbolt Protec 2	Abloy
2	Overhead Door Stop #GJ-904-H X 630	GJ
1	Astragal #1500P x 84" x 628	UA

#### Group #2

##### Opening #104

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Steel frame, 16 gauge, Z-075, welded, 1" face heads and jambs. (Prepared for a half Dutch door bottom section only).  
Half doors in wood 8600-MO series, cherry wood to paint.  
Wood shelf with laminate finish (color to be confirmed)

2	Hinges 5BB1 4.5" x 4" x 652 x	Ives
1	Lever lock #ND96-LD x Sparta x 626	Schlage
1	Cylinder deadbolt Protec 2	Abloy
1	Floor dome stop #FS17 x 626	Ives

#### Group #3

##### Existing sliding grids over counter and door #104

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4	Disc cylinder keying system Protec2 for existing sliding	Abloy
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#### Group #4

##### Opening #104-A

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Steel frame, 16 gauge, Z-075, welded, 1" face heads and jambs.  
Doors in wood 8600-MO series, cherry wood to paint.

3	Hinges 5BB1 4.5" x 4" x 652 x	Ives
1	Lock #ND70-LD x Sparta x 626	Schlage
1	Cylinder deadbolt Protec 2	Abloy
1	Overhead Door Stop #GJ-904-H X 630	GJ

### Group #5

Opening #105

#### Approved ULC 45 minutes

Steel frame, 16 gauge, Z-075, welded, 1.5" face heads and jambs.

Wooden door series AF-45-MO, cherry wood to be painted with reinforcements #AF-25

3	Hinges 5BB1 4.5" x 4" x 652 FNB	Ives
1	Lock #ND70-LD x Sparta x 626	Schlage
1	Cylinder deadbolt Protec 2	Abloy
1	Floor dome stop #FS17 x 626	Ives
1	Door closer LCN DS-1461 x MC x 689	LCN
1	Smoke seal #CF-12 head and jambs	UA
1	Automatic door bottom #50K x LP x 627	UA
1	Kick plate #NMH-A-8400 X 8" x LP x 630	Ives

### Group #6

Opening 106-A Existing sliding gates open securing the washer and dryer.

2	Disc cylinder keying system Protec2 for existing sliding doors	Abloy
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### Group #7-M

Opening #107

Exit

Aluminium frame with thermal break

Pair of aluminium doors insulated 51 mm with thermal break

1	Continuous hinge #112-HD x 83 1/8" x 628	Ives
1	Continuous hinge #112-HD x 83 1/8" EPT x 628	Ives
1	<b>Electrical Power Transfer #EPT-10 X 689 (MDR)</b>	<b>VD</b>
1	Concealed rod device #CD-9849-EO x 630 x MDR	VD
1	<b>Concealed rod device #CD-LX-9849-EO x 630 x MDR</b>	<b>VD</b>
2	Threaded cylinders I/C broad format Protec2 for option CD	Abloy
1	Large format cylinder with rod I/C Protec2 for trim #996-L	Abloy
1	Trim #996-L x Sparta x 626 (MDR)	VD
1	<b>Door opener #4640 X 120 volts A/C x 689 (Mgr)</b>	<b>LCN</b>
2	<b>Pushplate boxes # 8310-869-F black</b>	<b>LCN</b>
1	<b>Weather protection push button</b>	<b>LCN</b>
2	<b>Pushplate #8310 x 852 x 630</b>	<b>LCN</b>
2	Logos for reduced mobility	LCN
1	Drop plate # 4040-18-G x 689 (MDR)	LCN
1	Door closer XP-4040-TJ x MC x 689 (MDR)	LCN

#### From the manufacturer of aluminum doors and frames:

1	Weatherstripping for the head and jambs	Manufacturer
1	Astragale #1500-P X 84" X 628	UA
2	Door sweep #A-180 X 36" X 627 bottoms of the door, exterior side	UA
1	aluminium threshold width and depth to be confirmed on the construction site with an architect's representative.	

**Mode of operation:**

**During the day:**

The two concealed rod devices will have the top and the bottom bolts retracted with the CD option.

The external 996-L lever trim will be unlocked.

The two pushplates will be powered and active.

The two doors will be active in both directions.

**During the night:**

The two concealed rod devices will have the top and the bottom bolts in the top and bottom with the CD option.

The external 996-L lever trim will be unlocked.

The two pushplates will be cut-off from the power with option LX located in the MGR concealed rod devices.

The two doors will be active for the exit only.

Only the users with a key will have access to the building with the 996-L MDR lever trim.

**By the electrical contractor and specialized subcontractors:**

Power, ducts and complete wiring for connections and start-up of the electrified hardware and the electric opener and accessories.

**Group #8**

Opening #108

**Approved ULC 45 minutes**

Steel frame, 16 gauge, Z-075, welded, 1.5" face heads and jambs.

MGR Wooden door series AF-45-MO, cherry wood to be painted with reinforcements #AF-25

MDR Wooden door series AF-45-MO, cherry wood to be painted with reinforcements #AF-25 for the flush bolts on the upper part of the door.

6	Hinges 5BB1 4.5" x 4" x 652 FNA	Ives
2	Flush bolts #FB458 12" x 626	Ives
1	Auxiliary bolt kit located at 12" from the bottom of the two doors	Ives
1	Lock # ND-80-LD X Sparta x 626 MGR	Schl
1	Cylinder deadbolt Protec 2	Abloy
1	Floor dome stop #FS-17 x 626 MGR	Ives
1	Wall bumper W-401 X 626 MDR	Ives
1	Door closer LCN DS-1461 x MC x 689 MGR	LCN
1	Smoke seal #CF-12 head and jambs	UA
2	Automatic door bottoms #50K x LP x 627	UA
2	Kick plate #NMH-A-8400 X 8" x LP x 630	Ives

**Note:**

Wood doors, screw holes to accommodate hinges, hardware preparations and top and bottom seals made at the factory by the manufacturer.

The hardware form must be presented with all notes, comments, operating instructions for each hardware group.

The workshop drawings must include the manufacturer's name, the reinforcement points.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related works

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 61 00 - Common product requirements
- .3 Section 01 74 21 – Construction and demolition waste management and disposal
- .4 Section 01 78 00 - Documents and items to submit upon work completion
- .5 Section 06 40 00 - Woodwork (mirrors)
- .6 Section 07 92 00 - Joint sealants
- .7 Section 08 11 16 - Aluminum doors and frames
- .8 Section 10 28 10 - Washroom accessories (mirror)

### 1.2 References

- .1 American National Standards Institute (ANSI)
  - .1 ANSI/ASTM E330-02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM C 542-05, Standard Specification for Lock-Strip Gaskets.
  - .2 ASTM D 790-07e1, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
  - .3 ASTM D 1003-07e1, Standard Test Method for Haze and Luminous Transmittance of Plastics.
  - .4 ASTM D 1929-96(R2001) e1, Standard Test Method for Determining Ignition Temperature of Plastics.
  - .5 ASTM D 2240-05, Standard Test Method for Rubber Property - Durometer Hardness.
  - .6 ASTM E 84-10, Standard Test Method for Surface Burning Characteristics of Building Materials.
  - .7 ASTM E 330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
  - .8 ASTM F 1233-08, Standard Test Method for Security Glazing Materials and Systems.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-12.1-M90, - Tempered or Laminated Safety Glass

- .2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass
- .3 CAN/CGSB-12.3-M91, Flat, Clear Sheet Glass
- .4 CAN/CGSB-12.4-M91, Heat Absorbing Glass
- .5 CAN/CGSB-12.6-M91, Transparent (One Way) Mirrors
- .6 CAN/CGSB-12.8-97, Insulating Glass Units
- .7 CAN/CGSB-12.8-97, (revision) Insulating Glass Units
- .8 CAN/CGSB-12.9-M91, Spandrel Glass
- .9 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting
- .10 CAN/CGSB-12.11-M90, Wired Safety Glass
- .11 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets
- .12 CAN/CGSB-12.13-M91, Patterned Glass
- .13 CAN/CGSB-12.20 M89, Structural Design of Glass for Buildings
- .4 Canadian Standards Association (CSA) / CSA International
  - .1 CSA A440.2, Energy Performance Evaluation of Windows and Sliding Glass Doors.
  - .2 CSA, Window and door certification program
- .5 Environmental Choice Program (ECP)
  - .1 DCC-045-95 (R2005), Sealants and Caulking Compounds.
- .6 Flat Glass Manufacturers Association (FGMA).
  - .1 FGMA Glazing Manual.
- .7 Laminators Safety Glass Association (LSGA).
  - .1 LSGA Laminated Glass Design Guide.
- 1.3 Administrative Procedures
  - .1 No object
- 1.4 Documents and samples to submit
  - .1 Data Sheets
    - .1 Submit the required data sheets and the manufacturer's specifications and documentation for the products in accordance with section 01 33 00 -*Documents and samples to be submitted*

- .2 Submit a PDF copy of the applicable WHMIS (Workplace Hazardous Materials Information System) data sheets in accordance with section 01 33 00 - *Documents and samples to be submitted*. The data sheets must specify the VOC emission rate for following products:
        - .1 Caulking and sealing products for glass, during the application and curing period.
    - .2 Workshop drawings:
      - .1 Submit the workshop drawings required in accordance with section 01 33 00 - *Documents and samples to be submitted*.
    - .3 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
    - .4 Test reports: Submit test reports certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
    - .5 Samples
      - .1 Submit the required samples in accordance with section 01 33 00 - *Documents and samples to be submitted*.
      - .2 Submit a 100 mm sample of the products used.
- 1.5 Documents and samples to be submitted at the completion of work
  - .1 Submit the required documents and samples in accordance with section 01 78 00 - *Documents and samples to submit at the completion of work*.
  - .2 Operation and maintenance records: Provide operating and maintenance instructions, which will be incorporated into the operation and maintenance manual.
- 1.6 Quality assurance
  - .1 Certificates: Submit the documents signed by the manufacturer, certifying that the products, materials and equipment meet the physical characteristics and performance criteria requirements.
  - .2 Samples of work
    - .1 No object
- 1.7 Transportation, storage and handling
  - .1 Transport, store and handle the equipment and materials in accordance with section 01 61 00 - *Common product requirements* and the written manufacturer's instructions.
  - .2 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address.
  - .3 Storage and handling:
    - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area as per the manufacturer's recommendations.

.2 Store the glass and frames to protect them from marks, scratches and scrapes.

.3 Protect the surfaces of prefinished aluminum parts with a protective wrap.

.4 Replace damaged materials and equipment with new materials and equipment.

.4 Packaging Waste Management: Recover packaging waste for reuse / repurposing in accordance with the waste management plan compliant with section 01 74 21 - *Construction and demolition waste management and disposal*.

## 1.8 Ambient conditions

### .1 Ambient conditions

.1 Glass sealants must be used at an ambient temperature of at least 5 degrees Celsius. In addition, the area where the work is carried out must be ventilated for 24 hours after the sealants have been applied.

.2 Ensure that the prescribed minimum temperature is obtained before work begins and that it's maintain during the application of the sealants and for a period of 24 hours after the work is complete

## 1.9 Warranty

.1 Provide a written document, signed and issued on behalf of the owner, stipulating that the sealants, prescribed in this section, are guaranteed against any leakage of the enclosed air space and against any deposits on the inside, which could impair vision, for a period of ten (10) years from the date the Final Certificate of Completion is signed.

## 2. PRODUCTS

### 2.1 Materials

#### .1 Design requirements

.1 Respect the following requirements for glass and glass materials to ensure the continuity of the air and water vapor sealing system of the building envelope.

.1 The inner glass of multiple sealed units must have a continuous air barrier and moisture barrier system.

.2 The types of glass used in the construction of the structure must meet the requirements of the Québec Building Code for the use of safety glass in accordance with CAN / CGSB 12.20 M89, Structural Design of Glass for Buildings

.3 The glass dimensions must be determined to be resistant to permanent loads, wind loads, wind pressure and suction forces calculated in accordance with ANSI / ASTM E330.

.4 The maximum deflection for the glass must not exceed 1/200 of the glass deflection resistance limit and the deformation must in no way alter the physical properties of the glass materials.

### 2.2 Flat glass

.1 Window glass: according to the CAN/CGSB-12.2 standard, AA special choice glass quality, 5 mm thick.



- .2 Safety glass: according to the CAN/CGSB-12.1 standard, tinted grey, 6 mm thick.
    - .1 Type: 2, tempered.
    - .2 Category: B, float glass.
    - .3 Class: 1.
    - .4 Type of treatment for the chamfered edges, when visible
  - .3 Silvered mirrors: According to the CAN/CGSB-12.5 standard, 4 mm thick, Type 3A, protected with polyvinyl film.
  - .4 Wired safety glass: According to the CAN-12.11-M76 1 standard, Misco wire glass, transparent, 6 mm thick according to the CAN/CGSB-12.11 standard, polished on both sides.
  - .5 Spandrel glass: according to the CAN/CGSB-12.9 and CAN/CGSB-12.9 standards, color selected from the manufacturer's range, 5 mm thick. Float glass, tempered, covered in ceramic.
- 2.3 Sealed insulating glass
- .1 Insulating glass: according to the CAN/CGSB-12.8 standard, double, 25 mm overall.
  - .2 Glass: according to the CAN/CGSB-12.1 standard
    - .1 Exterior glass: 6 mm, tempered, clear
    - .2 Interior glass: 6 mm, clear
  - .3 Glass thickness: per pane.
  - .4 Thickness of the air space: 13 mm insulating-glass spacer with low thermal conductivity.
  - .5 Coating applied on the glass: Coating with low emissivity (LOW E) applied to the face number 2 by vacuum metallization.
  - .6 Inert gas space: ARGON
  - .7 Color: CLEAR
  - .8 Reflective: N/A
- 2.4 Accessories
- .1 Setting block: In neoprene with a Shore A hardness of 80 to 90 measured with a durometer according to ASTM D 2240, adapted to the glass mounting method, the glass weight and dimensions.
  - .2 Peripheral block: In neoprene with a Shore A hardness of 80 to 90 measured with a durometer according to ASTM D 224, self-adhesive on one side, 75 mm long x half the height of the glazing beads x the appropriate thickness of the glass to be installed.

- .3 Preformed adhesive strips for glass
  - .1 Pre-molded butyl compound with integrated spacer, resilient and tubular, with a Shore A hardness of 80 to 90 measured with a durometer according to ASTM D 224, coated on backing paper, of the appropriate size, in black.
  - .2 Closed-cell polyvinyl chloride foam, coated on backing paper, coated with adhesive on both sides, with a maximum water absorption capacity of 2%, able to withstand 25% compression, ensuring a tight seal for the air and vapour barrier.
- .4 Glass clamps: recent model, as recommended by the manufacturer
- .5 Extruded joints with lock strips: according to the ASTM C 452 standard

### 3. EXECUTION

#### 3.1 Manufacturer's Instructions

- .1 Compliance: Comply with the manufacturer's written requirements, recommendations or specifications, including technical bulletins and installation instructions specified in product catalogs and on the carton's packaging, in addition to the indications in the data sheets.

#### 3.2 Inspection

- .1 Ensure that openings for the glass are the correct dimensions and respect the allowable tolerances.
- .2 Ensure that the surfaces of the rebates and other recesses are clean and free of obstructions and that they are ready for the glass to be installed

#### 3.3 Preliminary work

- .1 Clean the contact surfaces with a solvent and dry with a cloth.
- .2 Seal rebates and other porous recesses with primer paint or a paint product compatible with the support.
- .3 Apply a primer / coating paint on the surfaces to be coated with a sealant.

#### 3.4 Installation of glass

- .1 Exterior glass - Mixed assembly (adhesive strips / sealing compound)
  - .1 Perform the work in accordance with the specifications of the Insulating Glass Manufacturers Alliance and the specifications contained in the Standards Manual of the Laminators Safety Glass Association, in respect to the methods for glass assembly.
  - .2 Cut the adhesive strips to the appropriate length and lay them on the permanent glazing beads, 6 mm below the line of sight. Seal the corners by abutting the strips and by covering with a sealant.
  - .3 Form a bead of sealant at the base of the glass, at the meeting point of the permanent glazing beads and the chassis, so as to provide an airtight and continuous water vapor between the chassis and the glass for the entire perimeter.

- .4 Place the setting blocks at intervals corresponding to one quarter of the width of the glass, so that the end blocks are no more than 150 mm from the corners of the glass.
- .5 Place the glass on the setting blocks and press it against the adhesive strips and the sealant bead at the base of the glass by exerting sufficient pressure to obtain perfect contact between the surfaces around the glass.
- .6 Arrange the removable glazing beads, with peripheral blocks between them and the glass, 6 mm below the line of sight.
- .7 Fill the space between the glass and the glazing beads with sealant to a depth equal to that of the receptacle, but no more than 9 mm below the line of sight.
- .8 Make a bead of uniform sealant at the top of the glass, along the empty space between the glass and the glazing beads and flush with the line of sight. Smooth the surface of the sealing bead using a suitable cloth or tool

.2 Interior glass - Assembly with wet glazing method (sealant/sealant)

- .1 Perform the work in accordance with the specifications of the Glazing Manual from FGMA, the Insulating Glass Manufacturers Alliance and the specifications contained in the Standards Manual of the Laminators Safety Glass Association, in respect to the methods for glass assembly.
- .2 Place the glass on the setting blocks. Place the glazing beads and center the glass using peripheral shims at 600 mm from center to center and at 6 mm below the line of sight.
- .3 Position and secure the glass using glass clamps.
- .4 Fill the space between the glass and the glazing beads to be level with the line of sight. Smooth and level the surface using a suitable tool

3.5 Clean-up

- .1 Once the installation is complete, the site must be cleaned to remove dirt and accumulated debris from construction and the environment.
- .2 Remove all traces of primer, caulking, waterproofing and filler.
- .3 Rid finished surfaces of sealant and other materials from the installation of the windows.
- .4 To remove all labels once the work is complete.
- .5 Clean the glass with a nonabrasive product, in accordance with the manufacturer's instructions.
- .6 When work is complete, remove the surplus equipment/materials, waste, tools, equipment and safety barriers from the site.

3.6 Protection of finished structures

- .1 Once the installation is complete, mark the glass with an "X" with a paste or removable plastic tape

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related requirements

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 06 10 00 - Carpentry
- .3 Section 07 26 00 - Sheet membrane air and vapour seal
- .4 Section 07 92 00 - Joint sealants

### 1.2 References

- .1 Aluminum Association (AA)
  - .1 AAI DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
  - .1 ASTM C 475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - .2 ASTM C 514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.
  - .3 ASTM C 557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
  - .4 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.
  - .5 ASTM C 954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
  - .6 ASTM C 1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - .7 ASTM C 1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  - .8 ASTM C 1280-99, Standard Specification for Application of Gypsum Sheathing.
  - .9 ASTM C 1177/C 1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - .10 ASTM C 1178/C 1178M-08 Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
  - .11 ASTM C 1396/C 1396M-09a, Standard Specification for Gypsum Wallboard.

- .3 Association of the Wall and Ceilings Industries International (AWCI)
  - .1 AWCI Levels of Gypsum Board Finish-97.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86 (R1988), Vapor Barrier, Polyethylene Sheet for Use in Building Construction
  - .2 CAN/CGSB-71.25-M88, Adhesives, for Bonding Drywall to Wood Framing and Metal Studs
- .5 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-1988(R2000), Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies

### **1.3 Transportation, storage and handling**

- .1 Transport the materials without altering the original packaging, container or lot and ensure the trademark and the manufacturer's intended designation are visible.
- .2 Store materials inside, on a dry and level surface under a tarp. Protect them from the elements, other materials and damage during construction and other activities.
- .3 Handle the plasterboards as not to damage their surfaces or ends. Also protect metal parts and fittings from all damage or torsion.

### **1.4 Conditions for implementation**

- .1 Maintain the ambient temperature at a minimum of 10 degrees Celsius and a maximum of 21 degrees Celsius for 48 hours prior to and during plasterboard installation and jointing and for at least 48 hours after the joints are finished.
- .2 Place the plasterboard and joint on dry surfaces that are free from frost.
- .3 Ensure proper ventilation in building areas covered with drywall to remove excess moisture that may prevent drying of the jointing material immediately after application.

### **1.5 Samples**

- .1 Submit the required samples in accordance with section 01 33 00 - *Documents and samples to submit*.
- .2 Submit a 300 mm x 300 mm sample of each panel model offered in this section, indicating the locations where they will be installed.

### **1.6 Waste management and disposal**

- .1 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .2 Transport gypsum and unused gypsum materials to a recycling facility approved by the Ministère's Representative.

- .3 Send unused paint and jointing products to an authorized collection site for hazardous materials approved by the Ministère's Representative.
- .4 It's strictly prohibited to dispose of unused paint and jointing products in drains, waterways, in a lake, on the ground or any other location where it will pose a risk to health or the environment.

