

# SPECIFICATIONS



**Correctional Service Canada  
Cowansville Institution  
Finishing Kitchens  
400, ave. Fordyce, Cowansville  
Project no : R.067720.600**

**Public Works and  
Government Services Canada**

**Issued for bid  
May 20<sup>th</sup>, 2016**

BFAA file n° :140227-006



**SPECIFICATIONS**  
Issued for bid, May 20<sup>th</sup>, 2016

**ARCHITECTS :**                    **BISSON FORTIN ET ASSOCIÉS ARCHITECTES**

---

Danielle Bisson, architect PA LEED BD+C

**END OF SECTION**

---



SPECIFICATIONS  
Issued for bid, May 20<sup>th</sup>, 2016

FOOD SERVICES :            BERNARD & ASSOCIATES



  
\_\_\_\_\_  
Jean-Claude Guénette, Project Director

END OF SECTION



**SPECIFICATIONS**

Issued for bid, May 20<sup>th</sup>, 2016

**STRUCTURAL :** SDK ET ASSOCIÉS



---

Pierre-Olivier Gingras, eng.

**END OF SECTION**



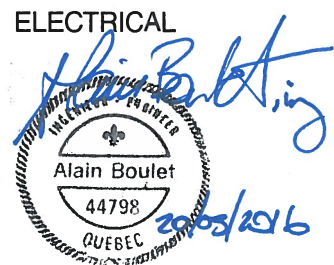


SPECIFICATIONS  
Issued for bid, May 20<sup>th</sup>, 2016

PAGEAU MOREL



Marc-Olivier de Tilly, Eng., LEED AP BD+C



Alain Boulet, P. Eng.

END OF SECTION



**NUMBER  
OF PAGES**

**DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS**

00 01 07	Seals page	4
00 01 10	Table of contents	2
00 01 15	List of documents	1

**DIVISION 01 – GENERAL REQUIREMENTS**

01 11 01	Work related general information	3
01 14 00	Work restrictions	3
01 31 19	Project meetings	2
01 32 16.07	Construction progress schedule – Bar (GANTT) chart	3
01 33 00	Submittal procedures	4
01 35 13	Special project procedures for CSC security requirements	7
01 35 29.06	Health and safety requirements	13
01 41 00	Regulatory requirements	1
01 45 00	Quality control	3
01 51 00	Temporary utilities	2
01 52 00	Construction facilities	2
01 56 00	Temporary barriers and enclosures	4
01 61 00	Common product requirements	4
01 71 00	Examination and preparation	1
01 73 00	Execution	2
01 74 11	Cleaning	3
01 74 21	Construction/renovation/demolition (CRD) waste management and disposal	2
01 77 00	Closeout procedures	2
01 78 00	Closeout submittals documents/elements	6
01 79 00	Demonstration and training	2
01 91 13	General commissioning (CX) requirements	9
01 91 31	Commissioning (CX) plan	11
01 91 33	Commissioning forms	3
01 91 41	Commissioning training	3
01 91 51	Building management manual (BMM)	4

**DIVISION 02 – EXISTING CONDITIONS**

02 41 99	Demolition for minor works	2
----------	----------------------------	---

**DIVISION 03 – CONCRETE**

03 10 00	Concrete formwork	3
03 20 00	Concrete reinforcement	2
03 30 00	Cast-in-place concrete	6

**DIVISION 04 – MASONRY**

04 04 99	Masonry for minor works	5
----------	-------------------------	---

**DIVISION 05 – METALS**

05 12 23	Structural steel for buildings	3
05 50 00	Metal fabrications	5

---

	<b><u>NUMBER OF PAGES</u></b>
<b><u>DIVISION 07 – THERMAL AND MOISTURE PROTECTION</u></b>	
07 92 00 Joint sealants	5
<b><u>DIVISION 09 – FINISHES</u></b>	
09 21 99 Partitions for minor works	5
09 30 13 Ceramic tiling	4
09 65 99 Resilient flooring for minor works	4
09 91 99 Painting for minor works	6
<b><u>DIVISION 11 – EQUIPMENT</u></b>	
11 41 10 Food service walk-in coolers and freezers	22
<b><u>DIVISION 21 – FIRE SUPPRESSION</u></b>	
21 05 01 Common Work Results – Mechanical	4
21 13 13 Wet Pipe Sprinkler Systems	6
<b><u>DIVISION 22 – PLUMBING</u></b>	
22 13 17 Drainage Waste and Vent Piping – Cast Iron and Copper	3
<b><u>DIVISION 26 – ELECTRICAL</u></b>	
26 05 00 Common Work Results – Electrical	10
26 05 20 Wire and Box Connectors 0–1000 V	2
26 05 21 Wires and Cables (0–1000 V)	3
26 05 28 Grounding – Secondary	3
26 05 29 Hangers and Supports for Electrical Systems	2
26 05 31 Splitters, Junction, Pull Boxes and Cabinets	2
26 05 32 Outlet Boxes, Conduit Boxes and Fittings	2
26 05 34 Conduits, Conduit Fastenings and Conduit Fittings	3
26 12 16.01 Dry Type Transformers up to 600 V Primary	3
26 24 16.01 Panelboards Breaker Type	3
26 27 26 Wiring Devices	4
26 28 13.01 Fuses – Low Voltage	2
26 28 16.02 Moulded Case Circuit Breakers	3
26 28 23 Disconnect Switches – Fused and Non-