## **2. PRODUCTS**

### **2.1 Materials / Equipment**

- .1 Fire-resistant gypsum drywall, Class A, Type X, 16 mm thick, compliant with the requirements of CAN/ULC S101 and ASTM E119 and having a Flame Spread Index compliant with CAN/ULC S102M and ASTM Test Method E84.
- .2 High-performance gypsum fibreboard for exterior application FOR INTERMEDIATE EXTERIOR COATING, homogeneous composition, fiber-reinforced, waterproof to the core.
  - .1 Compliant with the CAN/ULC-S102 (ASTM E84) standard, Flame Spread Value of 5 and Smoke Developed Value of 0.
  - .2 15.9 mm thick
  - .3 Class A according to the CAN/ULC-S107 standard.
  - .4 Type X according to the ASTM C1278 standard.
- .3 INTERIOR APPLICATION: Glass-mat gypsum panels, compliant with the ASTM D3273 (mould) standard, water and mould resistance, 16 mm thick.
- .4 APPLICATION IN DAMP ENVIRONMENTS Water-resistant panels made of gypsum and cellulose fibers compliant with the ASTM C1278, ASTM C1629 standards (abuse resistant – Level 1) with the ASTM 3273 standard (mould) and to the C79 and C630 standards.

### **2.2 Accessories**

- .1 Joint tape: 51 mm (2 in) fibreglass wide joint tape, see 3.2.A.
- .2 Joint compound: Joint compound with rapid hardening
- .3 Nails, wood frame: galvanized nails, 11 gauge, of length recommended by the manufacturer depending on the thickness of the plasterboard.
- .4 Screws, metal framework: self-drilling or pan-head, self-tapping, corrosion resistant, fine threads for heavy gauge steel. Self-drilling or pan-head, corrosion resistant, pointed with fine threads for light gauge framework or metal furring channels.
- .5 Screws, wooden framework: corrosion resistant, self-drilling or pan-head, normal thread, for wood, 32 mm long.
- .6 Metal furring channels, extension rods, attachment wires, inserts and anchors: Compliant with the manufacturer's recommendations .
- .7 Furring channels for drywall partitions: galvanized steel, with a 0.5 mm core thickness, enabling plasterboard to be attached with screws.

- .8 Steel tapping screws: compliant with the ASTM C1002 standard.
- .9 Adhesive for studs: compliant with the CAN/CGSB - 71.25 ASTM C557 standard.
- .10 Lamination Adhesive: As recommended by the manufacturer, asbestos-free.
- .11 Casing beads, corner reinforcements, control joints and edges: in accordance with ASTM C1047, galvanized metal, 0.5 mm thick, with perforated channels, in one piece.
- .12 Waterproofing products: See section 07 92 00 – *Joint sealants*.
- .13 Acoustic sealants: compliant with section 07 92 00 – *Joint sealants*
- .14 Polyethylene: compliant with the CAN/CGSB-51.34 standard, type 2.
- .15 Moldings and J 401 thickness for 13 mm and 16 mm gypsum.
- .16 Insulating strips: rubberized, water-resistant, open-cell neoprene, 3 mm thick, 12 mm wide, one side coated with a permanent self-adhesive, in the appropriate length.
- .17 Joint compound: Compliant with the ASTM C475 standard, asbestos-free.

### 3. EXECUTION

#### 3.1 Assembly

- .1 Unless otherwise indicated, install and finish plasterboard in accordance with the ASTM C840 standard.
- .2 Place the plasterboard covering in accordance with the ASTM C1280 standard.
- .3 Unless otherwise indicated, attach extension rods and supporting channels for plasterboard drop ceilings in accordance with the ASTM C840 standard.
- .4 Secure the light fixtures to the ceiling with additional extension rods placed no more than 150 mm from the angles of the appliance and not more than 600 mm around its perimeter.
- .5 Install the elements to be level with an acceptable deviation of 1: 1200.
- .6 Frame the furring channels, the light fixtures, the diffusers and the grates.
- .7 Unless otherwise indicated, install the furring channels for attaching the plasterboard in accordance with the ASTM C840 standard.
- .8 Place furring channels around building openings and around recessed hardware, cabinets, and inspection panels. Prolong the channels into the cheek. Consult with the hardware suppliers for required clearances and spaces.
- .9 Place the channels around conduit ducts, beams, columns, piping, or any visible utility.

#### 3.2 Application

- .1 Do place the plasterboard before the subframes, anchors, shims, insulating acoustic materials and electrical and mechanical installations have been approved.
- .2 Attach one or two layers of plasterboard to the furring or framing as shown in the drawings.

- .1 Single sheet:
  - .1 Place the plasterboard on the ceiling first, then cover the walls in accordance with the ASTM C840 standard.
  - .2 Lay the sheets vertically or horizontally, depending on which direction will reduce the number of joints required.
- .2 Double sheet:
  - .1 Place the plasterboards that form the underlay of the lining, then the sheets that will form the visible side.
  - .2 Lay the sheets that form the underlay of the ceiling covering before those of the underlay of the wall covering, and then lay the sheets for the visible side in the same order. Offset the joints of the two layers of each covering by at least 250 mm.
  - .3 Unless otherwise indicated, lay the sheets that form the underside of the lining at right angles to the supporting elements.
  - .4 Place the sheets that form the underside of the wall covering in such a way that the joints rest against the supporting elements and then lay the sheets on the visible side of this covering by offsetting the joints by at least 250 mm from those of the underside.
- .3 Place water-resistant plasterboard. Apply a sealant to the edges and ends of the plasterboard, in addition to the cuts that expose the core and the head of the fasteners used.
- .4 Apply a 12 mm diameter continuous bead of acoustic sealant around the perimeter of each partition wall, at the intersection of the plasterboard and the framework where the partitions conjoin with the building's attached elements. Perfectly seal all the cuts around the electrical boxes, the ducts, in the partitions where the perimeter is lined with an acoustic sealant.
- .5 Place the plasterboard vertically on the walls to eliminate butt joints. With the exception of the areas where local codes or fire rated assemblies require vertical installation, the sheets must be laid horizontally on stairs and other spaces with large wall surfaces, and the joints must be staggered on the posts.
- .6 Install the sheets with the facing on the exterior side.
- .7 Do not install plasterboard that is damaged or damp.
- .8 Place butt joints on the supporting elements. Offset the vertical joints on different posts on each side of the wall.

### 3.3 Installation

- .1 Install casing beads at the junction of the plasterboard and surfaces without joint covers, in addition to the locations indicated. Seal the joints with a waterproofing sealant.
- .2 Place continuous insulating strips on the edges of the plasterboard and casing beads, at their junction with the metal frames of the windows and exterior doors so there is no thermal bridge.



- .3 Make control joints with prefabricated elements, two casing beads laid back to back inserted into the covering formed by the plasterboard and independently attached on each side of the joint.
- .4 Place a continuous polyethylene dust shield along the bottom and across the control joints.
- .5 Make control joints where there is a change in the nature of the support, approximately every 10 m for long corridors.
- .6 Make the control joints to be square and aligned.
- .7 Install access hatches and access doors in the required locations. Refer to the appropriate sections.
  - .1 Firmly attach frames to the furring channels or framing elements.
- .8 Finish the joints between the sheets and re-entrant angles using the following products: joint compound, tape and taping compound. Apply these products according to the manufacturer's recommendations and smooth by thinning to make a surface finish for the sheets.
- .9 Plasterboard Finishes: Finish the plasterboard walls and ceilings in accordance with the requirements of the Recommended Specification on Levels of Gypsum Board Finish from the Association of the Wall and Ceiling Industries (AWCI) International.
  - .1 Degrees of finish:
    - .1 Degree 3: Drench the tape placed on the joints and inner corners in a joint compound and apply two separate layers of compound over the joints, corners and heads of fasteners and other accessories used. The jointed surfaces must be smooth and free of tool marks and dents.
- .10 Cover corner moldings, control joints and, if necessary, trim, in two layers of joint paste and a layer of smoothed and thinned tape to soften the surface finish of the sheets.
- .11 Fill the depressions left by the screw heads with joint compound and tape coating until a smooth surface is obtained with the adjacent surfaces of the plasterboard so that these depressions are no longer visible when the finish is complete.
- .12 Lightly sand the irregular ends and other imperfections. Avoid sanding adjacent surfaces.
- .13 Once completed, the work must be smooth, level or plumb, free of warping and other defects, and ready to be coated with a finish.
- .14 Coat the surface to be textured with a white primer sealer. Allow to dry, then apply the textured finish according to the manufacturer's instructions.
- .15 Mix the joint compound to obtain a slightly less consistent mixture than when the finish for the joints.
- .16 Ensure the plasterboard covering remains protected to ensure that they are not damaged or deteriorated at the near-completion date.

**3.4 Installation of water-resistant and mold-resistant fiberglass plastic-reinforced panels - specific information**

- .1 Install the panels at the locations specified in the drawings.
- .2 Follow the manufacturer's recommendations for substrate preparation, proper installation and jointing between each panel to ensure waterproofing required by the certification organizations.
- .3 Ensure the finished product is uniform and flat.

**3.5 Installation of intermediate exterior covering panels: Specific information**

- .1 Preparation: Examine the subframe; Ensure that the surface of the framing and the furring strips on which the covering is installed does not vary by more than 3 mm from the surface of the adjoining parts.
- .2 Use the exterior covering as indicated in the plans. Install the exterior covering in accordance with the manufacturer's recommendations and the guidelines in GA-253 and the ASTM C 1280 standard.
- .3 Use maximum lengths to minimize the number of joints.
- .4 Nail the exterior covering to the wooden frame with nails spaced 102 mm from center to center around the perimeter to ensure shear strength, spaced 203 mm center to center on the perimeter where the supports are located and/or the shear strength is unnecessary and spaced 203 mm from center to center along intermediate posts for both conditions.
- .4 **NOT APPLICABLE** Screw the exterior covering to the metal frame every 203 mm center to center on the perimeter where the supports are located and every 203 mm along the intermediate posts. A greater number of fasteners may be specified to achieve specific values.
- .5 Push the fasteners to be tight and flush with the surface of the covering. Do not countersink. Place the fasteners at least 10 mm from the edges and ends of the panels, tight and flush with the surface of the covering.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 78 00 - Documents and items to submit upon work completion
- .3 Section 03 35 00 – Concrete finishing
- .4 Section 06 10 00 - Carpentry
- .5 Section 06 40 00 - Woodwork
- .6 Section 07 92 00 - Joint sealing

### 1.2 References

- .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), Vapor Barrier, Polyethylene Sheet for Use in Building Construction
  - .2 CGSB 71-GP-22M-78 (MODIF.), 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 Canadian Standards Association (CSA) / CSA International)
  - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt
  - .2 CAN/CSA-A3000-F03(R2006), Cementitious materials compendium (Contains A3001, A3002, A3003, A3004 and A3005).
- .5 Terrazzo, Tile and Marble Association of Canada (TTMAC)
  - .1 Specifications Guide 09 30 00 Tile Installation Manual from TTMAC
  - .2 Maintenance guide, 2000.

### 1.3 Data Sheets

- .1 Submit the required data sheets in accordance with section 01 33 00 - Documents and samples to submit.
- .2 Provide the manufacturer's documentation for the following:
  - .1 ceramic tiles, with the indication of the types, formats and profiles required;
  - .2 Chemical resistant grout and mortar (epoxy and furan resins);
  - .3 Cementitious material based underlayment (hydraulic binders);
  - .4 Portland cement grout and mortar for dry mortarless installation;
  - .5 baguette joints;
  - .6 The bond coat and elastomeric membrane;
  - .7 the reinforcement strip;
  - .8 the levelling coat;
  - .9 Portland grout and cement glue, latex modified;
  - .10 Commercial grade Portland cement grout;
  - .11 the organic adhesive;
  - .12 Anti-slip tiles;
  - .13 Waterproofing membrane;
  - .14 fasteners:

### 1.4 Samples

- .1 Submit the required samples in accordance with section 01 33 00 - *Documents and samples to be submitted*.
- .2 Baseboards: Submit one (1) sample for each type, color, texture, format and pattern of tile.

- .3 Flooring: Submit one (1) 300 mm x 300 mm sample for each type, color, texture, format and pattern of tile.
- .4 Submit samples of rounded and grooved edge elements, including interior and exterior corner elements for vertical surfaces, for each type, color and format.

#### **1.5 Transportation, storage and handling**

- .1 Deliver materials and materials in their packaging with the manufacturer's seal and label intact.
- .2 Store the material and equipment so they are not damaged or contaminated.
- .3 Store materials and equipment in a dry area protected from frost, dirt and damage.
- .4 Store cementing materials (hydraulic binders) on a dry surface.

#### **1.6 Waste management and disposal**

- .1 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .2 Send the adhesives, waterproofing products and coatings to an authorized collection site for hazardous materials approved by the Departmental Representative.
- .3 It's strictly prohibited to dispose of unused adhesives, waterproofing products and coatings in drains, waterways, in a lake, on the ground or any other location that will pose a risk to health or the environment.

#### **1.7 Conditions for implementation**

- .1 Maintain ambient air and surface temperature to accommodate ceramic tile above 12° C for a period of 48 hours before laying, throughout laying and for 48 hours after the work is complete.
- .2 Do not install tiles when the temperature is lower than 12°C or higher than 38°C.
- .3 Do not use mortar or epoxy grout at temperatures below 15°C or higher than 25°C.

#### **1.8 Additional materials/equipment**

- .1 Submit the additional materials in accordance with section 01 78 00 - *Documents and items to submit upon work completion*.
- .2 Provide additional tiles corresponding to at least 2% of the total number of each type and color of tiles required for the work, and store them in the designated location.
- .3 Supplied materials and equipment must come from the same production lot as those used.

## **2. PRODUCTS**

### **2.1 Ceramic**

#### **.1 Ceramic tiles**

- .1 Floor applications: Enamelled porcelain tile, PEI IV, 300 x 600 MIDSTONE from the SOLIGO series, color ANTRACITE (#CA7024), straight lay pattern.
- .2 Wall application: BRICKWALL series from CERAGRES, 65 x 500 nominal thickness, running bond pattern

### **2.2 Mortars and adhesives**

- .1 A single component, high performance, polymer-modified dry-set mortar: compliant with the ANSI A118.4 and ANSI A118.11 standards.
  - .1 ANSI A118.4 - shear strength, ceramic mosaic (porcelain) waterproof: 2.59 to 3.79 MPa at 28 days.
  - .2 ANSI A118.4 - shear strength, enamelled wall tiles: 1.55 to 2.41 MPa at 28 days.
  - .3 ANSI A118.4 - shear strength, enamelled sandstone tiles on sandstone tiles: 1.69 to 2.76 MPa at 28 days.
  - .4 ANSI A118.11 - shear strength, enamelled sandstone tiles on plywood: 1.03 to 1.10 MPa at 28 days.

### **2.3 Primer sealer stain killer**

- .1 Check with the manufacturer whether or not the specified product requires the application of a stain-resistant primer.
- .2 Perform a test on a small area first, taking every precaution to ensure that the results are satisfactory.
- .3 Apply only the product recommended by the manufacturer.

### **2.4 Grout**

- .1 Chemical resistant grout
  - .1 Epoxy grout: Compliant with the ANSI A108.1 standard, in the quality, color and with the characteristics corresponding to those of the epoxy bond coat. The adhesive and the grout must come from the same manufacturer

### **2.5 Accessories**

- .1 Wall protection profile:
  - .1 Profile finishing and edge protection, extruded aluminum, anodized finish:
    - .1 Acceptable product: Schluter®-SCHIENE
  - .2 Edge protection for tiled surfaces and upper section, 6 mm radius, extruded aluminium, anodized finish.

- .1 Acceptable product: Schluter®-RONDEC
- .2 Transitions: Special extruded elements with a gentle slope in anodized aluminum
  - .1 Acceptable product: Schluter®-RENO-U
- .3 Prefabricated control joints: special elements having a Shore A hardness of at least 60 and an elasticity of less or more than 40% when used in accordance with detail 301EJ from the TTMAC
- .4 Joint-sealing compound: compliant with section 07 92 00 - *Joint sealants*.
- .5 Primer and protective coating for floors: according to the tile and grout manufacture's recommendations.

## **2.6 Proportioning formulas:**

- .1 Dry mortar or for dry mortarless installation: proportioned according to the manufacturer's instructions.
- .2 Organic adhesive: pre-mixed.
- .3 Bond and levelling coat and grout: proportioned according to the manufacturer's instructions.

## **2.7 Resurfacing/levelling coat;**

- .1 Coating with the acrylic resin, containing Portland cement, specifically designed to fill and level the concrete support slabs Products containing gypsum are not accepted.
- .2 The product used must have at least the following characteristics:
  - .1 Compressive strength: 25 MPa.
  - .2 Tensile strength: 7 MPa.
  - .3 Flexural strength: 7 MPa.
  - .4 Density: 1.9
- .3 The coating must be able to be applied in layers up to 50 mm thick, graded with a bevel and smoothed with a trowel.
- .4 The coating layer must be ready to receive the subsequent layer 48 hours after application.

## **2.8 Cleaning Products**

- .1 Products specially designed for cleaning masonry and concrete surfaces, but which do not interfere with the bonding of the various layers of coating used for applying tiles, including resurfacing-smoothing layers, in addition to elastomer-based waterproofing layers and membranes.
- .2 Products containing acidic or caustic substances will not be accepted.

# **3. EXECUTION**

### 3.1 Quality of work execution

- .1 Unless otherwise indicated, perform the tiling according to the "Tile installation manual", published by Terrazzo, Tile and Marble Association of Canada (TTMAC)
- .2 Lay the tiles or support coats on clean, sound surfaces.
- .3 Adjust tiles to corners, around accessories, appliances, drains and other built-in objects. Make uniform joints. Trim the edges so that they are neat and smooth.
- .4 The maximum allowable flatness deviation is 1: 800.
- .5 Make uniform joints about 3 mm wide so that the tiles are plumb, square, aligned and along the same plane. Ensure there are no differences in the tiles in the finished work. Align the patterns.
- .6 Arrange the tiles so that the perimeter tiles measure at least half of their full size.
- .7 After laying, tap the tiles and replace those that sound hollow to obtain perfect adhesion.
- .8 Make the inside corners with sharp edges and exterior edges with rounded corners.
- .9 Use tiles with rounded edges when finalizing a wall panel, except at the line of encounter of the panel with a surface that protrudes or is in a different plane.
- .10 Install baguette joints at the junction of floor tiles with the different coatings.
- .11 **Plan for the application of a stain-resistant primer recommended by the manufacturer before grouting the tile.**
- .12 Wait at least 24 hours after laying the tiles before applying the grout
- .13 Once the work has hardened and the grout is well set, clean the tiled surfaces.
- .14 Execute control joints where required, of a width equal to that of the joints between the tiles. Fill the control joints with a sealant compliant with section 07 92 00 – Joint *sealants*. Keep the building's expansion joints free from mortar and grout.

### 3.2 Tile trim

- .1 Install the transitions and wall protection profiles, accessories and trim for aluminium tiles for the finish of the baseboard, corners, coating transition, etc.
- .2 Color selected by the Departmental Representative

### 3.3 Baseboards

- .1 Install the ceramic baseboard below the built-in furniture as indicated. Take the existing support into account.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 45 00 - Quality control.
- .3 Section 01 78 00 - Documents and items to submit upon work completion
- .4 Section 09 53 00 - Acoustical ceiling suspension assemblies

### 1.2 References

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - .2 ASTM E1264-98, Standard Classification for Acoustical Ceiling Products.
  - .3 ASTM E1477-98a (2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86, Vapor Barrier, Polyethylene Sheet for Use in Building Construction, incorporating modification number 1, 1988.
  - .2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units
- .3 Canadian Standards Association (CSA) / CSA International
  - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC - S102 - 2003, Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies

### 1.3 Documents/samples to submit

- .1 Submit the required samples in accordance with section 01 33 00 - *Documents and samples to be submitted.*
- .2 Data sheets: Submit the data sheets for the products.
- .3 Submit two actual size samples, for each type of acoustic element.

### 1.4 Transportation, storage and handling

- .1 Protect absorbent materials used or stored on-site against moisture damage.

- .2 Store the material / replacement at the location indicated by the Departmental Representative.
- .3 Waste management and disposal
  - .1 Remove packaging materials from the site and send them to the appropriate recycling facilities.

#### 1.5 **Environment**

- .1 Allow moisture-free structures to dry before proceeding with the installation.
- .2 Before and during the work, maintain a constant temperature of at least 15 degrees Celsius and a relative humidity of 20-40%.
- .3 Before using the materials, store them for 48 hours in the premises where they will be used.

#### 1.6 **Replacement materials/equipment**

- .1 Submit the required replacement acoustic elements in accordance with section 01 33 00 - *Documents and items to submit upon work completion.*
- .2 Provide an additional amount of acoustic elements equivalent to 2% of the total ceiling surface, for each acoustic element type and model used in the scope of the present work.
- .3 Ensure replacement materials / equipment are from the same production lots as the materials / equipment used for the work.
- .4 Clearly identify each type of acoustic element, also indicating the color and texture.

### 2. **PRODUCTS**

#### 2.1 **Materials / Equipment**

- .1 Acoustic elements for suspended ceilings:
  - .1 Composed of mineral fiber and hydroformed ceramic.
  - .2 Surface finish: washable plastic, applied in the factory.
  - .3 Classification with the CAN/CGSB-92.1 standard, ASTM E1264: type 3, form 2, pattern E, fire resistance class A.
  - .4 Flame spread value of less than 25 and Smoke developed value of less than 50, compliant with the CAN/ULC 102 and ASTM E 84 standard.
  - .5 Superior sag resistance: Humiguard Plus.
  - .6 Anti-mold and antibacterial: Antimicrobial treatment guaranteed for 30 years.
- .7 Acoustic elements for hanging ceilings: Compliant with the CAN/CGSB - 92.1, ASTM E1264 standard. Dimensions 600 mm x 1200 mm x 16 mm fire resistance according to CAN / ULC 102 and ASTM E 84.

### 3. EXECUTION

#### 3.1 Inspection

- .1 It is prohibited to install panels and acoustic tiles before the Departmental Representative has inspected installations that will be concealed by the ceiling.

#### 3.2 Installation of the suspension framework elements

- .1 Place the acoustic panels and tiles on the suspension frame.

#### 3.3 Coordination of work

- .1 Coordinate ceiling mounting work with that of the sections for light fixtures, diffusers, speakers and sprinklers and other components to be mounted in the acoustic ceiling.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related requirements

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Mechanical division, fittings for recessed mechanical appliances.
- .3 Electrical division, fittings for recessed lighting appliances.

### 1.2 References

- .1 ASTM International
  - .1 ASTM C 635/C 635M-07, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - .2 ASTM C 636/C 636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

### 1.3 Calculation criteria

- .1 Maximum deflection: 1/360 of the span, determined by the bending tests prescribed in the ASTM C635 standard.

### 1.4 Workshop drawings

- .1 Submit the workshop drawings required in accordance with section 01 33 00 - *Documents and samples to be submitted*.
- .2 In the case of particular arrangements of the grid elements, submit reflected ceiling plan views, as indicated.
- .3 The workshop drawings must clearly indicate the arrangement, details of the spacing and fastening of the anchor and suspension elements, the method to join the main and secondary sections, the location of the removable sections, the details of the level changes, the dimensions and location of the hatches and the suspension method for acoustic elements near the ceiling lights, lateral support elements and accessories.

### 1.5 Warranty

- .1 Manufacturer's 30 year limited warranty

### 1.6 Waste management and disposal

- .1 Send the unused metal materials to a metal recycling facility approved by the Departmental Representative.
- .2 Remove packaging materials from the site and send them to the appropriate recycling facilities.

## 2. PRODUCTS

### 2.1 Materials and equipment

- .1 Suspension elements for suspended ceiling: Compliant with the ICC-ES (ESR-1308), ASTM C 635 standards
  - .1 T-profile exposed in hot-dip galvanized steel:
    - .1 Earthquake-resistant
    - .2 Finish: White powder coating
    - .3 Main tether designed to provide a robust and secure connection and precision quick alignment confirmed with an audible click; Removes and replaces easily
  - .2 Hanger wire: Annealed and galvanized 2.6 mm diameter steel wire
  - .3 Anchors for hanger wire: Special manufacture ring recommended by the manufacturer
  - .4 U-profiles: 38 mm x 38 mm, made of 18 gauge galvanized steel.
- .2 Supports/sections for gypsum ceiling:
  - .1 Prefabricated G40 galvanized steel profile system, 0.018 in. thick, in accordance with the ASTM C 645 standard,
  - .2 Rigid continuous support section, corner and perimeter moldings, blocking sections for rigid supports and perimeter moldings.
- .3 Accessories: Splice plates, fasteners, metallic wire fasteners, wall and ceiling joints, molding, exposures, recessed, required to make a complete suspension frame, according to the manufacturer's recommendations.

## 3. EXECUTION

### 3.1 Assembly

- .1 Unless otherwise indicated, install frame elements in accordance with the ASTM C636 standard.
- .2 Install the suspension frames according to the manufacturer's instructions and the proven calculation criteria of the certification organizations.
- .3 Do not install suspended ceiling framing before the Departmental Representative has verified and approved the installations that will be concealed in the ceiling void.
- .4 Attach the hanger wire to the upper frame using the fastening methods according to the indications.
- .5 Place the hanger wire no more than 1200 mm center to center and less than 150 mm from the main T ends.

- .6 Trace two perpendicular medians on the ceiling to ensure the installation is symmetric around the room's periphery. Arrange the framing so that the width of the edge elements is no less than 50% of the standard width of the elements according to the reflected ceiling plan.
  - .7 Properly coordinate the arrangement of the framing elements with the location of the other ceiling mounted elements.
  - .8 Install wall-ceiling moldings that will define the exact ceiling height.
  - .9 Once completed, the frame must be able to withstand any additional loads, such as light fixtures, diffusers, grates and speakers.
  - .10 For lighting fixtures and diffusers, additional hanger wire must be installed no more than 150 mm from each corner and every 600 mm at most around the appliance.
  - .11 Attach the transversal sections to the load-bearing sections to obtain a rigid assembly.
  - .12 Place a border around the lighting fixture openings, diffusers and speakers, in addition to the ceiling level changes.
  - .13 The edges of the finished ceiling must be square along the walls and must have a flatness deviation greater than 1:1000.
- 3.2 Clean-up
- .1 Retouch painted surfaces with scratches, abrasions or other flaws.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 03 35 00 – Concrete finishing
- .3 Section 07 92 00 - Joint sealers

### 1.2 References

- .1 Any reference made to the standards of the specification produced by the various organizations according to the specified edition of the specification or, if no edition is specified, with the latest revised edition at the date of the contract.
- .2 Hardening time (at 25 degrees C/77 degrees F):
  - .1 4 to 5 hours - surface non-stick when touched
  - .2 24 hours - normal service
- .3 Flammability after hardening: self-extinguishing
- .4 Limit of thermal resistance
  - .1 60 degrees C / 140 degrees F - continuous exposure
  - .2 93 degrees C / 200 degrees F - intermittent exposure
- .5 Content of solids: 100%
- .6 Handling time: 35 minutes at 25 degrees C / 77 degrees F

### 1.3 Documents to submit

- .1 Product Information:
  - .1 Submit technical instructions, installation instructions and general manufacturer's recommendations for each type of resin floor coating to be applied in accordance with the requirements in section 01 33 00 - *Documents and samples to submit*.
  - .2 Submit the certification indicating that the products are compliant with section 01 33 00 - *Documents and samples to submit*.
- .2 Samples: Submit a 300 mm X 300 mm sample on a rigid panel for each type of resin floor coating in the color and finish indicated in accordance with the requirements of section 01 33 00 - *Documents and samples to be submitted*.

### 1.4 Quality assurance

- .1 Sole responsibility: The resin flooring primer materials must come from the same manufacturer, including primers, resins, curing agents, topcoats or protective coatings.

- .2 The manufacturer must have at least 10 years of proven experience in the manufacturing and installation of the primary materials described in this section
- .3 The Contractor must have completed at least five similar projects of similar size and complexity, either Stonhard or an approved contractor of equivalent competency.
- .4 Provide the secondary materials of type and source recommended by the manufacturer of the primer materials.
- .5 Preparatory meeting:
  - .1 The Contractor must hold a meeting at least thirty days before the work begins.
  - .2 Parties invited to this meeting:
    - .1 The General contractor;
    - .2 The Departmental Representative;
    - .3 The Manufacturer's representative or the installation contractor.
- 1.5 Delivery, storage and handling:
  - .1 Deliver the materials to the construction site. Before work begins, the Contractor for the flooring must verify that all materials have been delivered to the site and no damage was incurred during transit.
  - .2 All components will be measured and packaged in the factory per unit of mixing in an easy to handle manner as to eliminate any risk for dosing errors when mixing products on-site. It's prohibited to dose the components by weight or volume on-site in any circumstances.
  - .3 Store materials in a dry, closed area protected from moisture. The temperature of the warehouse will be maintained between 16 degrees C and 32 degrees C.
- 1.6 Samples of work
  - .1 For approval purposes, apply the floor coating under the manufacturer's supervision over an area of 9 m<sup>2</sup> (100 sq. ft.) of the surface to be covered. Finish the coating application on the designated surface in accordance with the samples provided. Once approved, the sample of the work will be the reference standard for the appearance, color, texture, manner of execution, etc., and all work must be compliant with the sample.
- 1.7 Conditions for implementation
  - .1 ATTENTION - concrete support: The concrete must cure for at least 14 days. The slabs on the ground must be waterproofed with a vapour barrier. If not, apply an osmotic pressure-resistant grout before installing the coating.
  - .2 Temperature: The General Contractor must provide the services, including electricity, water, heating (room temperature between 16 degrees C and 32 degrees C / 60 degrees F and 90 degrees F), and ensure that permanent lighting is installed. Seven days before work begins up to 48 hours after completion, the ambient air temperature must not drop below 18 degrees C (65 degrees F) and for the support, under 16 degrees C (60 degrees F). The relative humidity must not exceed 40% during this same period.



- .3 Humidity: Ensure that the moisture content of the surface to be covered is within the limits prescribed by the manufacturer of the coating.
- .4 Safety: Comply with the safety requirements of the Workplace Hazardous Materials Information System (WHMIS) with respect to the use, handling, storage and disposal of hazardous materials.
- .5 Restrict access to the area where the coating will be applied during the application of the coating and for the next 24 hours to all other trades.
- .6 The General Contractor will be responsible for protecting the finished floor from damage by workers of other trades.
- .7 The manufacturer's representative must be present on the construction site when the workers begin the application.

#### 1.8 Warranty

- .1 Provide a single written warranty for the materials and labor. This warranty will remain in force for five (5) years from the coating application date.

## 2. PRODUCTS

### 2.1 Epoxy floor coating

- .1 General use epoxy coating with 0 VOC, made with 100% solid matter (two components)
- .2 Physical properties: Apply a floor covering of which the physical properties of the distribution slab, including the aggregate, are in accordance with the following results when subjected to the cited tests and standards:

Compressive strength (ASTM C-695)	11,000 psi (75.8 MPa)
Slip resistance (ASTM D-1679)	0.8 (dry) 0.55 (wet)
Elastic resistance (ASTM C 307)	6,500 psi (44.8 MPa)
Flexural strength (ASTM C-580)	7,000 psi (48.3 MPa)
Limit of thermal resistance	93 degrees - continuous exposure 121 degrees - intermittent exposure
Abrasion resistance (ASTM D 4060, CS-17)	0.06 G of loss / 1000 mg at 1,000 cycles)
Pull-off strength (ASTM D-4541)	> 2.8 MPa (complete rupture of the concrete)
Resistance to mechanical shock (ASTM 2794)	60 in/lbs
Coefficient of friction (ASTM C-1028)	0.8 (dry) 0.65 (wet)
Hardness (ASTM D-2240/Shore D)	85-90 (min.)
Resistance of fungi (ASTM G 21)	0
Resistance to growth of mold (ASTM D 3273)	10

## 2.2 Colors

- .1 Chosen from the manufacturer's standard range

## 2.3 Sealing product

- .1 Use the type of caulking made by the resin flooring manufacturer for the use and condition of the indicated joint.

# 3. EXECUTION

## 3.1 Preparation

- .1 Substrate: Using a shot blasting machine (Blastrac), remove the concrete substrates from adhesion-damaging materials such as existing finish, curing agents and laitance.

## 3.2 Application

- .1 Coating: Mix both components of the coating strictly in accordance with the manufacturer's process. Spread the first coat with a floor squeegee and make even with a roller. When the surface is no longer sticky to the touch, apply a second coat, to obtain a dry film thickness of about 200 to 250 microns (8 to 10 mils) per coat.
- .2 Caulking: Fill the caulking joints in epoxy or urethane made by the manufacturer to match the finish of the manufacturer's recommended coating.

## 3.3 Quality control on-site

- .1 The right to invoke the following material testing methods, at any time and the number of times requested during the application of the coating.
- .2 The Departmental Representative may retain the services of an independent laboratory to collect samples of the materials used on-site. These samples must be collected, identified, sealed and certified in the presence of the Contractor.
- .3 The testing laboratory must carry out tests to evaluate the specified characteristics using appropriate analytical methods specified in this specification or, if no method is included, using one of the methods specified in the manufacturer's technical instructions.
- .4 If the test results show that the materials used do not comply with the specification requirements in the specification, the Departmental Representative may direct the Contractor to cease work, remove any non-compliant materials, pay for the testing and resume the coating's application after having properly prepared the surfaces that were covered with non-compliant materials.

## 3.4 Curing, protection and cleaning

- .1 Harden the resin flooring in accordance with the manufacturer's instructions, taking the necessary precautions to prevent contamination during the various installation steps prior to the finished coating is completely cured. Restrict access to the area where the coating has been applied for at least 12 hours.
- .2 Protect the resin flooring from damage or wear during construction. When temporary protection is required for this purpose, follow the manufacturer's recommendations for the selection and application method for the protective materials. The General Contractor is responsible to protect and clean the surfaces after the final coats have been applied.

- .3 Clean-up: Remove the temporary protection and clean the resin flooring before the final inspection. Use the recommended cleaners and procedures from the resin coating manufacturer.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 61 00 - Common product requirements
- .3 Section 01 78 00 - Documents and items to submit upon work completion
- .4 Section 06 10 00 - Carpentry
- .5 Section 06 20 00 - Joinery
- .6 Section 09 21 16 - Gypsum board

### 1.2 References

- .1 Department of Justice Canada (JUS)
  - .1 Canadian Environmental Protection Act (CEPA 1999), ch.33
- .2 Environmental Protection Agency (EPA)
  - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Data sheets (DS).
- .4 Master Painters Institute (MPI)
  - .1 MPI Architectural Painting Specification Manual - February 2004
- .5 National Fire Code of Canada - 1995
- .6 Society for Protective Coatings (SSPC)
  - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
- .7 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act (TGD) 1992, ch. 34

### 1.3 Quality assurance

- .1 Qualifications
  - .1 The Contractor must be able to demonstrate at least five (5) years of experience in the execution of similar work.
  - .2 The painting work must be carried out by qualified workers holding a "Certificate of qualification in the skilled trades".

- .3 Apprentices may also be hired on the condition that they work under the direct supervision of a skilled worker in accordance with the regulations governing this trade.

#### 1.4 Documents/samples to submit

- .1 Submit the required documents and samples in accordance with section 01 33 00 - *Documents and samples to submit*.
- .2 Data Sheets
  - .1 Submit the data sheets and instructions required for each type of paint or coating used for the covering.
  - .2 Submit the required technical data for the application or use of paint thinner.
  - .3 Submit two (2) data sheets required under the Workplace Hazardous Materials Information System (WHMIS), which must comply with this system according to section 01 33 00 – *Documents and samples to submit*. The data sheets must indicate the VOC emission rate of the products during the application and curing period.
- .3 Samples
  - .1 Submit samples of all colors offered if the products are manufactured in a restricted range of color.
- .4 Test reports: submit test reports from recognized independent laboratories certifying that the paint products and coatings meet the requirements for physical characteristics and performance criteria. The reports must indicate the following:
  - .1 Presence and concentrations, if any, of lead, cadmium and chromium in the paint product or coating used.
  - .2 Presence and concentrations, if any, of mercury in the paint product or coating used.
  - .3 Presence and concentrations, if any, of organochlorine compounds and polychlorinated biphenyls (PCB) (polychlorinated diphenyls) in the paint product or coating used.
- .5 Certificates: Submit the documents signed by the manufacturer, certifying that the products, coating and other materials meet the physical characteristics and performance criteria requirements.

#### 1.5 Maintenance

- .1 Replacement materials/equipment
  - .1 Provide materials and substitute products from the same production batches as the ones used. Cover with a protective wrapping, correctly identified with the appropriate labels and in compliance with section 01 78 00 - *Documents and items to submit upon work completion*.

- .2 Quantity: Provide one (1) container of four (4) liters of each color and type of primer, or topcoat, stain, or finish coat. Mark the paint and plaster containers by associating each color and type of product used with the approved paint and plaster coating nomenclature, specifying the colors selected for the different products.

#### 1.6 **Transportation, storage and handling**

##### .1 Packaging, shipping, handling and unloading

- .1 Transport, store and handle the equipment and materials in accordance with section *01 61 00 - Common product requirements* and the written manufacturer's instructions.

##### .2 Acceptance of materials and products

- .1 Identify paint and plaster products and materials and products used with labels indicating the following:
  - .1 the manufacturer's name and the address;
  - .2 the type of paint or coating;
  - .3 compliance with the standards or relevant requirements;
  - .4 The color number, according to the list of specified colors.

##### .3 Remove damaged, open or refused materials and products from the site.

##### .4 Storage and protection

- .1 Provide a safe storage area that is dry and kept at a controlled temperature and ensure that it's properly maintained.
- .2 Store materials and products away from heat sources.
- .3 Store materials and products in a well ventilated area with temperatures between 7 degrees Celsius and 30 degrees Celsius.

##### .5 The temperature of storage of heat-sensitive products must never be lower than the manufacturer's minimum recommended temperature.

##### .6 Keep the areas used for storage, cleaning and surface preparation clean and in good working order. Return these areas to their original state of cleanliness once the work is complete.

##### .7 Remove only the quantity of material from storage that will be used on the same day.

##### .8 Requirements relating to fire safety

- .1 Provide one (1) dry 9 kg chemical fire extinguisher for ABC fires and place near the storage area.
- .2 Place oily rags, waste, empty containers and spontaneously combustible materials in ULC-approved sealed containers and remove these containers from the work site on a daily basis.

- .3 Handle, store, use and dispose of flammable and combustible products and materials in accordance with the requirements of the National Fire Code of Canada.

.9 Waste management and disposal

- .1 Remove all packaging materials from the site and transport them to the appropriate recycling facilities.
- .2 Handle and dispose of hazardous materials in accordance with the applicable regional and municipal regulations.
- .3 Send unused paint and coating products to an authorized collection site for hazardous materials approved by the Departmental Representative.
- .4 Paints, stains, wood preservatives and related products such as diluents and solvents are considered to be hazardous materials and are therefore subject to the applicable regulations for their disposal. Information on the relevant legislation can be obtained from the provincial ministries responsible for the environment and the relevant regional authorities.
- .5 Products that cannot be reused must be treated as hazardous waste and disposed of appropriately.
- .6 Place materials and products designated as hazardous or toxic, including used adhesive and sealant tubes and containers, in designated areas or hazardous waste containers.
- .7 To reduce contamination of soil or waterways and sanitary and storm sewer systems, strictly observe the following guidelines.
  - .1 Keep the water used for cleaning in the case of paints and other water-based products so that the various deposited materials can be collected by filtration.
  - .2 Store cleaning products, thinners, solvents and paint in containers designated for this purpose and dispose of them appropriately.
  - .3 Keep rags soaked with oil and solvent used during painting for the means of recovering contaminants and dispose of them, or clean the rags appropriately, as the case required.
  - .4 Make appropriate arrangements for the removal of contaminants in accordance with hazardous waste regulations.
  - .5 Allow empty paint containers to dry before disposal or recycling (in areas with adequate facilities).

1.7 **Warranty**

- .1 **ATTESTATION OF SURFACE PREPARATION:** The Contractor must submit a signed written statement from the manufacturer of the paint and floor coverings, clearly indicating that the preparations for the surfaces to be covered have been carried out in full compliance with the manufacturer's requirements and recommendations.
  - .1 In the event that the quality of the finished work in this specification cannot be achieved due to the deficiency of the substrate, immediately notify the Departmental Representative so that adjustments can be made.

- .2 CERTIFICATION: The person applying must submit evidence in the form of a written attestation stating that they have the certifications required for the implementation of the specified products.
- .3 WARRANTY: The Contractor must submit a written warranty against any occurrence of chipping, discoloration, shearing, cracks or other defects in the appearance for a period of three (3) years.
- .1 This guarantee must appear in the operations manual to be submitted to the Departmental Representative at the end of the work

#### 1.8 **Conditions for implementation**

- .1 Provide heating systems to raise ambient air and substrate temperatures to more than 10 degrees Celsius at least 24 hours before work begins and to maintain these temperatures during and after completion, until the surfaces have sufficiently dried and cured.
  - .1 Provide continuous ventilation for seven (7) days after the completion of work.
  - .2 Coordinate the use of the existing ventilation system with the Departmental Representative and, if necessary, make arrangements for its operation during and after the completion of the work.
  - .3 Provide and temporarily install the heating and ventilation equipment required if permanent systems cannot be used; If the building's permanent systems fail to meet the minimum requirements, provide and install additional equipment to meet the minimum requirements.
  - .4 Provide the lighting equipment required and maintain an illumination level of at least 323 lux on the surfaces to be painted.
- .2 Ambient temperature, relative humidity and moisture content of the substrate
  - .1 Do not paint under the following conditions:
    - .1 Ambient and substrate temperatures are less than 10 degrees Celsius.
    - .2 The temperature of the substrate is greater than 32 degrees Celsius, unless the paint formula to be used is designed for application at elevated temperatures.
    - .3 Ambient air and substrate temperatures are not within the range recommended by the MPI or the paint manufacturer.
    - .4 The relative humidity is less than 85% or the dew point corresponds to a difference of more than 3 degrees Celsius between the temperature of the air and that of the substrate. The paint product will not be applied if the difference between the dew point and the ambient or substrate temperature is greater than 3 degrees Celsius. Relative humidity must therefore be determined using a sling psychrometer before the implementation begins.
    - .5 It is raining, snowing, presence of fog or drizzle, or precipitation in the form of snow or rain is expected before the paint is completely dried.



- .6 The environmental conditions during the drying or curing of the applied product or coating are in accordance with the specified ranges until the new coating is able to withstand the usual climatic conditions.
- .2 Paint the coating to ensure compliance with the conditions and maximum moisture content of the substrate listed below:
  - .1 Curing period of at least 28 days for new concrete or masonry surfaces;
  - .2 Maximum moisture content of 15% for wood;
  - .3 Maximum moisture content of 12% for plasterboard and plaster coatings.
- .3 Perform the tests to determine the moisture content of the substrates using a properly calibrated electronic moisture meter. For concrete floors, evaluate the moisture content by a simple "control of the covering power on the reference surface".
- .4 Conduct tests on gypsum, concrete and masonry surfaces to determine their alkalinity.
- .3 State of the surfaces and implementation conditions
  - .1 Apply the paint product only in areas where the quality of the finished surfaces will not be altered by dust suspended in the ambient air during construction work or by wind-blown dust or a ventilation system.
  - .2 Apply paint and coatings to properly prepared surfaces with a moisture content within the specified range.
  - .3 Apply paint when the previous coat is dry or sufficiently hardened.
- .4 Additional requirements for the application of paint or coating on interior surfaces
  - .1 Apply paint products when the temperature at the work sites can be maintained within the manufacturer's recommended limits of the products used.
  - .2 In occupied buildings, all painting must be done after closing hours. The work schedule must be approved by the Departmental Representative and a sufficient drying and curing time must be provided before the occupants return.

## 2. PRODUCTS

### 2.1 Materials / Equipment

- .1 The paint products and coatings listed in the MPI's List of Approved Products may be used in the scope of the present work.
- .2 All products in the paint system selected must come from the same manufacturer.
- .3 Only approved products that have been certified Environmental Choice E2 may be used for the purposes of this work.
- .4 Comply with the most recent MPI requirements for interior paint coatings, including those for surface preparation and application of primer or topcoats.

- .5 The products used, being the primary or topcoat products, paint, coatings, varnishes, stains, lacquers, fillers, thinners, solvents and others, must appear on the Approved Product List in the MPI Architectural Painting Specification Manual.
- .6 The paint products used must comply with the requirements of the MPI Environmental Choice E2, based on the Volatile Organic Compound (VOC) content determined in accordance with method 24 of the Environmental Protection Agency (EPA).
- .7 Prescribe products on the MPI'S List of Approved Products that have been rated E2 at least to meet indoor air quality requirements, including odor requirements, where applicable.

## 2.2 Colors

- .1 The Departmental Representative will provide the list of colors after the contract has been awarded.
- .2 The list of colors will be based on the selection of five (5) base colors and three (3) accent colors. A maximum of eight (8) colors will be selected for the all work.
- .3 The colors will be selected from the full range of colors and shades offered by the manufacturers.
- .4 Unless otherwise indicated, if particular products are offered in a limited range of colors, the colors of the products actually implemented will be selected from this restricted range.
- .5 In three-layer paint systems, the second layer should be of a slightly paler shade than the topcoat so each layer can be easily identified.

## 2.3 Surface preparation and finishing systems

- .1 System N° 1 : WALLS - PLASTERBOARD AND DRYWALL:
  - .1 Surface preparation:
    - .1 The surface must be clean and dry, free of oil, grease, rust and soap and the nail or screw well sunk and completely filled. Sand the joints if granular roughness is present, then dust. It is prohibited to sand the adjacent plasterboard surfaces.
  - .2 Finishing system:
    - .1 Apply a primer coat compliant with the standards CGSB 1-GP-119, CGSB 1-GP-203 and MPI Certified Category 17
    - .2 Apply two (2) coats of 100% acrylic latex paint:

.2 System N° 2 : CEILING - PLASTERBOARD AND DRYWALL:

.1 Surface preparation:

- .1 The surface must be clean and dry, free of oil, grease, rust and soap and the nail or screw well sunk and completely filled. Sand the joints if granular roughness is present, then dust. It is prohibited to sand the adjacent plasterboard surfaces.

.2 Finishing system:

- .1 Apply a primer coat compliant with the standards CGSB 1-GP-119, CGSB 1-GP-203 and MPI Certified Category 17
- .2 Apply two (2) coats of 100% acrylic latex paint:

.3 System N° 3 : METAL STRUCTURES (metal structural sections of the washroom counters).

.1 Surface preparation: SP5 white metal blast cleaning

- .1 Primer: Apply one (1) coat of a high performance two-component chemical hardening epoxy coating with the following characteristics:

- .1 Abrasion resistance (ASTM D4069): 180 Mg loss
- .2 Hardness (ASTM D 3363): H
- .3 Pull-Off Strength (ASTM D 4541): 1000 PSI
- .4 Water resistance (ASTM D 4585, 1000 hrs): no effect
- .5 Operating temperature: 121 DEGREES C
- .6 Flame spread rating (ASTM E 84): Class A (0-25)

.2 Finishing system:

- .1 Apply one (1) coat of high-performance two-component aliphatic urethane coating, chemical hardening.
- .3 Paint must be applied according to the manufacturer's recommendations. The work must be done in the workshop and if there are retouches on the site, they must be impeccable and be approved by the Departmental Representative.

.4 System N° 4 : PAINTING CONTAINING EPOXY RESIN FOR INTERIOR AND EXTERIOR WOOD SURFACES

.1 Surface preparation:

- .1 The surface must be clean, dry and free of contaminants or dirt

- .2 Wash the surface with a mixture of a cleaner / degreaser (TSP). Rinse and let dry completely.
  - .3 Remove mold with 1 liter of bleach mixed with 4 liters of water. Allow to soak for 20 minutes and rinse with cool water. Dry for 48 hours.
  - .4 Replace defective elements or parts.
  - .5 Sand wood with a P100 sandpaper
  - .6 Seal the knots with a water-based primer sealer
- .2 Finishing system:
  - .1 Apply one (1) coat of water-based, multi-surface single-component sanding primer coat with the following characteristics:
    - .1 Impact strength (ASTM D2794): >100 lbs
    - .2 Hardness (ASTM D 3363): HB
    - .3 Adhesion: excellent on wood
  - .2 Apply TWO (2) coats of epoxy - acrylic resin based with silicone.
- .5 System N° 5: SEMI-TRANSPARENT FINISHING COAT FOR WOODWORKS, WOOD LININGS AND WOODEN COMPONENTS
  - .1 Surface preparation:
    - .1 The surface must be clean, dry and free of contamination or dirt
    - .2 Wash surface with a mixture of degreaser (TSP), one liter of bleach and three liters of water, let soak for 20 minutes. Let dry for 48 hours.
    - .3 Replace defective elements or parts.
    - .4 The surface must be clean, dry and free of contaminants or dirt, oil, grease, rust, soap, old paint or others.
    - .5 Clean with a high pressure waterjet
    - .6 Sand wood with 60/80 sandpaper
  - .2 Finishing system:
    - .1 Apply three (3) coats of satin finish topcoat with a brush according to the manufacturer's recommendations.
  - .3 Acceptable product:
    - .1 WOODMATE from PEINTURES MF, color NATURAL
    - .2 SANSIN ENS, color NATURAL

- .6 System N° 6: GALVANIZED METAL SURFACES or PIPES AND CONNECTIONS AND COPPER. (visible conduits)
  - .1 Surface preparation:
    - .1 Degreasing and deoxidizing the surface with a brush
  - .2 Finishing system:
    - .1 Two layers of zinc phosphate primer
    - .2 Characteristics:
      - .1 Density: 095 to 20 degrees C
      - .2 V.O.C.: 774 (ready to use)
      - .3 Color: medium grey.

### 3. EXECUTION - PAINTING PERFORMED ON THE CONSTRUCTION SITE

#### 3.1 Manufacturer's Instructions

- .1 Compliance: Follow manufacturer's recommendations or written instructions, including product bulletins and data sheets, in addition to the instructions for handling, storing and implementing products.

#### 3.2 General Information

- .1 Unless otherwise specified, prepare interior surfaces and perform painting in accordance with the requirements of the MPI Architectural Painting Specifications Manual.
- .2 Apply the paint products according to manufacturer's written instructions.

#### 3.3 Inspection

- .1 Inspect existing substrates to ensure their condition will not compromise the proper preparation of the surfaces to be covered with paint or coatings. Before work begins, notify the Departmental Representative, of any unsatisfactory or unfavorable damage, defects or conditions.
- .2 Conduct tests to verify the moisture content of the surfaces to be painted using a properly calibrated electronic moisture meter; the moisture content of concrete floors must, however, be evaluated by a simple "Control of covering power on reference surface". Do not begin work until the condition of the substrates is deemed acceptable, depending on the range of values recommended by the manufacturer.
- .3 Maximum moisture content
  - .1 Concrete: 6%.
  - .2 Concrete or clay blocks and bricks: 6%.
  - .3 Wood: 15%.

### 3.4 Preliminary work

#### .1 Protection

- .1 Protect building surfaces and neighboring structures that do not need to be painted or coated against specks, marks and other damage with clean blankets or covers. If the surfaces in question are damaged, clean and restore them as directed by the Departmental Representative.
- .2 Protect permanently attached items, fire rating labels from doors and frames for example.
- .3 Protect factory-coated materials and components from finishing products.
- .4 Ensure the protection of the general public in or near the building.

#### .2 Surface preparation

- .1 Remove cover plates from electrical appliances, lighting fixtures, hardware applied to doors, bathroom accessories and other hardware, in addition to surface-mounted fixtures and fittings before coating work begins. Identify all items and store them in a safe place; reinstall once the paint coating has been completed.
- .2 Cover or move furniture components and transportable materials to facilitate painting if required. Replace these elements and materials as work progresses.
- .3 Post "FRESH PAINT" signs in the areas occupied during the completion of the work. The signs must be accepted by the Departmental Representative.

#### .3 Prepare interior surfaces and perform painting in accordance with the requirements of the MPI Architectural Painting Specifications Manual. Refer to this document for specific requirements that will be added to the instructions below.

- .1 Remove dust, dirt and other foreign matter by wiping surfaces with clean, dry cloths and vacuuming or sweeping with a compressed air jet.
- .2 Wash surfaces with biodegradable detergent with bleach and clean, hot water, with a stiff bristle brush to rid the surfaces of dirt, oil and other contaminants if necessary.
- .3 After brushing the surfaces thoroughly, rinse them with clean water until all foreign matter is gone.
- .4 Allow the surfaces to drip completely and dry thoroughly.
- .5 It's recommended to use water-based cleaners rather than organic solvents to prepare surfaces to receive a water-based paint.
- .6 Attach trigger sprayers on the spray hoses.
- .7 Once dry, many water-based paints cannot be removed with water. The use of mineral elements or organic solvents for the cleaning of these paints must be minimized.

- .4 Before applying the primer or topcoat and between subsequent layers, prevent the cleaned surfaces from being contaminated with salts, acids, alkalis, corrosive chemicals, grease, oil and solvents. Apply the primer or topcoat, paint or other pre-treatment product as soon as possible after cleaning and before the surface is contaminated again.
- .5 When possible, apply a print coat on the concealed surfaces of the new wooden structures before putting them in place. Use prescribed topcoat products for exposed surfaces.
  - .1 Apply a vinyl topcoat product that meets the requirements for product No. 36 of the MPI list of knots, gum, sap and resinous surfaces.
  - .2 Seal cracks and nail holes with a filler.
  - .3 Stain the filler before applying it to stained wood.
- .6 Sand and dust the surfaces between each layer, if necessary, to ensure good adhesion of the next layer and to remove any visible defects at a distance of 1000 mm or less.
- .7 Clean the metal surfaces to be painted by removing rust marks, laminate chips, welding slag, dirt, oil, grease and other foreign matter in accordance with MPI requirements. Remove all traces of striping products, then clean the corners and depressions of the surfaces using appropriate methods.
- .8 Retouch the surfaces coated with a print product applied in the workshop with the appropriate topcoat product as directed.
- .9 Do not apply paint on prepared surfaces prior to approval from the Departmental Representative.
- .10 The application method used must be approved by the Departmental Representative. Unless otherwise indicated, apply the product according to the manufacturer's instructions.

### 3.5 **Electrical and mechanical materials**

- .1 Unless otherwise indicated, apply the paint to piping, electrical conduits, ventilation ducts, supports / suspensions, and other visible electrical and mechanical elements inside so that the color and finish of the painted surfaces match with their respective surfaces.
- .2 Boiler rooms and mechanical and electrical installations: Paint to piping, electrical conduits, ventilation ducts, supports / suspensions, and other visible electrical and mechanical elements.
- .3 Other non-finished zones: Leave the piping, electrical conduits, ventilation ducts, supports / suspensions, and other visible electrical and mechanical elements in their original state and retouch only scratches or other marks on the existing coating.
- .4 Retouch scratches and marks on factory applied coatings using the product supplied by the equipment manufacturer.
- .5 Do not paint identification labels.
- .6 Do not paint sprinkler heads.
- .7 Apply a topcoat product and a coat of matt black paint to the inside surfaces of the ventilation ducts that can be seen through the grates, dampers and diffusers.

- .8 Paint all pipes of the fire protection network in red.
- .9 Apply a red-enamel paint on the fire alarm system switches and the emergency exit lighting system.
- .10 Paint all pipes of the natural gas network in yellow.
- .11 Paint both faces and sides of electrical and telephone switchboards prior to installation. Leave the material in its original condition, with the exception of retouching if necessary, and paint the ducts, fittings and other unfinished parts.
- .12 Do not paint transformers and equipment inside power substations.

### 3.6 **Implementation Tolerances**

- .1 Walls: no visible defects at a distance of 1000 mm, at an angle of 90 degrees of the surface being examined.
- .2 Ceiling: No visible defects by an observer on the ground, at an angle of 45 degrees of the surface being examined, under the expected final illumination.
- .3 The color and gloss of the finishing coat must be uniform over the entire surface being examined.

### 3.7 **Restoration of premises**

- .1 Clean and reinstall all hardware removed to facilitate painting.
- .2 Remove guards and warning signs as soon as possible when the work is complete.
- .3 Remove splatters on exposed surfaces that have not been painted. Remove smudges and specks as work progresses with a compatible solvent.
- .4 Protect freshly painted surfaces from drips and dust to the satisfaction of the Departmental Representative and avoid scratching new coatings.
- .5 Restore the premises used for paint storage, mixing and handling, and clean the tools and equipment used to their initial state of cleanliness, to the satisfaction of the Departmental Representative.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted

### 1.2 References

- .1 ASTM A167-99, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A653/A653M-99a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment
- .4 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking
- .5 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel
- .6 CAN/CSA-B651-95, Accessible Design for the Built Environment

### 1.3 workshop drawings, data sheets and samples to submit

- .1 Provide workshop drawings, samples and product data sheets in accordance with the requirements in section 01 33 00 - *Documents and samples to be submitted*
- .2 Workshop drawings must indicate manufacturing and installation details, hardware parts and show the plan and elevation views.
- .3 Provide the data sheets for each of the panel types, hardware, accessories and fasteners prescribed in Part 2. The data sheets must indicate:
  - .1 Physical properties accompanied by the number and title of the standards outlining the performance criteria to be met and the test methods used to measure them;
  - .2 The installation methods and the materials used to fix them in place mechanically.

### 1.4 Storage and handling

- .1 Store products and materials in a dry place so that they do not come into contact with the floor and according to the manufacturer's specific requirements.
- .2 Store materials on supports to prevent deformation.

### 1.5 Warranty

- .1 The washroom partition manufacturer guarantees, by written certification, all washroom partitions for a period of five (5) years from the date of receipt of goods by the Departmental Representative against any defects in materials, design or manufacturing.
- .2 This warranty does not cover defects in installation, improper use or vandalism.

## 2. PRODUCTS

### 2.1 Materials and equipment

- .1 Partitions for the W.C. compartments and urinal shields Solid color reinforced composite (SCRC),
  - .1 Material: Fiber-reinforced with polycarbonate and phenolic resin.
  - .2 Class B compliant with the ASTM E 84 standard "Interior Wall and Ceiling finish classification"
  - .3 Anti-graffiti, anti-scratch, increased resistance to moisture
- .2 Accepted product: SIERRASERIES from BOBRICK

### 2.2 Hardware parts

- .1 Assembly support hinges: Stainless steel stays
  - .1 Door opening: Indicated in the plans
  - .2 Door closing: by gravity.
  - .3 Mechanism for adjusting the opening angle of the door up to 90 °.
  - .4 Parts with an emergency access device.
- .2 Latch:
  - .1 Hand-held knob for the disabled, with concealed bolt for concealed locking and equipped with an emergency access device;
  - .2 Finish / material: stainless steel parts.
- .3 Door opener:
  - .1 Embedded door opener for sliding bolt and door opening towards the interior and/or exterior with rubber doorstop;
  - .2 Finish/material: Cast zinc and chrome cast parts on copper and nickel plating.
- .4 Headrails:
  - .1 With anti-grip profile, 25 mm x 41 mm x 1.5 mm, in one piece; extrusion;
  - .2 Finish / material: Natural anodized aluminum
- .5 Clothes hangers:
  - .1 Combination hook and rubber bumper;
  - .2 Finish / material: stainless steel

- .6 Door handles:
  - .1 Handles for the disabled, C-shaped, 139.7 mm c / c, suitable for doors opening outwards;
  - .2 Stainless steel parts.
- .7 Supports and assembly parts:
  - .1 To attach to each other, walls or partitions, pilasters, panel compartments and urinal screen:
    - .1 Support brackets in double T or F form, in cast zinc and chromium on copper and nickel plating.
    - .2 To fix the headrails to the wall: sheet steel folded chrome after folding, 0.9mm (20 gauge)
  - .8 Fasteners: Screws and bolts made from chrome-plated steel.

## 2.3 Manufacturing

- .1 Panels (doors, partitions, urinal screen):
  - .1 dimensions:
    - .1 Doors and partitions: 25mm thick x 1800 mm high x the width indicated in the drawings
    - .2 Urinal screen: 25mm thick x the width indicated in the drawings x 1067 mm high for the screens fixed to the wall using support brackets
  - .2 Pilasters: 32 mm thick, of the same construction as the door panels and partition,
  - .3 Pilaster shoes: stainless steel polished 0.8 mm (22 gauge) thick, 102 mm high.

## 2.4 Finish for the doors, panels, pilaster and screens

- .1 Steel:
  - .1 The steel components must be cleaned, degreased and neutralized with a phosphate or chromate treatment product.
  - .2 Elements must be coated with a primer coat applied with a spray gun in accordance with CAN / CGSB-1.81.
  - .3 The elements must be coated with a "tenacious" organic polymer paint, electrostatic application, before baking with a smooth, hard finish and a film thickness of 0.025 mm.
  - .4 Door panels, pillars and walls must be of the same color; It will be selected from the range of **ANTI-GRAFFITI** colors offered by the manufacturer. One color only for the present work.

### 3. EXECUTION

#### 3.1 Installation

##### .1 Verify the installation:

.1 Nailing base required to fasten consoles and other supporting elements to the washroom's partitions and walls.

.2 If required, notify the Contractor of missing items to be supplied and installed by others and are re for the execution of the work described in this section and do not begin work until all corrections have been made.

.3 Carry out work in accordance with the CAN/CSA-B651 standard

#### 3.2 Placing

##### .1 General information - installation of the partitions:

.1 Securely install partitions, plumb and square;

.2 Leave a space of 12 mm between the wall or the wall of the room and the partition or end pilaster;

.3 Secure the supports to masonry or concrete surfaces using screws and sockets, in hollow walls, with bolts and toggle anchors.

.4 To fix the partitions and the pilasters to the supports using nuts and through bolts, with sleeve.

.5 Compensate for floor unevenness by means of screw jacks through the mounting plated integrated into the studs. Cover the fasteners in the floor with stainless steel shoes.

.6 Equip each door with a hinge and latch and each cabin with clothes hook placed on the door at 1500 mm high. Adjust and align the hardware to ensure proper operation. Adjust the door opening angle to 30 ° from the closed door position. Place a bumper on the door.

.7 Put a handle on doors that open toward the outside and install them on the inside and outside of the door in accordance with the CAN / CSA-B651 standard.

.8 Install hardware and support bars.

##### .2 Installation of the partitions attached to the floor, with headrails:

.1 Using appropriate supports, secure the pilasters to the floor level and plumb, then secure the installation with the screw jacks.

.2 Securely attach the pilaster shoes.

.3 Attach the headrail to the pilasters using at least two fasteners per side.

.4 Adjust the top of the doors to be parallel with the headrail when the doors are closed.

.3 Installation of urinal screens:

- .1 Supply and install urinal screens consisting of a pilaster panel in accordance with the requirements for toilet compartments and as specified by the manufacturer.
- .2 Attach the screens to the partitions or walls of the room with 3 suitable brackets.

**END OF SECTION**

## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 74 11 - Cleaning
- .3 Section 06 10 00 - Carpentry
- .4 Section 07 92 00 - Joint sealing
- .5 section 08 71 00 - Door hardware
- .6 Section 09 91 23 - Paint

### 1.2 References

- .1 Aluminum Association Designation System for Aluminum Finishes
- .2 The Canadian Green Building Council (CGBC)
  - .1 LEED Canada-NC, version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green building rating system for new construction and major renovations (reference kit) (including the 2007 addendum).
  - .2 LEED Canada-CI, version 1.0-2007, LEED (Leadership in Energy and Environmental Design) : Commercial Interiors Green Building Rating System
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment
  - .2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking
  - .3 CAN/CGSB-1.104-M91, Semigloss Alkyd Air Drying and Baking Enamel
- .4 Canadian Standards Association (CSA) / CSA International)
  - .1 CSA-G40.20-04/G40.21-02, General requirements for rolled or welded structural quality steel / Structural quality steel
  - .2 CSA G164-M92 (C2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CSA W59 - 03, Welded steel construction (metal arc welding).
- .5 Green Seal Environmental Standards
  - .1 Standard GC-03-93, Anti-Corrosive Paints.
  - .2 Standard GS-11-97, Architectural Paints
- .6 American Society for Testing and Materials (ASTM)
  - .1 ASTM A 653/A 653M-10a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

- .7 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - February 2004
    - .1 MPI category #76, Quick Dry Alkyd Metal Primer.
    - .2 MPI category #81, Machinery Enamel.
    - .3 MPI category #96, Quick Dry Enamel Gloss.

### 1.3 Manufacturer's warranty

- .1 A five (5) year warranty covering the installation and the panels against any manufacturer's defect. A five (5) year warranty covering the trolleys and tracks against any manufacturer's defect. These warranties will be in effect from the provisional date of the acceptance of work.

### 1.4 Workshop drawings

- .1 Submit the workshop drawings in accordance with section 01 33 00 - *Documents and samples to be submitted*.
  - .1 Work shop drawings must indicate the type, size and characteristics of service doors, the type of material, the type of operating mechanisms, details of the hardware and accessories
- .2 Data Sheets
  - .1 Submit the required data sheets, manufacturer's instructions and documentation for wire mesh partitions. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finish

### 1.5 Delivery, storage and handling:

- .1 Delivery and acceptance: Deliver the materials and equipment to the site in their original packaging, which must be labeled with the manufacturer's name and address.
- .2 Storage and handling
  - .1 Store materials and equipment as not to rest on the floor in a clean, dry and well ventilated area as per the manufacturer's recommendations.
  - .2 Store the partitions to protect them from the marks, scratches and scrapes.
  - .3 Replace damaged elements.

## 2. PRODUCTS

### 2.1 Materials

- .1 Curtains:
  - .1 Vertical grid composed of solid aluminum panels, full height having an angle of 15 degrees in-between.
  - .2 Modules: Opaque modules 152 mm wide.

- .1 Hinges: continuous, recessed aluminum
- .2 Opaque panels: 136 mm wide X 1.6 mm thick
- .3 Structural strip 102mm high at the base and top, with an aluminum extrusion 1.6mm thick and composed of modules with an angle of 15 ° in-between to facilitate folding the partition.
- .2 Locking:
  - .1 The post for enclosure will be equipped with a mortise lock with a cylinder on one side only.
  - .2 This enclosure post will be attached to a full height wall stud
  - .3 The enclosure post will feature a floor and ceiling self-locking system located inside the niche
  - .4 Intermediate posts will be located at all curves and at recommended intervals of 3m. The intermediate posts will be activated from the inside and will have a lock on the floor. This lock will be retained in a dust-proof socket, made of stainless steel
- .3 Rail:
  - .1 The curtain will be suspended on a rail of 33mm wide by 40mm high. The rail will be an alloy 6351-T6 aluminium section
  - .2 Radius of curvature: as illustrated on drawing

### 3. EXECUTION

#### 3.1 Installation

- .1 The installation must be carried out by an authorized installer trained by the manufacturer
- .2 Verification of conditions: Before installing the wire mesh partitions, ensure that the condition of the surfaces / supports previously implemented in other sections or contracts is acceptable and allows work to be carried out in accordance with the manufacturer's written instructions.
  - .1 Inform the Departmental Representative of any unacceptable condition detected.
  - .2 Begin installation work only after the unacceptable conditions have been corrected and receiving written approval from the Departmental Representative.

#### 3.2 Clean-up

- .1 Clean-up during work: Perform clean-up activities in accordance with section 01 74 11 - *Clean-up*.
  - 1. Ensure the locations are clean at the end of each working day.
- .2 Final clean-up: Remove the surplus equipment/materials, waste, tools and equipment in accordance with section 01 74 11 - *Cleaning* when the work is complete.

**END OF SECTION**



## 1. GENERAL INFORMATION

### 1.1 Related sections

- .1 Section 01 33 00 - Documents and samples to be submitted
- .2 Section 01 78 00 - Documents and items to submit upon work completion
- .3 Section 06 10 00 - Carpentry
- .4 Section 08 80 50 - Glazing (mirror)
- .5 Section 10 16 00 – Metal partitions for washrooms

### 1.2 References

- .1 ASTM International
  - .1 ASTM A 167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM B 456-03, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
  - .3 ASTM A 653/A 653M-09, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM A 924/A 924M-09, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment
  - .2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking
  - .3 CGSB 31-GP-107MA-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover
- .3 Canadian Standards Association (CSA)
  - .1 CAN/CSA-B651-04, Accessible Design for the Built Environment
  - .2 CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

### 1.3 Maintenance records

- .1 Provide the instructions required for the maintenance of the laminate, which must be incorporated into the maintenance and operating manual.

### 1.4 Documents and samples to submit

- .1 Submit the data sheets and workshop drawings in accordance with section 01 33 00 - *Documents and samples to be submitted*.

- .2 Submit the required data sheets, manufacturer's instructions and documentation for the products. The data sheets must indicate the product characteristics, performance criteria, dimensions, the limits and finish
- .3 The workshop drawings must indicate the size and details of the components, the nature of the base materials and the finish of the interior and exterior surfaces and the installation details for the support bar fasteners.

#### **1.5 Protection**

- .1 During the transportation and installation, protect structures with a laminate finish with strong Kraft paper or place them in shipping crates. Store materials horizontally once with the construction site.

#### **1.6 Warranty**

- .1 Provide a written, issued and signed document on behalf of the Departmental Representative stating that the laminate structures are guaranteed against warpage and delamination for a period of ten (10) years. The hardware is also covered for a period of five (5) years from the date of the "Final Acceptance" certificate of the work is signed
- .2 Provide a five (5) year parts and labor warranty against damage to metal lockers (excluding vandalism).

#### **1.7 Documents / elements to be submitted at the completion of work**

- .1 Provide instructions for the cleaning and maintenance of the accessories for the washrooms and toilets and attach them to the manual referred to in section 01 78 00 - *Documents and items to submit upon work completion.*

### **2. PRODUCTS**

#### **2.1 Materials**

- .1 Stainless sheet steel: Compliant with the ASTM A167 standard, grade 304, satin finish
- .2 Stainless steel tubes: grade 304, commercial quality, without longitudinal joint, wall thickness 1.2 mm.
- .3 Fasteners: Hidden screws and bolts must be hot-dip galvanized; the exposed fasteners must have the same finish as the elements they will be fastened to; the expandable fiber, lead or rubber sleeves must comply with the manufacturer's recommendations for the accessories to be fastened.

#### **2.2 Manufacturing**

- .1 The joints of the shaped elements must be welded and then smoothed by grinding. Mechanical fasteners must be used in the approved locations.
- .2 If possible, visible surfaces must not have joints
- .3 Flat surfaces must be free of distortions, scratches and dents
- .4 Parts of the elements that come into contact with other building finishes must be painted to prevent electrolytic reactions

- .5 Anchors and hidden fasteners in ferrous metal must be hot-dip galvanized in accordance with the CSA G164 standard
- .6 The elements must be assembled in the workshop and packed with their anchors and fittings
- .7 The inserts and frames must be delivered to the site in time for their installation, with the templates, details and instructions for their installation
- .8 The accessories must be supplied with the anchor plates and the steel elements required for their installation on the wall frame posts and the framing elements.

## **2.3 Accessories**

- .1 Accessories provided and installed by the contractor:
  - .1 All washroom accessories must come from the same manufacturer.
  - .2 Support bars in each washroom and stalls for persons with reduced mobility (free of obstacles) in accordance with Article 3.8.3.8
    - .1 A 600 mm support bar per washroom or stall, located at the back of the toilet bowl
    - .2 A 900 mm support bar per washroom or stall, located laterally to the toilet bowl
  - .3 Garbage bin: Wall type, for wall mounting, stainless steel, satin finish.
    - .1 Satin finish stainless steel. Rounded edges and ledges. Provide hooks, reusable vinyl liner; removable for maintenance.
    - .2 Capacity: 48.3 L.
    - .3 Dimensions: 585 high X 385 wide X 215 deep
    - .4 Accepted product: B-277 from BOBRICK or approved equivalent
  - .4 Sanitary napkin disposal: stainless steel, for surface mounting; full-length hinged cover, universal symbol.
    - .1 Satin finish stainless steel. One-piece lid construction; Rounded edges and ledges
    - .2 Capacity: 3.8 L.
    - .3 Dimensions: 190 X 255 X 95 mm
    - .4 Accepted product: B-270 from BOBRICK or approved equivalent
  - .5 Toilet paper distributor:
    - .1 For a single jumbo roll
    - .2 Assembly: on the surface
    - .3 Dimensions: 271 mm X 115 mm

- .4 Assembly plate: Stainless steel 16 gauge (1.6 mm)
- .5 Door: Stainless steel, type 304 22 gauge (0.8 mm) with satin finish The slot indicates the level of the toilet paper inside the frame. Equipped with a key lock the same as the other manufacturer's accessories.
- .6 Spindle: The removable rubber O rings must allow conversion to a smaller spindle. Interior fixed stainless steel spindle, 20 gauge (0.9 mm)
- .7 Accepted product: B-2892 from BOBRICK or approved equivalent
- .6 Liquid hand soap dispenser:
  - .1 Vertical tank in satin-finish stainless steel. For all-purpose hand soap, push-button
  - .2 Capacity: 1.2 L.
  - .3 Soap refill window
  - .4 Surface-mounted Requires special key to open
  - .5 Anti-vandalism.
  - .6 Dimensions: 120 X 205mm X 90mm
  - .7 Accepted product: B-2111 from BOBRICK or approved equivalent
- .7 Changing table:
  - .1 Polypropylene cabinet and bed with stainless steel veneer
  - .2 Dimensions: 894 X 565 mm. Depth (closed) 100 mm. Extension (open) 589 mm.
  - .3 Color: White Granite
  - .4 Accepted product: KB200-05SS from BOBRICK or approved equivalent
- .8 Mop and broom holder (holds 3 mops):
  - .1 Material: 18-8 stainless steel, type 304, thickness 0.8 mm, satin finish
  - .2 Dimensions: 610 mm X 125 mm
  - .3 Accepted product: B-223-24 from BOBRICK
- .9 Mirrors:
  - .1 Mirror secured with polyvinyl film, sharp edges chamfered at 45 degrees. Support and assembly as designed in the architecture plan. Refer to section 08 80 50 – Glass.

## **2.4 Finish**

- .1 Chromium and nickel covering: in accordance with the ASTM B456 standard, satin finish.
- .2 Baked enamel paint: surfaces coated with a metal conditioner coating compliant with the CGSB 31-GP-107Ma standard, a type 2 primer coat in accordance with the CAN / CGSB-1.81 standard and baked, plus 2 coats of Type 2 enamel paint in accordance with the CAN / CGSB-1.88 standard and baked until a hard and resistant finish is obtained. Sanding required between finish coats. Color chosen by the Departmental Representative from the standard colors offered.
- .3 No part shall bear, on a visible face, the manufacturer's name or trademark.

## **3. EXECUTION**

### **3.1 Installation**

- .1 Install the washroom accessories in the locations indicated in the architectural plans.
- .2 Install and secure the accessories as follows.
  - .1 Walls with studs: Secure the steel support plates to the studs with dowels or anchors before applying the finishing plaster or laying the gypsum board
  - .2 In masonry or concrete: Use bolts with expandable lead anchors secured in drilled holes
  - .3 Shower / toilet stalls: Use male / female through bolts.
- .3 Attach the support bar to the recessed anchors provided by the bar's manufacturer
- .4 Attach the accessories using tamperproof screws/bolts
- .5 Fill the dispenser devices just before final building's final acceptance.
- .6 Install mirrors compliant with the instructions.

### **3.2 Clean-up**

- .1 When the work in this section is complete, remove all protective elements, clean the finished surfaces so that they are free from dirt and stains
- .2 Polish the metal parts and replace those which are defective or are damaged

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related requirements**

- .1 Section 23 05 93 – Testing, adjusting and balancing for HVAC.

### **1.2 Reference standards**

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)
  - .1 ANSI/ASME B16.15-06, Cast Bronze Threaded Fittings, Classes 125 and 250.
  - .2 ANSI/ASME B16.18-01, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ANSI/ASME B16.22-01, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ANSI/ASME B16.24-01, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 ASTM International Inc.
  - .1 ASTM A 307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM A 536-84 (2004) e1, Standard Specification for Ductile Iron Castings.
  - .3 ASTM B 88M-05, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)
  - .1 ANSI/AWWA C111/A21.11-07, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .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, Grey Iron Gate Valves, Flanged and Threaded Ends.
  - .3 MSS-SP-71-05, Grey 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)
  - .1 National Plumbing Code of Canada 2015 (NPC).
- .9 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

## **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.

### **2.2 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 cast copper to ANSI/ASME B16.18; with 301 stainless 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 NPS 2 and under, screwed:
  - .1 Rising stem: to MSS-SP-80, Class 125, 860 kPa, bronze body, screw-in bonnet, solid wedge disc.
- .3 NPS 2 1/2 and over, , flanged:
  - .1 Rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, OS&Y bronze trim.
- .4 NPS 2 1/2 and over, , flanged:
  - .1 Non-rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, bronze trim, bolted bonnet.

## **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 Lockshield handles: as indicated.



## **2.6 Swing check valves**

### **.1 NPS 2 and under, screwed:**

- .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 brass ball, PTFE adjustable packing, brass gland and PTFE Bunan TFE seat, steel lever handle.**

## **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 Province(s) Plumbing Code and local authority having jurisdiction.**
- .2 Assemble piping using fittings manufactured to ANSI standards.**
- .3 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.**
- .4 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.**

### **3.3 Valves**

- .1 Balance recirculation system using lockshield globe valves. Mark settings and record on as-built drawings on completion.**

### **3.4 Pressure tests**

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

### **3.5 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 to Provincial potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing.

### **3.6 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.

### **3.7 Disinfection**

- .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction.

### **3.8 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.
- .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.
- .4 Bring HWS storage tank up to design temperature slowly.
- .5 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.

.6 Check control, limit, safety devices for normal and safe operation.

.7 Rectify start-up deficiencies.

### **3.9 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 TAB HWC in accordance with Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

.3 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.4 Sterilize HWS and HWC systems for Legionella control.

.5 Verify performance of temperature controls.

.6 Verify compliance with safety and health requirements.

.7 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.

.8 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.

### **3.10 Reports:**

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: Reports, using report forms.

.2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

### **3.11 Operation requirements**

- .1 Co-ordinate operation and maintenance requirements including, cleaning and maintenance of specified materials.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Reference standards**

#### **.1 CSA Group**

- .1 CAN/CSA-B45 Series-02, Plumbing Fixtures, (Consists of B45.0, B45.1, B45.2, B45.3, B45.4, B45.5, B45.6, B45.7, B45.8 and B45.9).
- .2 CSA B125.3, Plumbing Fittings.
- .3 CSA B651, Accessible Design for the Built Environment.

### **1.2 Closeout submittals**

- .1 Provide maintenance and operation records of the sanitary appliances.
- .2 Include:
  - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
  - .2 Details of operation, servicing, maintenance.
  - .3 List of recommended spare parts.

### **1.3 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.

## **2. PRODUCTS**

### **2.1 General**

- .1 As indicated on plans

### **2.2 Sustainable materials and equipment**

- .1 Sustainable development requirements
  - .1 Equipment, materials and resources: in accordance with the general specifications

## **2.3 Manufactured units**

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CSA B125.3.
- .3 Number, locations: as indicated.
- .4 Fixtures in any one location to be product of one manufacturer and of same type.
- .5 Trim in any one location to be product of one manufacturer and of same type.
- .6 Units
  - .1 See description on plans.
- .7 Fixture piping:
  - .1 Hot and cold water supplies to fixtures:
    - .1 Chrome plated flexible supply pipes with handwheel stop, reducers, escutcheon.
  - .2 Waste:
    - .1 Brass P trap with clean out on fixtures not having integral trap.
    - .2 Chrome plated in exposed places.
- .8 Chair carriers:
  - .1 Factory manufactured floor-mounted carrier systems for wall-mounted fixtures.

## **3. EXECUTION**

### **3.1 Examination**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for washroom fixtures installation in accordance with manufacturer's written instructions.

### **3.2 Installation**

- .1 Mounting heights:
  - .1 Standard: to manufacturer's recommendations as indicated, measured from finished floor.
  - .2 Wall-hung fixtures: as indicated, measured from finished floor.

.3 Barrier-free: to most stringent NBCCSA B651.

### **3.3 Adjusting**

.1 Conform to water conservation requirements specified this section.

.2 Adjustments:

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Adjust flush valves to suit actual site conditions.

.3 Checks:

.1 Water closets, urinals: flushing action.

.2 Aerators: operation, cleanliness.

.3 Vacuum breakers, backflow preventers: operation under all conditions.

### **3.4 Cleaning**

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

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

**END OF SECTION**

## **1. GENERAL**

### **1.1 Reference standards**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-B45 Series-02(R2008), Plumbing Fixtures.
  - .2 CAN/CSA-B125.3-05, Plumbing Fittings.
  - .3 CAN/CSA-B651-04, Accessible Design for the Built Environment.
- .2 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).

### **1.2 Action and informational submittals**

- .1 Provide submittals in accordance with Section [01 33 00 - Submittal Procedures].
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Sustainable Design Submittals:
  - .1 LEED Submittals: in accordance with [Section 01 35 21 - LEED Requirements].

### **1.3 Closeout submittals**

- .1 Provide maintenance data in accordance with Section [01 78 00 - Closeout Submittals].
- .2 Include:
  - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
  - .2 Details of operation, servicing, maintenance.
  - .3 List of recommended spare parts.

### **1.4 Delivery, storage and handling**

- .1 Deliver, store and handle in accordance with product requirements.



- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

## **2. PRODUCTS**

### **2.1 Sustainable material**

- .1 Materials and products as specified on plans.

### **2.2 Manufactured units**

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: architectural drawings and engineered plans to govern.
- .5 Fixtures to be product of one manufacturer.
- .6 Trim to be product of one manufacturer.
- .7 Service sinks as see on plans.

## **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 Mounting heights:
  - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
  - .2 Wall-hung fixtures: measured from finished floor.
  - .3 Physically handicapped: to comply with most stringent of either NBC or CAN/CSA-B651.

### **3.3 Adjusting**

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
  - .1 Adjust water flow rate to design flow rates.
  - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks:
  - .1 Aerators: operation, cleanliness.
  - .2 Vacuum breakers, backflow preventers: operation under all conditions.
  - .3 Wash fountains: operation of flow-actuating devices.
- .4 Thermostatic controls:
  - .1 Verify temperature settings, operation of control, limit and safety controls.

### **3.4 Cleaning**

- .1 Execute cleaning works.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Reference standards**

- .1 American Society of Mechanical Engineers (ASME)
- .2 ASTM International
- .3 Factory Mutual (FM)
- .4 WHMIS, Health Canada / Information System Hazardous Materials at work
- .5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
- .6 Underwriter's Laboratories of Canada (ULC)
- .7 SMACNA, Sheet Metal and Conditioning Contractors National Association inc., Round Industrial Duct Construction Standards, lasted edition.

### **1.2 Action and informational submittals**

- .1 Provide submittals required.
- .2 Product Data.
- .3 Shop drawings
  - .1 Submit shop drawings for the following cases :
    - .1 Springs and cushion, anti-vibration mountings
    - .2 Structural assembly
- .4 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

### **1.3 Closeout submittals**

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

### **1.4 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:
  - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

## **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 as specified Section.

## 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 Pipe hangers

When corrosion risks, use galvanised protection

- .1 Finishes:
  - .1 Pipe hangers and supports: galvanized painted with zinc-rich paint after manufacture.
  - .2 Ensure steel hangers in contact with copper piping are copper plated epoxy coated.
- .2 Upper attachment structural: suspension from lower flange of I-Beam:
  - .1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.
    - .1 Rod: 9 mm UL listed 13 mm FM approved.
- .3 Upper attachment structural: suspension from upper flange of I-Beam:
  - .1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed.
  - .2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed.
- .4 Upper attachment to concrete:
  - .1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.
  - .2 Concrete inserts: wedge shaped body with knockout protector plate UL listed FM approved to MSS SP 69.
- .5 Shop and field-fabricated assemblies:
  - .1 Trapeze hanger assemblies.
  - .2 Steel brackets.

- .3 Sway braces for seismic restraint systems: to Section.
- .6 Hanger rods: threaded rod material to MSS SP 58:
  - .1 Ensure that hanger rods are subject to tensile loading only.
  - .2 Provide linkages where lateral or axial movement of pipework is anticipated.
- .7 Pipe attachments: material to MSS SP 58:
  - .1 Attachments for steel piping: carbon steel black.
  - .2 Attachments for copper piping: copper plated black steel.
  - .3 Use insulation shields for hot pipework.
  - .4 Oversize pipe hangers and supports for hot water hangers.
- .8 Adjustable clevis: material to MSS SP 69 UL listed FM approved, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
  - .1 Ensure "U" has hole in bottom for rivetting to insulation shields.
- .9 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll, to MSS SP 69.
- .10 U-bolts: carbon steel to MSS SP 69 with 2 nuts at each end to ASTM A 563.
- .11 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP 69.

## **2.4 Riser clamps**

- .1 Steel or cast iron pipe: black carbon steel to MSS SP 58, type 42, UL listed.
- .2 Copper pipe: carbon steel copper plated to MSS SP 58, type 42.
- .3 Bolts: to ASTM A 307.
- .4 Nuts: to ASTM A 563.

## **2.5 Insulation protection shields**

- .1 Insulated cold piping:
- .2 64 kg/m<sup>3</sup> density insulation plus insulation protection shield to: MSS SP 69, galvanized sheet carbon steel. Length designed for maximum 3 m span.
- .3 Insulated hot piping:
- .4 Curved plate 300 mm long, with edges turned up, welded-in centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP 69.

## **2.6 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 Travel stops must be set in factory to its "cold" position and must be designed to stay in this position without any external force.
- .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.

## **2.7 Spring suspension, variable lift**

- .1 Vertical movement between 13 mm and 50 mm : single precompressed spring suspension, variable lift
- .2 Vertical movement superior to 50 mm : double precompressed spring suspension, variable lift, both (2) springs mounted in series in a single casing
- .3 Variable lift suspensions must include a factory set travel stop.
- .4 Springs, alloy steel, in accordance with ASTM A 125, must have been shot peen tested and a magnetic control, which the following characteristics have been tried and tested in order to know, the clear height, the height under the load, and the stiffness (permissible difference of +/- 5%); A C.M.T.R. (certified material test report).

## **2.8 Equipment supports**

- .1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel. Submit 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.
- .2 Vibration Control Devices:
  - .1 Install on piping systems at pumps, boilers, chillers, cooling towers, and as indicated.
- .3 Clamps on riser piping:
  - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
  - .2 Bolt-tightening torques to industry standards.
  - .3 Steel pipes: install below coupling or shear lugs welded to pipe.
  - .4 Cast iron pipes: install below joint.
- .4 Clevis plates:
  - .1 Attach to concrete with 4 minimum concrete inserts, one at each corner.
- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.
- .6 Use approved constant support type hangers where:
  - .1 Vertical movement of pipework is 13 mm or more,
  - .2 Transfer of load to adjacent hangers or connected equipment is not permitted.
- .7 Use variable support spring hangers where:
  - .1 Transfer of load to adjacent piping or to connected equipment is not critical.
  - .2 Variation in supporting effect does not exceed 25 % of total load.

### **3.3 Hanger spacing**

- .1 Plumbing piping: to National Plumbing Code of Canada (NPC) applicable.
- .2 Fire protection: to applicable fire code.
- .3 Copper piping: up to NPS 1/2: every 1.5 m.



- .4 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.
- .5 Within 300 mm of each elbow.

Maximum Pipe Size : NPS	Maximum Spacing Steel	Maximum Spacing Copper
up to 1-1/4	2.1 m	1.8 m
1-1/2	2.7 m	2.4 m
2	3.0 m	2.7 m
2-1/2	3.6 m	3.0 m
3	3.6 m	3.0 m
3-1/2	3.9 m	3.3 m
4	4.2 m	3.6 m
5	4.8 m	
6	5.1 m	
8	5.7 m	
10	6.6 m	
12	6.9 m	

- .6 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.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Summary**

- .1 Section 23 05 93 – Testing, adjusting and balancing for HVAC .

### **1.2 Reference standards**

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .2 National Fire Protection Association (NFPA)
  - .1 NFPA 13, Standard for the Installation of Sprinkler Systems.
- .3 National Research Council Canada (NRC)

### **1.3 Action and informational submittals**

- .1 Submit product data and specifications and documentation of manufacturers for products.
- .2 Submit shop drawings signed and sealed by a member of the OIQ Engineer of all systems and anti-vibration devices and earthquake protection.
- .3 Submit to completion, a certificate of compliance signed by an engineer member of the OIQ, claiming that all systems and vibration and earthquake protection devices comply with applicable standards.

### **1.4 Quality assurance**

- .1 Health and Safety:
  - .1 Do construction occupational health and safety.

### **1.5 Delivery, storage, and handling**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:

- .1 Construction/Demolition Waste Management and Disposal: separate waste materials for [reuse] [and] [recycling].

## 2. PRODUCTS

### 2.1 General

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

### 2.2 Seismic control measures

.1 General:

- .1 Following systems and/or equipment to remain operational during and after earthquakes:
- .2 Seismic control systems to work in every direction.
- .3 Fasteners and attachment points to resist same maximum load as seismic restraint.
- .4 Drilled or power driven anchors and fasteners not permitted.
- .5 No equipment, equipment supports or mounts to fail before failure of structure.
- .6 Supports of cast iron or threaded pipe not permitted.
- .7 Seismic control measures not to interfere with integrity of firestopping.

.2 Static equipment:

- .1 Anchor equipment to equipment supports. Anchor equipment supports to structure.
- .2 Suspended equipment:
  - .1 Use one or more of following methods depending upon site conditions:
    - .1 Install tight to structure.
    - .2 Cross brace in every direction.
    - .3 Brace back to structure.
    - .4 Cable restraint system.

- .3 Seismic restraints:
  - .1 Cushioning action gentle and steady.
  - .2 Never reach metal-like stiffness.
- .3 Vibration isolated equipment:
  - .1 Seismic control measures not to jeopardize noise and vibration isolation systems. Provide 6 to 9 mm clearance during normal operation of equipment and systems between seismic restraint and equipment.
  - .2 Incorporate seismic restraints into vibration isolation system to resist complete isolator unloading.
  - .3 As indicated.
- .4 Piping systems:
  - .1 Fire protection systems: to NFPA 13.
  - .2 Piping systems: hangers longer than 300 mm; brace at each hanger.
  - .3 Compatible with requirements for anchoring and guiding of piping systems.
- .5 Bracing methods:
  - .1 Approved by Consultant.
  - .2 Structural angles or channels.
  - .3 Cable restraint system incorporating grommets, shackles and other hardware to ensure alignment of restraints and to avoid bending of cables at connection points. Incorporate neoprene into cable connections to reduce shock loads.

### **3. EXECUTION**

#### **3.1 Manufacturer's instructions**

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

#### **3.2 Installation**

- .1 Seismic control measures to meet requirements of NBC.
- .2 Install vibration isolation equipment in accordance with manufacturers instructions and adjust mountings to level equipment.

- .3 Ensure piping, ducting and electrical connections to isolated equipment do not reduce system flexibility and that piping, conduit and ducting passage through walls and floors do not transmit vibrations.
- .4 Unless indicated otherwise, support piping connected to isolated equipment with spring mounts or spring hangers with 25 mm minimum static deflection as follows:
  - .1 Up to NPS4: first 3 points of support. NPS5 to NPS8: first 4 points of support. NPS10 and Over: first 6 points of support.
  - .2 First point of support: static deflection of twice deflection of isolated equipment, but not more than 50 mm.
- .5 Where isolation is bolted to floor use vibration isolation rubber washers.
- .6 Block and shim level bases so that ductwork and piping connections can be made to rigid system at operating level, before isolator adjustment is made. Ensure that there is no physical contact between isolated equipment and building structure.

### **3.3 Field quality control**

- .1 Manufacturer's Field Services:
  - .1 Arrange with manufacturer's representative to review work of this Section and submit written reports to verify compliance with Contract Documents.
  - .2 Manufacturer's Field Services: consisting of product use recommendations and periodic site visits to review installation, scheduled as follows:
    - .1 After delivery and storage of Products.
    - .2 After preparatory work is complete but before installation commences.
    - .3 Twice during the installation, at 25% and 60% completion stages.
    - .4 Upon completion of installation.
  - .3 Submit manufacturer's reports to DCC Representative within 3 days of manufacturer representative's review.
  - .4 Make adjustments and corrections in accordance with written report.
- .2 Inspection and Certification:
  - .1 Experienced and competent sound and vibration testing professional engineer to take vibration measurement for HVAC system[s] after start up and TAB of systems to Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
  - .2 Provide Consultant with notice 24 hours in advance of commencement of tests.

- .3 Establish adequacy of equipment isolation and acceptability of noise levels in occupied areas and where appropriate, remedial recommendations (including sound curves).
- .4 Submit complete report of test results including sound curves.

### **3.4 Cleaning**

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Qualifications of TAB personnel**

- .1 Submit names of personnel to perform TAB to Departmental Representative within 90 days of award of contract.
- .2 Provide documentation confirming qualifications, successful experience.
- .3 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-1-2002.
  - .2 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems-1998.
  - .3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing-2002.
- .4 Recommendations and suggested practices contained in the TAB Standard: mandatory.
- .5 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.
- .6 Use TAB Standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.
- .7 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.
- .8 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.



## **1.2 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.

## **1.3 Exceptions**

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

## **1.4 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.

## **1.5 Pre-TAB review**

- .1 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

## **1.6 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.

## **1.7 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.

## **1.8 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 Duct systems clean.
    - .2 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
    - .3 Correct fan rotation.
    - .4 Fire, smoke, volume control dampers installed and open.
    - .5 Access doors, installed, closed.
    - .6 Outlets installed, volume control dampers open.

## **1.9 Accuracy tolerances versus theoretical values**

- .1 Carry out testing, adjustment and balancing of systems to results not exceeding or exceeding the deviations of theoretical values.
  - .1 Mechanical systems: more than 5%, less than 2%

## **1.10 Accuracy tolerances between measured and actual values**

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

### **1.11 Instruments**

- .1 Calibrate instruments in accordance with requirements of the most stringent standard or reference document for HVAC or other systems subject to TAB report.

### **1.12 Preliminary TAB report**

- .1 Submit for checking and approval, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
  - .1 Proposed method of performing system testing, adjustment and balancing if it differs from the method described in the standard or the reference document used;

### **1.13 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 one (1) copie of TAB Report for verification and approval, in English in electronic sample.

### **1.14 Verification**

- .1 Reported results subject to verification by Departmental Representative.
- .2 Number and location of verified results as directed by Departmental Representative.
- .3 Pay costs to repeat TAB as required to satisfaction of Departmental Representative.

### **1.15 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.

### **1.16 Completion of TAB**

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

### **1.17 Air systems**

- .1 Standard: TAB to most stringent of this section or TAB standards of AABC NEBB SMACNA ASHRAE.
- .2 Qualifications: personnel performing TAB qualified to standards of AABC and NEBB.
- .3 Quality assurance: perform TAB under direction of supervisor qualified by to standards of AABC and NEBB.
- .4 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.
- .5 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.
- .6 Locations of systems measurements to include as appropriate: main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

### **1.18 Other tab requirements**

- .1 Flush valves: Adjust according to prevailing pressure conditions.

### **1.19 Other requirements for ERE operations**

- .1 General requirements for works or works described in this section
  - .1 Qualification of EER Operations Personnel: as specified in the section on air systems.
  - .2 Quality Assurance: as prescribed in the section dealing with aeraulic systems.
- .2 Pressure conditions in building
  - .1 Adjust HVAC systems and equipment and associated control / control devices to achieve prescribed operating conditions at all times.

.3 Interzone Pressure Differentials

- .1 Adjust HVAC systems and equipment and related control / control devices to achieve prescribed air pressure differentials, regardless of the normal operation combinations of the systems and devices involved.

.4 Smoke Control Systems

- .1 Verify operation of dampers, fire and smoke dampers, sensors and detectors, as part of the ventilation systems prescribed in Division 23.

**1.20 Post-occupancy tab**

- .1 Measure dry bulb temperature, wet bulb temperature (or percentage relative humidity), air velocity, air jets configuration, noise levels in the occupied area of the following areas.
- .2 Participate in comprehensive emergency evacuation drills.

**1.21 Verification**

- .1 The Contractor shall assist the Departmental Representative in verifying the following:
  - .1 Air flow rates of exhaust systems.

**2. PRODUCTS**

**2.1 Not used**

- .1 Not used.

**3. EXECUTION**

**3.1 Not used**

- .1 Not used.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related requirements**

- .1 Section 23 05 29 – hangers and supports for HVAC piping and equipment.

### **1.2 Reference standards**

- .1 Unless otherwise indicated, perform all work in accordance with the current edition of the "Quebec Construction Code".
- .2 In addition, perform work in accordance with any other code or other standard having jurisdiction, as applicable, including but not limited to:
  - .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
    - .1 ANSI / ASHRAE / IESNA 90.1, SI; Energy Standard for Buildings Except Low Rise Residential Buildings.
  - .2 ASTM International Inc.
    - .1 ASTM B209M, Specification for Aluminum and Aluminum Alloy Sheet and Plate (Metric).
    - .2 ASTM C335, Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
    - .3 ASTM C411, Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
    - .4 ASTM C449/C449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
    - .5 ASTM C547, Specification for Mineral Fiber Pipe Insulation.
    - .6 ASTM C553, Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
    - .7 ASTM C612, Specification for Mineral Fiber Block and Board Thermal Insulation.
    - .8 ASTM C795, Specification for Thermal Insulation for Use with Austenitic Stainless Steel.
    - .9 ASTM C921, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

- .3 Canadian Thermal Insulation Association (CCIT), National Insulation Standards.
- .4 Government of Québec.
  - .1 Regulation respecting the conservation of energy in new buildings.
- .5 Canadian General Standards Board (CGSB).
  - .1 CGSB 51 GP 52Ma, Vapor-impermeable envelope and coating material for thermal insulation of pipes, ducts and equipment.
- .6 Underwriters Laboratories of Canada (ULC).
  - .1 .1 CAN / ULC S102, Standard Test Method; Superficial combustion characteristics of building materials and assemblies.
  - .2 .2 CAN / ULC S701, Thermal Insulation Polystyrene, Boards and Pipe Covering.
  - .3 .3 ULC Grease Duct Insulation Test Protocol.
  - .4 .4 CAN / ULC S115, Standard Method for Fire Resistance Testing of Fire Stops.
  - .5 .5 ULC-S144, Standard Method of Fire Resistance Test - Grease Duct Assemblies.
  - .6 .6 ULC, Fire Resistant Ducts Guide (No. 40U21) (FRD).
- .7 National Fire Protection Association (NFPA)
  - .1 NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.
  - .2 NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
  - .3 NFPA 101 - Life Safety Code.

### 1.3 Definitions

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

- .4 Air ducts: the entire ductwork including ducts, elbows, tees and all accessories.
- .2 Insulation thickness to cover all components of heat insulation such as reinforcements, corner irons, T-joints, flanges, etc.

#### **1.4 Action and informational submittals**

- .1 Provide required submittals.
- .2 Samples:
  - .1 Submit for approval:
    - .1 A complete assembly of each type of thermal insulation complex comprising the thermal insulation material itself, the coating and the glue. Place the sample on a 12 mm plywood panel. Place under the sample a typed label indicating the network / fluid being conveyed.
  - .3 Workshop drawings, insulation for fire rated pipes:
    - .1 Workshop drawings shall include the following:
      - .1 The detailed plan of the certification body showing the dimensions and size of the duct, the cross-sectional area through which it passes, the allowable aperture size, permitted annular space, method of insulation, As well as the name and designation number of the certification body, the fire resistance rating obtained and the date of registration.
      - .2 The certificate of conformity of the certification body indicating the conformity of the products and systems to the applicable test standards.
      - .3 For proposed uses that are not strictly in accordance with the approval, submit the plan of the certification body with the modifications approved by the fire protection specialist of the manufacturer of the fire protection system.
      - .4 Preparation and recommendations.
      - .5 Requirements and recommendations for storage and handling.
      - .6 Installation methods.
    - .2 Detail Sheets: Details must include (3M Fire Foil Detail Sheets), but not limited to the following (check with the field conditions and resistance ratings of the speakers shown on the Plans):
      - .1 Ventilation duct (access on four sides): detail sheet FRD-17: insulating envelope for ducts 615 / one layer / resistance rating of 1 or 2 hours.



- .2 Ventilation ducts (access on two or three sides): detail sheet FRD-23: insulating enclosure for ducts 615 / one layer / resistance rating of 1 or 2 hours.

## **1.5 Qualification of the workforce**

- .1 The installer must be an expert in the field, have at least three years of proven experience in carrying out work of the type and scope corresponding to those described in this section and possess the qualifications required by the " ACIT or be a member.
- .2 Have work done by skilled laundry workers.

## **1.6 Quality assurance**

- .1 The Canadian Thermal Insulation Association (CCITA) quality standards manual for mechanical insulation and its additions and amendments are to be used as a standard reference and form part of the project specifications .
- .2 The Contractor responsible for installing mechanical insulation shall keep a copy of this quality standard manual as a reference.
- .3 Thermal insulation for fire rated pipes.
  - .1 Product: Manufactured according to Acceptable Monitoring Program of Test Organization. Each container or package: the label of the approval company or the approval symbol.
  - .2 General: Install fireproof systems using approved methods with proven materials and classified to provide a certified assembly.
  - .3 Manufacturer's competence: products supplied by a single manufacturer having at least ten years of experience.
  - .4 Competencies of the installer: the company must demonstrate its competence to install the products indicated by its experience, personnel and training, and by following one of the following criteria:
    - .1 Master Contractor of 3M;
    - .2 Certified Tradesman of 3M;
    - .3 Contractor with the skills and knowledge to install 3M products in accordance with manufacturer's instructions;
    - .4 Contractor with five or more years experience in installing fire-resistant duct systems;

- .5 The Contractor shall provide a list of completed projects as proof of experience including the name and address of the projects, the name and address of the Departmental Representative.

## **2. PRODUCTS**

### **2.1 Fire and smoke rating**

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

### **2.2 Insulation**

- .1 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C 335.
- .2 TIAC Code D-2: Mineral fibre blanket to ASTM C 553 faced with factory applied vapour retarder jacket to CGSB 51-GP-52Ma.
  - .1 Mineral fibre: to ASTM C 553.
  - .2 Jacket: to CGSB 51-GP-52Ma.
  - .3 Thermal conductivity "K" not exceeding 0.035 W/m•°C (0.24 Btu-in/hr•ft²•°F) at an average temperature of 24°C.
  - .4 Temperature limit: 120°C.
  - .5 Density: 24 kg/m³.
  - .6 Acceptable products: Manson Alley Wrap FSK.
- .3 Type D-3 insulation: rigid ducts made of mineral fibers, with factory-installed vapor barrier.
  - .1 Mineral fiber jackets: in accordance with ASTM C547.
  - .2 Vapor barrier: conforms to CGSB 51 GP 52Ma.
  - .3 Thermal conductivity "K" not exceeding 0.037 W/m²•°C at an average temperature of 38°C.
  - .4 Density: 40 kg/m³.
  - .5 Temperature limit: 454°C.
  - .6 Acceptable products: Knauf KwikFlex Pipe & Tank with FSK shirt.

## 2.3 Jackets

- .1 Canvas:
  - .1 Cotton cloth with a basis weight of 220 g/m<sup>2</sup>, plain weave, fire resistance approved by ULC, coated with heat-resistant and fire retardant adhesive, diluted to ASTM C921.
  - .2 Acceptable Products: Fattal Thermocanvas.
  - .3 Insulating adhesive: Compatible with thermal insulation.

## 2.4 Accessories

- .1 Vapour retarder lap adhesive:
  - .1 Water based, fire retardant type, compatible with insulation.
- .2 Indoor Vapour Retarder Finish:
  - .1 Vinyl emulsion type acrylic, compatible with insulation.
- .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.
- .4 ULC Listed Canvas Jacket:
  - .1 220 gm/m<sup>2</sup> cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
- .5 Outdoor Vapour Retarder Mastic:
  - .1 Vinyl emulsion type acrylic, compatible with insulation.
  - .2 Reinforcing fabric: Fibrous glass, untreated 305 g/m<sup>2</sup>.
- .6 Tape: self-adhesive, aluminum, reinforced, 75 mm wide minimum.
- .7 Contact adhesive: quick-setting
- .8 Canvas adhesive: washable.
- .9 Tie wire: 1.5 mm stainless steel.
- .10 Banding: 19 mm wide, 0.5 mm thick stainless steel.
- .11 Facing: 25 mm stainless steel hexagonal wire mesh stitched on one face of insulation one face of insulation with expanded metal lath on other face.
- .12 Fasteners: 4 mm diameter pins with 35 mm diameter square clips, length to suit thickness of insulation.

## 2.5 Produit acceptables

- .1 The specified products or approved equivalent from Owens Corning, Johns Manville, Knauf, Certain Teed.

## 3. EXECUTION

### 3.1 Pre-installation requirements

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

### 3.2 Installation

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturer's instructions and as indicated.
- .3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.
- .4 If there are raised joints, overlap them with overlapping tape or flexible insulation material with integrated vapor barrier to ensure an integral vapor barrier.
- .5 Install vapor barrier and apply finishes seamlessly:
  - .1 Brackets and suspensions shall not pierce the vapor barrier.
- .6 Hangers and supports in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
  - .1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.
- .7 Fasteners: install at 300 mm on center in horizontal and vertical directions, minimum 2 rows each side.

### 3.3 Ductwork insulation schedule

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

Networks and equipment	Insulation thickness mm (po)	Type of insulation
The exhaust air duct, over a length of 5 m from the roof or the outer wall, on the main line and branch lines	50 (2)	D-2

### **3.4 Finishing**

- .1 .1 Exposed air ducts located inside the building: canvas canvas shirts.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related Section**

- .1 23 05 29 – Support and suspensions for HVAC Piping and Equipment.

### **1.2 Reference standards**

- .1 Unless otherwise specified, perform all work in accordance with the current edition of the "Quebec Construction Code."
- .2 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 American Society for Testing and Materials International (ASTM)
    - .1 ASTM A167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
    - .2 ASTM B 209M, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate [Metric].
    - .3 ASTM C 335, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
    - .4 ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
    - .5 ASTM C 449/C 449M, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
    - .6 ASTM C 533, Calcium Silicate Block and Pipe Thermal Insulation.
    - .7 ASTM C 547, Mineral Fiber Pipe Insulation.
    - .8 ASTM C552, Standard Specification for Cellular Glass Thermal Insulation.
    - .9 ASTM C 795, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
    - .10 ASTM C 921, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Manufacturers Associations.

- .1 Canadian Association of thermal insulation (TIAC), National Insulation Standards.

.4 National Research Council.

- .1 Code modèle national de l'énergie pour les bâtiments - Canada.

.5 Government of Quebec.

- .1 Regulations energy conservation in new buildings.

.6 Underwriters Laboratories (ULC)

- .1 CAN / ULC S102, Standard Method of Test; Surface Burning Characteristics of Building Materials and Assemblies.
- .2 CAN / ULC-S102.2, Standard test method; surface burning characteristics of flooring and miscellaneous materials and assemblies.
- .3 CAN / ULC S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .4 CAN / ULC S702, Standard for Thermal insulation mineral fiber for buildings.
- .5 CAN / ULC-S702.2, Thermal Insulation, Mineral Fibre for Buildings, Part 2: Application Guidelines / Standard for Thermal insulation mineral fiber for buildings.

.7 Department of Justice Canada.

- .1 Canadian Environmental Assessment Act (CEAA).
- .2 Canadian Act, Environmental Protection Act (CEPA).
- .3 Under the Transportation of Dangerous Goods (TDG).

.8 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.

.9 Canadian General Standards Board (CGSB)

- .1 CGSB 51 GP 52 mA, Envelope and vapor impermeable coating material for the thermal insulation of the pipes, ducts and equipment.

- .2 CGSB 19-GP-14M, Sealant single component, based on butyl-polyisobutylene, polymerization by evaporating the solvent.
- .3 CAN / CGSB 51.9, Thermal Insulation mineral fiber pipe and cylindrical ducts.
- .4 CAN / CGSB 51.11, insulating mats mineral fiber.
- .5 CAN / CGSB-51.12, Cement insulation and finish.
- .6 CAN / CGSB-51.40, thermal insulation, flexible, elastomeric, unicellular, sheet and tubular.
- .7 CAN / CGSB 51.53, Poly (vinyl chloride) sheet for Pipes, containers and Round Ducts.
- .10 Health Canada / Information System Hazardous Materials (WHMIS).
- .1 Material Safety Data Sheets (MSDS).

### 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.
  - .3 "Network": - piping, including accessories, trim, etc., such as valves, elbows, pumps, tees, etc. which are incorporated.
- .2 The thickness of insulation that is to cover all components of the item to be insulated, such as reinforcements, angle irons, brackets, joints, etc.

### 1.4 Action and informational submittals

- .1 Submit all required documents and samples.

### 1.5 Qualification of the workforce

- .1 The installer must be an expert in the field, have at least three years successful experience in implementing the type and scope of work corresponding to those described in this section, and possess the qualifications required by the TIAC or be a member.
- .2 Carry out the work by skilled workers in insulation.



## **1.6 Quality assurance**

- .1 The manual quality standards for mechanical isolation of the Canadian Thermal Insulation Association (TIAC) and its authorized additions and amendments to be used as a standard reference and is part of the estimate of this project .
- .2 Contractor responsible for the installation of mechanical insulation must keep a copy of this manual quality standards as reference.

## **1.7 Management and Disposal**

- .1 Separate waste materials for reuse / re-use and recycling.
- .2 Place in designated containers insulating materials and accessories products in surplus or unused.
- .3 Divert unused metal materials from metal recycling facility approved by Departmental Representative.
- .4 Divert unused adhesive products to an authorized collection site for hazardous materials, approved by the 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 Materials must be tested according to ASTM C411.

## **2.2 Sealants**

- .1 Caulking that strong odors which contain toxic chemicals or that are not certified as being of a type resistant to molds should not be used in air handling units.
- .2 .2 If we can not do otherwise than using toxic products, restrict its use in places where the fumes can be vented to the outside or in places where they will be confined behind a sealing system air, or even apply several months before the area is occupied to allow the evacuation of fumes over the longest possible period.

## **2.3 Insulation**

- .1 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C 335.

- .2 TIAC Code A-1: rigid moulded mineral fibre without factory applied vapour retarder jacket.
  - .1 Mineral fibre: to [CAN/ULC-S702] [ASTM C 547].
  - .2 Steam Pare: conforms to CGSB 51 GP 52 mA.
  - .3 Coefficient of thermal conductivity "K" of not more than  $0.033 \text{ W} / \text{m}^2 \cdot ^\circ \text{C}$  at an average temperature of  $24^\circ \text{C}$ .
  - .4 Temperature Limit:  $-29^\circ \text{C}$  to  $454^\circ \text{C}$ .
  - .5 Acceptable Products: Manson Alley-K.
- .3 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
  - .1 Mineral fibre: to [CAN/ULC-S702] [ASTM C 547].
  - .2 Jacket: to CGSB 51-GP-52Ma.
  - .3 Coefficient of thermal conductivity "K" of not more than  $0,035 \text{ W} / \text{m}^2 \cdot ^\circ \text{C}$  at an average temperature of  $24^\circ \text{C}$ .
  - .4 Temperature Limit:  $120^\circ \text{C}$ .
  - .5 Density:  $24 \text{ kg} / \text{m}^3$ .
  - .6 Acceptable Products: Manson Alley Wrap FSK.
- .4 TIAC Code A-6: flexible unicellular tubular elastomer.
  - .1 Insulation: to CAN / CGSB 51.40 standard..
  - .2 Coefficient of thermal conductivity "K" of not more than  $0,039 \text{ W} / \text{m}^2 \cdot ^\circ \text{C}$  at an average temperature of  $24^\circ \text{C}$ .
  - .3 Temperature limit:  $-57^\circ \text{C}$  to  $105^\circ \text{C}$ .
  - .4 Thermal insulation certified by the manufacturer as being free agents capable of causing cracks by stress corrosion.
  - .5 Acceptable Products: AP Armaflex, pipe insulation.

## 2.4 Insulation securement

- .1 Products Accessories:
  - .1 Tape: self-adhesive, aluminum, reinforced, 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 Insulating types P 1 and P-2:
  - .1 Tapes: aluminum, self-adhesive ULC listed for the following features: index flame spread less than 25 and smoke developed rating less than 50:
    - .1 Acceptable Products: ribbon Fattal Insultape manufactured by S. Fattal Canvas inc.
  - .2 Adhesive seal overlap: Glue Fast setting for sealing joints and overlaps of vapor:
    - .1 Acceptable Products: Foster 87-75 without asbestos fiber, to coverage of 6 m<sup>2</sup> / L.
  - .3 Coating adhesive insulation, fire retardant coating:
    - .1 Acceptable Products: Foster 30-36 without asbestos fiber, with coverage of 1.25 m<sup>2</sup> / L.
- .3 For insulating the type P 3:
  - .1 Contact glue: Glue quick-drying outdoors for sealing the transverse and longitudinal joints of thermal insulation.
    - .1 Acceptable Product: rubatex, model 373.
  - .2 Tape: PVC, self-adhesive:
    - .1 Acceptable Products: Armstrong 520, Foster 85-20 without asbestos fiber, with coverage of 5 m<sup>2</sup> / L.
  - .3 Coating insulation coating for P-3: coating to be installed on exposed plumbing, water-based, flexible to semi-gloss finish for indoor and outdoor application, white in color and can be applied to brush or spray.
    - .1 Acceptable Product: rubatex, model 374.

## 2.5 Jackets

- .1 Polyvinyl Chloride (PVC):
  - .1 One-piece moulded type and sheet to CAN/CGSB-51.53 with pre-formed shapes as required.
  - .2 Colours: one chosen by the Ministry Representative.

- .3 Minimum service temperatures: -20 degrees C.
- .4 Maximum service temperature: 65 degrees C.
- .5 Moisture vapour transmission: 0.02 perm.
- .6 Thickness: 0.5 mm.
- .7 Fastenings:
  - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
  - .2 Tacks.
  - .3 Pressure sensitive vinyl tape of matching colour.
- .8 Special requirements:
  - .1 External pipework protected material against UV radiation, of at least 0.8 mm thick.
- .9 Acceptable Products: Zeston.
- .2 Canvas:
  - .1 220 and 120 gm/m<sup>2</sup> cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
  - .2 Lagging adhesive: compatible with insulation.
  - .3 Acceptable Products: Thermocanvas Fattal.
- .3 Aluminum:
  - .1 To ASTM B 209.
  - .2 Thickness: 0.50 mm sheet.
  - .3 Finish: smooth.
  - .4 Joining: longitudinal and circumferential slip joints with 50 mm laps.
  - .5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.
  - .6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.
  - .7 Acceptable Products: Permaclad.

.4 Stainless steel:

.1 Type: 304.

.2 Thickness: 0.25 mm.

.3 Finish: smooth.

.4 Joining: longitudinal and circumferential slip joints with 50 mm laps.

.5 Fittings: 0.5 mm thick die-shaped fitting covers with factory-attached protective liner.

.6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.

.7 Acceptable Products: Permaclad.

## 2.6 Cement

.1 Thermal insulating and finishing cement:

.1 Hydraulic setting or Air drying on mineral wool, to ASTM C 449/C 449M.

## 2.7 Acceptable Products

.1 Specified or equivalent products approved by Owens Corning, Johns Manville, Knauf.

# 3. EXECUTION

## 3.1 Installation

.1 Do not place the insulation that once completed mandatory tests and the results approved by the Departmental Representative.

.2 Ensure that the surfaces of the insulation and elements to be insulated are clean and dry during installation of insulation and during application of a topcoat.

.3 Apply materials, accessories and shirts and apply finishing coatings to manufacturers' recommendations and these requirements; apply finishing coated in at least two layers.

.4 Insulation placed on the body roof references must be held in place by adhesive applied over the entire surface (100%).

.5 Provide harnesses and protective shells under Section 23 05 29 - Support and suspensions for HVAC Piping and Equipment:

- .1 Cut the insulation under the pipe over a length at least equal to the length of the wheel or of the shell, and over a width equal to one third the perimeter of the pipe.
- .2 Replace insulation by high density insulation.
- .3 Cover with vapor so as to ensure continuity in the case of a cold pipe.
- .4 Protection harness.
- .6 The vapor barrier should not have openings or be interrupted at the location of the sleeves, fittings and supports.
- .7 Provide insulation grooved type couplings on the piping of heating water.

### 3.2 Insulation

- .1 Install insulation in accordance with ANSI / NFPA 90A and ANSI / NFPA 90B.
- .2 Use insulating shells for pipe diameter equal to or less than DN 12 and a heat insulating shells or curved segments for pipes of diameter greater than DN 12.
- .3 Thermal insulation multiple thicknesses stagger joints abutting each thickness of insulation.
- .4 Vertical piping diameter greater than DN 3: use supports of insulation which will be welded or bolted to the pipe, directly above the lower fitting and 4.5 m apart.
- .5 Joints of insulation: straight cut the ends of each thickness of insulation, according to the manufacturer's instructions, leaving a vacuum of 25 mm between successive sections and fill with flexible insulating P2 type of mineral fiber loosely celui- this.
- .6 Seal and finish the ends of the insulation, exposed or not, with insulating cement.
- .7 Piping Expansion joints: provide joints to allow free expansion and contraction of the pipe without damaging the insulation or coating.
- .8 Orifice plate mounting Flanges, unions and fittings to the input and output devices, expansion joints, valves, valves and other components requiring periodic maintenance: ask the insulation and coating so that we can disassemble and assemble these items without damaging the adjacent insulation and coating.
- .9 Fittings, cold application (5 ° C to 15 ° C): insulate fittings with sections of pipe insulation cut tight fit tab or a tightly placed flexible insulation and covered with a reinforcing membrane embedded in a coating vapor barrier. Alternately insulate fittings with tightly placed flexible insulation and covered with a reinforcing membrane embedded in vapor barrier coating and PVC coated.
- .10 Do not install insulation on the following chrome elements:
  - .1 Pipes, valves and fittings.

### 3.3 Fixing the insulation

- .1 Fasten each insulation section by ribbons placed not more than 900 mm center distance at a rate of at least one ribbon at each end and one in the center of each section of insulation.

### 3.4 Table - insulation of pipes

- .1 Unless otherwise indicated, the insulation of pipes also includes the insulation of valves, faucets hats, filters and strainers, flanges and fittings.
- .2 Chrome exposed piping and fittings and chrome fittings serving fixtures must not be insulated.
- .3 Insulate piping systems and equipment as shown in the following table:

NETWORKS AND EQUIPMENT		TEMPERATURE FLUID ° C	TYPE OF INSULATION
.1	Drinking cold water systems	4	P-1
.2	Non-potable cold water systems	4	P-1
.3	Drinking hot water systems	60	P-1

- .4 Thickness P-1 type insulation.

TEMPERATURE FLUID ° C	NOMINAL DIAMETER PIPE (ND)			
	Thickness (mm)			
	25 mm and less	32 to 50 mm	63 to 100 mm	125 mm and more
151-240	63		75	89
121-150	50	63		75
96-120	38		50	
50-95	25		38	
14-49	25		38	
5-13	25	38		
Less than 5	25	38		
Ventilation	25			
Geothermal Fluid	38	50	50	50

### **3.5 Finish**

- .1 Exposed pipes located inside the building: Aluminum shirts.
- .2 Exposed pipes located in mechanical rooms: canvas fabric shirts.
- .3 Concealed pipes located inside the building: canvas cloth shirts on valves and fittings; any other topcoat.
- .4 Pipes located outside the building: shirts completely airtight and waterproof aluminum.
- .5 Attachments: screws and bands in stainless steel, placed at 150 mm centers; cachets or winged sleeves.
- .6 Installation: as recommended by TIAC.

### **3.6 Prefabricated envelopes and thermal insulation, removable**

- .1 Application: pumps, service doors, expansion joints, valves, flow measuring devices, mechanical seals, flanges, fittings, unions and other accessories.
- .2 Design: designed to be periodically removed and replaced without damaging adjacent insulation.
- .3 Thermal Insulation.
  - .1 Thermal Insulation of the requested type for the device or piping concerned, shaped to fit the shape of the elements to be insulated.
  - .2 Thickness: double the required thickness for the device or piping concerned.
  - .3 Vapour added in the case of water cooling systems or other cold surfaces.
- .4 Envelopes: aluminum 1.3 mm thick or stainless steel 0.6 mm thick, with external coating and quick disconnect belts.

### **3.7 Sealants**

- .1 Follow manufacturer's recommendations regarding temperatures, relative humidity and the moisture content of the substrate specific to the implementation and drying sealants, as well as special instructions on the use of these latter.

**END OF SECTION**



## **1. GENERAL**

### **1.1 Reference standards**

- .1 American Society of Mechanical Engineers (ASME)
  - .1 ASME B16.5, Pipe Flanges and Flanged Fittings.
  - .2 ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ASME B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
  - .4 ASME B18.2.1, Square and Hex Bolts and Screws Inch Series.
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A 47/A 47M, Standard Specification for Ferritic Malleable Iron Castings.
  - .2 ASTM A 53/A 53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
  - .3 ASTM B 75M, Standard Specification for Seamless Copper Tube Metric.
  - .4 ASTM B 837, Standard Specification for Seamless Copper Tube for Natural Gas and Liquefied Petroleum (LP) Gas Fuel Distribution Systems.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA W47.1, Certification of Companies for Fusion Welding of Steel.
- .4 Canadian Standards Association (CSA)/Canadian Gas Association (CGA)
  - .1 CAN/CSA B149.1HB, Natural Gas and Propane Installation Code Handbook.
  - .2 CAN/CSA B149.2, Propane Storage and Handling Code.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

### **1.2 Action and informational submittals**

- .1 Submit documents and samples required.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.
  - .2 Indicate on manufacturer's catalogue literature following: valves.

- .3 Submit MSDS required under Information System Hazardous Materials (WHMIS), which must conform to this system. These records must indicate the emission VOC adhesives and solvents during application and curing period.
- .3 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.
- .6 Documents / Elements to submit to completion: submit maintenance records and technical data for incorporation in the prescribed manual.
- .7 Submit test reports.
- .8 Submit the commissioning report. Quality assurance

### **1.3 Quality Assurance**

- .1 Pre-Installation Meeting:
  - .1 Convene pre-installation meeting one week prior to beginning on-site installations during which it will do the following:
    - .2 Verify project requirements.
    - .1 Review installation and substrate conditions.
    - .2 Co-ordination with other building subtrades.
    - .3 Review manufacturer's installation instructions and warranty requirements.
- .2 Health and Safety:
  - .1 Do construction occupational health and safety.

### **1.4 Delivery, storage and handling**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
- .4 Separate for reuse and recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan (WMP).
- .5 Divert unused [metal] materials from landfill to metal recycling facility as approved by Departmental Representative.

## **2. PRODUCTS**

### **2.1 Pipe**

- .1 Steel pipe: to ASTM A 53/A 53M, Schedule 40, seamless as follows:
  - .1 NPS 1/2 to 2, screwed.
  - .2 NPS 2 1/2 and over, plain end.
- .2 Copper tube: to ASTM B 837.

### **2.2 Jointing material**

- .1 Screwed fittings: pulverized lead paste.
- .2 Welded fittings: to CSA W47.1.
- .3 Flange gaskets: nonmetallic flat.
- .4 Brazing: to ASTM B 837.

### **2.3 Fittings**

- .1 Steel pipe fittings, screwed, flanged or welded:
  - .1 Malleable iron: screwed, banded, Class 150.
  - .2 Steel pipe flanges and flanged fittings: to ASME B16.5.
  - .3 Welding: butt-welding fittings.
  - .4 Unions: malleable iron, brass to iron, ground seat, to ASTM A 47/A 47M.
  - .5 Bolts and nuts: to ASME B18.2.1.
  - .6 Nipples: schedule 40, to ASTM A 53/A 53M.
- .2 Copper pipe fittings, screwed, flanged or soldered:

- .1 Cast copper fittings: to ASME B16.18.
- .2 Wrought copper fittings: to ASME B16.22.

## **2.4 Valves**

- .1 Provincial Code approved, lubricated plug ball type.

## **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 Piping**

- .1 Install piping in accordance with provincial / territorial regulations relevant to CAN / CSA B149.1, and CAN / CSA B149.2 standard, and the requirements of this section.
- .2 Install drip points:
  - .1 At low points in piping system.
  - .2 At connections to equipment.

### **3.3 Valves**

- .1 Unless otherwise indicated by the Departmental Representative, install faucets, valves and the valves so that their rod is vertical or horizontal.
- .2 Install valves at branch take-offs to isolate pieces of equipment, and as indicated.

### **3.4 Field quality control**

- .1 Site Tests/Inspection:
  - .1 Test system in accordance with CAN/CSA B149.1 and CAN/CSA B149.2 and requirements of authorities having jurisdiction.
- .2 Manufacturer's Field Services:
  - .1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports, in acceptable format, to verify compliance of work with Contract.

- .2 Provide manufacturer's field services, consisting of product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer's instructions.
- .3 Schedule site visits to review work at stages listed:
  - .1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
  - .2 Twice during progress of work at 25% and 60% complete.
  - .3 Upon completion of work, after cleaning is carried out.
- .4 Obtain reports within 3 days of review and submit immediately to Departmental Representative.

### **3.5 Adjusting**

- .1 Purging: purge after pressure test in accordance with CAN/CSA B149.1 CAN/CSA B149.2.
- .2 Pre-Start-Up Inspections:
  - .1 Check vents from regulators, control valves, terminate outside building in approved location, protected against blockage, damage.
  - .2 Check gas trains, entire installation is approved by authority having jurisdiction.

### **3.6 Cleaning**

- .1 Perform cleaning and setting road network, CAN / CSA B149.1 standard, CAN / CSA B149.2 standard, and the requirements of this section.
- .2 Perform cleaning operations as specified in accordance with manufacturer's recommendations.
- .3 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

## 1. GENERAL

### 1.1 Reference standards

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- .2 ASTM International
  - .1 ASTM A 480/A 480M-03c, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
  - .2 ASTM A 635/A 635M-02, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements for.
  - .3 ASTM A 653/A 653M-03, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- .3 Department of Justice Canada.
  - .1 Act Canadian Environmental Protection Act (CEPA), in force.
- .4 Health Canada / Information System Hazardous Materials (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .5 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.
- .6 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
  - .1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2nd Edition and Addendum No. 1.
  - .2 . SMACNA HVAC Air Duct Leakage Test Manual, 1st Edition.

## **1.2 Action and informational submittals**

- .1 Submit product data and shop drawings.
- .2 Product Data: submit, in the case of the following, MSDSs required under Information System Hazardous Materials (WHMIS), which must comply with the general requirements.
  - .1 Sealants.
  - .2 Sealing tape.
  - .3 Prefabricated joints trademark.

## **1.3 Quality Assurance**

- .1 Reliability of technical data
  - .1 Data from catalogs and manufacturers' literature must be reliable, confirmed by tests have been made by the same manufacturers or on their behalf by independent laboratories and certifying compliance of the requirements of elements codes and standards.
- .2 Health and Safety
  - .1 Take necessary measures for health and building safety in accordance with the general requirements.
- .3 Management Plan for the quality of indoor air (IAQ)
  - .1 Develop and implement a quality management plan for indoor air (IAQ) in accordance with the general requirements.
  - .2 Implement during the construction stage, the SMACNA on the quality guidelines of the air in the occupied buildings, and set out in the document entitled "Indoor Air Quality Guideline for Occupied Buildings under Construction" .
- .4 Sustainable Development

## **1.4 Cleanliness air ducts**

- .1 The Contractor shall make arrangements to ensure the cleanliness of the air ducts during manufacture, during delivery and storage before installation and during the works until provisional acceptance of work.
  - .1 After manufacture and during delivery, the pipes must be protected from dust.
  - .2 When storing pipes before installation, the pipes must be protected by a sheet of polythene against dust and weather

- .3 All the open ends of ventilation ducts installed by the Contractor must be sealed tightly by a new film polythene to prevent dust and waste from getting into the pipes during the execution of the work.
- .2 Ducts should be clean before the start switching on ventilation systems. The amount of the surface of the air ducts dust should be less than 0.75 mg / 100 cm<sup>2</sup>, according to the "NADCA Vacuum Test".

## 2. PRODUCTS

### 2.1 Rectangular Duct

Table of U.S. gauge sheets (dimensions based on the longest side)

Dimension	U.S. Gauge
0 to 760 mm	24
790 to 1370 mm	22
1400 to 2130 mm	20

### 2.2 Circular Ducts

- .1 All circular ducts will be of type "to spiral wound gaskets".

### 2.3 Sealant

- .1 Sealant: Duct, water-based, polymer-based, fire resistant, oil resistant and can withstand temperatures from -30 degrees Celsius to 93 degrees Celsius.

### 2.4 Sealing Tape

- .1 Sealing tape: membrane glass fibers, loose weave, treated with polyvinyl, 50 mm wide.

### 2.5 Sealing air ducts

- .1 According to the requirements contained in the HVAC Air Duct Leakage Test Manual SMACNA.

### 2.6 Fittings

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows:



- .1 Rectangular: standard radius or short radius with single thickness turning vanes, centreline radius: 1.5 times width of duct.
- .2 Round: smooth radius, centreline radius: 1.5 times diameter.
- .3 Mitred elbows, rectangular:
  - .1 To 400 mm: with single thickness turning vanes.
  - .2 Over 400 mm: with double thickness turning vanes.
- .4 Branches:
  - .1 Rectangular main and branch: with radius on branch 1.5 times width of duct 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: 30 degrees maximum included angle.
- .6 Offsets:
  - .1 Full radiused elbows as indicated.
- .7 Obstruction deflectors: maintain full cross-sectional area.
  - .1 Maximum included angles: as for transitions.

## **2.7 Fire stopping**

- .1 Retaining angles around duct, on both sides of fire separation in accordance with general requirements
- .2 Fire stopping material and installation must not distort duct.

## **2.8 Galvanized steel**

- .1 Lock forming quality: to ASTM A 653/A 653M, Z90 zinc coating.
- .2 Thickness, fabrication and reinforcement: to ASHRAE SMACNA.

- .3 Joints: to ASHRAE SMACNA proprietary manufactured duct joint. Proprietary manufactured flanged duct joint to be considered to be a class A seal.

## 2.9 Hangers and supports

### .1 Hangers and Supports:

- .1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct.
- .1 Maximum size duct supported by strap hanger: 500 mm.
- .2 Hanger configuration: to ASHRAE and SMACNA.
- .2 Hangers: black galvanized steel angle with black galvanized steel rods to following table:

Duct Size (mm)	Angle Size (mm)	Rod Size (mm)
up to 750	25 x 25 x 3	6
751 to 1050	40 x 40 x 3	6
1051 to 1500	40 x 40 x 3	10
1501 to 2100	50 x 50 x 3	10
2101 to 2400	50 x 50 x 5	10
2401 and over	50 x 50 x 6	10

- .3 Upper hanger attachments:
- .1 For concrete: manufactured concrete inserts.
- .2 For steel joist: manufactured joist clamp.
- .3 . For steel beams: manufactured beam clamps:

## 3. EXECUTION

### 3.1 General

- .1 Do work in accordance with the relevant standards.
- .2 Do not break continuity of insulation vapour barrier with hangers or rods.
- .3 Support risers in accordance with the relevant standards.
- .4 Install breakaway joints in ductwork on sides of fire separation.

- .5 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 ASHRAE as follows:

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

**END OF SECTION**

## **1. GENERAL**

### **1.1 Description of the system**

#### **.1 Performance Requirements**

- .1 The technical data from the catalogs and documentation of manufacturers must be reliable, based on test results have been made by the same manufacturers or on their behalf by independent laboratories, and having helped certify compliance elements to the requirements of codes and standards.

### **1.2 Action and informational submittals**

#### **.1 Product Data:**

- .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Indicate following:
  - .1 Capacity.
  - .2 Throw and terminal velocity.
  - .3 Noise criteria.
  - .4 Pressure drop.
  - .5 Neck velocity.

### **1.3 Quality Assurance**

- .1 Health and Safety: take the necessary steps in health and construction safety in accordance with the general requirements.

### **1.4 Delivery, storage and handling**

#### **.1 Packing, shipping, handling and unloading**

- .1 Deliver, store and handle materials in accordance with the general requirements.
- .2 Delivery and Store materials in accordance with manufacturer's recommendations.

.2 Packaging Waste Management:

- .1 Management and disposal of construction / demolition waste: separate waste materials for reuse / re-use and recycling in accordance with the general requirements.

**1.5 Maintenance**

.1 Materials / Replacement Materials

- .1 Provide materials / equipment replacement.
- .2 Provide also the following:
  - .1 Key for flow control;
  - .2 Key for air pattern adjustment when required.

**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 Assembly-coated frame for the frames as directed.
  - .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.

**2.3 Supply grilles and registers**

- .1 General: grilles and diffuser as indicated plans

### **3. EXECUTION**

#### **3.1 Examination**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for diffuser, register and grille installation in accordance with manufacturer's written instructions.

#### **3.2 Installation**

- .1 Install in accordance with manufacturer's instructions.
- .2 Install with flat head screws in countersunk holes where fastenings are visible.

#### **3.3 Cleaning**

- .1 After the installation work and control of the performance ended, evacuate the building site materials / surplus materials, rubbish, tools and equipment.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Reference standards**

- .1 American National Standards Institute (ANSI)/ National Fire Protection Association (NFPA)
  - .1 ANSI/NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM E 90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- .3 Santé Canada/Système d'information sur les matières dangereuses utilisées au travail (SIMDUT)
  - .1 Fiches signalétiques (FS).
- .4 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
- .5 Society of Automotive Engineers (SAE)

### **1.2 Description of the system**

- .1 Performance Criteria
  - .1 The technical data from the catalogs and documentation of manufacturers must be reliable, based on test results have been made by the same manufacturers or on their behalf by independent laboratories, and having helped certify compliance elements to the requirements of codes and standards.

### **1.3 Action and informational submittals**

- .1 Product Data:
- .2 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
  - .1 Indicate following:
    - .1 Pressure drop.
    - .2 Face area.
    - .3 Free area.

.3 Quality assurance: submit documents.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Test Reports:

.1 submit certified data from independent laboratory substantiating acoustic and aerodynamic performance to ASTM E 90.

#### **1.4 Quality Assurance**

.1 Health and Safety: take the necessary measures for health and building safety.

#### **1.5 Delivery, storage and handling**

.1 Packing, shipping, handling and unloading

.1 Deliver, store and handle materials and equipment.

.2 Deliver, store materials and equipment in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal

.1 Management and disposal of construction / demolition waste: separate waste materials for reuse / re-use and recycling.

### **2. PRODUCTS**

#### **2.1 Fixed louvres - aluminum**

.1 See the specifications on the plans.

### **3. EXECUTION**

#### **3.1 Examination**

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for louvres, intakes and vents installation in accordance with manufacturer's written instructions.

#### **3.2 Installation**

.1 In accordance with manufacturer's and SMACNA recommendations.

.2 Reinforce and brace as indicated.

.3 Anchor securely into opening. Seal with caulking to ensure weather tightness.



### **3.3 Cleaning**

- .1 Perform cleaning.
- .2 Once the installation work and control of the complete performance, completion remove materials / surplus materials, rubbish, tools and equipment.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related requirements**

- .1 Section 01 11 01.

### **1.2 Reference standards**

- .1 CSA Group
  - .1 CSA C22.106, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
  - .2 CSA C22.2.
  - .3 CAN/CSA-C22.3 No.1-01, Overhead Systems.
  - .4 CAN3-C235-83(R2000), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
  - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

### **1.3 Definitions**

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

### **1.4 Design requirements**

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
  - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates for control items in English and French.
- .4 Use one nameplate or label for both languages.

## **1.5 Action and informational submittals**

- .1 Shop drawings:
  - .1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
  - .2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- .2 Quality control:
  - .1 Provide CSA certified equipment and material.
  - .2 Permits and fees: in accordance with General Conditions of contract.
  - .3 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.

## **1.6 Quality Control**

- .1 Qualification Electrical work must be carried out by a master electrician or by an electrician contractor licensed by the province in which the work will be carried out.
  - .1 Employees enrolled in a provincial apprenticeship program may perform specific duties if they are under the direct supervision of a licensed electrician.
  - .2 Allowed tasks: according to the degree of training and according to aptitude shown for the execution of specific tasks.
- .2 Work site meetings
  - .1 Plan work site meetings
  - .2 Work site meeting : the on-site quality control by the supplier and as specified in article Field Quality Control, of part 3 must include field visits at the following stages:
    - .1 Once the products have been delivered and stored on site, and the preparatory work has been completed, but prior to the start of work to install the work covered by this section.
    - .2 Once the work is completed and the cleaning is done.
  - .3 Take the necessary precautions in terms of occupational health and safety in construction.

## 2. PRODUCTS

### 2.1 Materials and equipment

- .1 Materials and units must be CSA certified.
- .2 Factory assemble control panels and component assemblies.

### 2.2 Wiring terminations

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

### 2.3 Equipment identification

- .1 Identify electrical equipment with nameplates as follows:
  - .1 Nameplates: lamicoid 3 mm matt white finish face, black core.
  - .2 Sizes as follows:

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

- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .4 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .5 Terminal cabinets and pull boxes: indicate system and voltage.
- .6 Transformers: indicate capacity, primary and secondary voltages.

## **2.4 Finishes**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

## **3. EXECUTION**

### **3.1 Installation**

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

### **3.2 Nameplates and labels**

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

### **3.3 Location of outlets**

- .1 Locate outlets as required.
- .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. Locate light switches on latch side of doors.
  - .1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

### **3.4 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.

### **3.5 Co-ordination of protective devices**

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

### **3.6 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.

### **3.7 Cleaning**

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

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related requirements**

- .1 Section 26 05 00 – Common work results for electrical.

### **1.2 Delivery, storage and handling**

- .1 Packaging Waste Management: remove for reuse and return of pallets crates padding and packaging materials.

## **2. PRODUCTS**

### **2.1 Building wires**

- .1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 600 1000 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE, Jacketted.

### **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: aluminum.
- .6 Overall covering: thermoplastic polyvinyl chloride, compliant to applicable Building Code classification for this project.
- .7 Fastenings:
  - .1 One hole aluminum 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 50 mm centers.
- .3 Threaded rods: 6 mm diameter to support suspended channels.
- .8 Connectors:
  - .1 Watertight, 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 Connectors: anti short connectors.

## **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 DCC Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

### **3.2 General cable installation**

- .1 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.
- .2 Conductor length for parallel feeders to be identical.
- .3 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .4 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.
- .5 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.
- .6 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.



### **3.3 Installation of teck90 cable (0 -1000 v)**

- .1 Group cables wherever possible on channels.
- .2 Install cable exposed concealed, securely supported by straps.

### **3.4 Installation of armoured cables**

- .1 Group cables wherever possible on channels.

### **3.5 Installation of aluminum sheathed cable**

- .1 Group cables wherever possible on channels.

### **3.6 Installation of control cables**

- .1 Install control cables in conduit.
- .2 Ground control cable shield.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Section content**

- .1 Materials and equipment regarding dry-type transformers up to 600 V primary, installation as well as identification.

### **1.2 Related requirements**

- .1 Section 01 11 01.
- .2 Section 26 05 00 – Common work results for electrical.

### **1.3 Reference standards**

- .1 CSA International
  - .1 CAN/CSA-C22.2 No.47-M90 (R2001), Air-Cooled Transformers (Dry Type).
  - .2 CSA C9-02(R2001), Dry-Type Transformers.
- .2 National Electrical Manufacturers Association (NEMA)

### **1.4 Data Sheets**

- .1 Submit the data sheets in accordance with section 01 11 01 – Summary of Work.

### **1.5 Management and elimination of waste**

- .1 Evacuate off-site all packaging material and eliminate using appropriate recycling locations.
- .2 Place all of the packaging materials of paper, plastic, polystyrene, corrugated cardboard in bins, appropriately installed on-site for recycling, in accordance with the waste management plan.
- .3 Bend the strip of metal banding, flatten and place in designated areas for recycling.

## **2. PRODUCTS**

### **2.1 Transformers**

- .1 All transformers must be provided by a single fabricator.
- .2 Design 1.
  - .1 Type: ANN.

- .2 3 phase, 45 kVA, 600 V input, 200 V output, 60 Hz.
- .3 Voltage taps: standard.
- .4 Insulation: Class 4, 150 degrees C temperature rise.
- .5 Basic Impulse Level (BIL): standard.
- .6 Hipot: standard.
- .7 Average sound level: standard
- .8 Impedance at 17 degrees C: standard
- .9 Enclosure: NEMA CSA, removable metal front panel.
- .10 Mounting: floor.
- .11 Finish: in accordance with Section 26 05 00 - Common Work Results for Electrical.

## **2.2 Equipment identification**

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Label size: 7.

## **3. EXECUTION**

### **3.1 Installation**

- .1 Install transformers in accordance with the specifications.
- .2 Ensure adequate clearance around transformer for ventilation.
- .3 Remove shipping supports only after transformer is installed and just before putting into service.
- .4 Loosen isolation pad bolts until no compression is visible.
- .5 Make primary and secondary connections in accordance with wiring diagram.
- .6 Energize transformers after installation is complete.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related requirements**

- .1 Section 26 05 00 – Common work results for electrical.

### **1.2 Reference standards**

- .1 CSA International
  - .1 CSA C22.2 No.29-11, Panelboards and Enclosed Panelboards.

### **1.3 Action and informational submittals**

- .1 Submit drawings as required.
- .2 Include on drawings: Electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

### **1.4 Management and elimination of waste**

- .1 Evacuate off-site all packaging material and eliminate using appropriate recycling locations.
- .2 Place all of the packaging materials of paper, plastic, polystyrene, corrugated cardboard in bins, appropriately installed on-site for recycling, in accordance with the waste management plan.
- .3 Bend the strip of metal banding, flatten and place in designated areas for recycling.
- .4 Provide all the unused metal cables to an recycling plant approved by the Department representative.

## **2. PRODUCTS**

### **2.1 Panelboards**

- .1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.
  - .1 Install circuit breakers in panelboards before shipment.
  - .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .2 250V panelboards: bus and breakers rated for 14 A (symmetrical) interrupting capacity or as indicated.

- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Two keys for each panelboard and key panelboards alike.
- .6 Aluminum bus with neutral of same ampere rating of mains.
- .7 Mains: suitable for bolt-on breakers.
- .8 Trim with concealed front bolts and hinges.
- .9 Trim and door finish: baked enamel.

## **2.2 Breakers**

- .1 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.
- .2 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

## **2.3 Equipment identification**

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Nameplate for each panelboard size 4 engraved.
- .3 Nameplate for each circuit in distribution panelboards size 2 engraved.
- .4 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

# **3. EXECUTION**

## **3.1 Installation**

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards in accordance with Section 06 10 00 - Rough Carpentry. Where practical, group panelboards on common backboard.

- .3 Mount panelboards to height specified in Section 26 05 00 - Common Work Results for Electrical or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related requirements**

- .1 Section 01 11 01 – Summary of Work
- .2 Section 26 05 00 – Common work results for electrical.

### **1.2 Reference standards**

- .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).

### **1.3 Shop drawings and data sheets**

- .1 Submit required data sheets and shop drawings.

### **1.4 Management and elimination of waste**

- .1 Evacuate off-site all packaging material and eliminate using appropriate recycling locations.
- .2 Place all of the packaging materials of paper, plastic, polystyrene, corrugated cardboard in bins, appropriately installed on-site for recycling, in accordance with the waste management plan.
- .3 Bend the strip of metal banding, flatten and place in designated areas for recycling.
- .4 Provide the unused metal cables to a recycling plant approved by the Department representative.

## **2. PRODUCTS**

### **2.1 Switches**

- .1 15, 20 A, 120 V, 347 V, single pole, double pole, switches to: CSA C22.2 No.55.
- .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 Ivory toggle.
- .3 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads and 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 Ivory 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 Ivory 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 Use only a single fabricator for all sheet steel covers.
- .3 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.



- .4 Stainless steel, 1 mm thick cover plates for wiring devices mounted in flush-mounted outlet box.
- .5 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .6 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.
- .7 Weatherproof spring-loaded cover plates complete with gaskets for single receptacles or switches.

### **3. EXECUTION**

#### **3.1 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.
- .3 Cover plates:
  - .1 Protect the finish of the plates-covers in stainless steel steel by using a sheet of paper or a plastic film, which will be removed once all paint and other work is completed.
  - .2 Install suitable common cover plates where wiring devices are grouped.
  - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

**END OF SECTION**

## **1. GENERAL**

### **1.1 Related requirements**

- .1 Section 01 11 01 – Summary of Work

### **1.2 Reference standards**

- .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)

### **1.3 Action and informational submittals**

- .1 Provide submittals as required.
- .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 Consultant.
- .3 Quality assurance :
  - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures.

## **1.4 Quality assurance**

- .1 Provide as required.

## **2. PRODUCTS**

### **2.1 Lamps**

- .1 Only LED luminaire will be accepted.

### **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 Type A – Recessed LED luminaire, 125mm diameter round, white trim, retrofit conversion or to be installed in octagonal box. IC class, 10watts, 120V, 3000K, 82CRI, 650 initial lumens dimmable.
- .2 Type B – Architectural surface LED luminaire, tamperproof, oval 300mm diameter, black trim. IP65 class, 20W, 120V, 300K, 82CRI and 1000 initial lumens.
- .3 Type C – Under counter surface continuous LED strip, white trim. 2W/ft, 120V, 3000K, 82CRI, 1440mm long.

## **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 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 appropriately.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for recycling.

**END OF SECTION**

## 1. GENERAL

### 1.1 Reference standards

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C 117, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D 422-63, Standard Test Method for Particle-Size Analysis of Soils.
  - .4 ASTM D 698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>2</sup>) (600 kN-m/m<sup>2</sup>).
  - .5 ASTM D 1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>2</sup>) (2,700 kN-m/m<sup>2</sup>).
  - .6 ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-8.1, Sieves, Testing, Woven Wire, Inch Series.
  - .2 CAN/CGSB-8.2, Sieves, Testing, Woven Wire, Metric.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

### 1.2 Definitions

- .1 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .2 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .3 Unsuitable materials:
  - .1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

- .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 ASTM C136.

### 1.3 Existing conditions

.1 Buried services:

- .1 Before commencing work establish location of buried services on and adjacent to site.
- .2 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.2 Existing buildings and surface features:

- .1 Conduct condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
- .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by DEPARTMENTAL Representative.

## 2. PRODUCTS

2.1 Not used

## 3. EXECUTION

### 3.1 Temporary erosion and sedimentation control

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.2 Site preparation

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

### **3.3 Preparation/ protection**

- .1 Protect existing features in accordance with applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .4 Protect buried services that are required to remain undisturbed.

### **3.4 Stockpiling**

- .1 Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

### **3.5 Cofferdams, shoring, bracing and underpinning**

- .1 Maintain sides and slopes of excavations in safe condition by appropriate methods.

### **3.6 Dewatering and heave prevention**

- .1 Keep excavations free of water while Work is in progress.
- .2 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
- .3 Protect open excavations against flooding and damage due to surface run-off.

### **3.7 Excavation**

- .1 Excavation must not interfere with bearing capacity of adjacent foundations.
- .2 Keep excavated and stockpiled materials safe distance away from edge of trench.
- .3 Restrict vehicle operations directly adjacent to open trenches.
- .4 Dispose of surplus and unsuitable excavated material off site.
- .5 Do not obstruct flow of surface drainage or natural watercourses.

- .6 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .7 Notify DEPARTMENTAL Representative when bottom of excavation is reached.
- .8 Obtain DEPARTMENTAL Representative approval of completed excavation.
- .9 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by DEPARTMENTAL Representative.
- .10 Hand trim, make firm and remove loose material and debris from excavations.
  - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

### **3.8 Backfilling**

- .1 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .2 Do not use backfill material which is frozen or contains ice, snow or debris.
- .3 Place backfill material in uniform layers not exceeding [150] mm compacted thickness up to [grades indicated]. Compact each layer before placing succeeding layer.
- .4 Backfilling around installations:
  - .1 Place bedding and surround material as specified elsewhere.
  - .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
  - .3 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 150 mm.

### **3.9 Restoration**

- .1 Upon completion of Work, remove waste materials and debris.
- .2 Return the lawn at the level where it was prior to the start of excavation work
- .3 Reinstall pavements, sidewalks, and curbs disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .4 Clean and reinstall areas affected by Work as directed by DEPARTMENTAL Representative

**END OF SECTION**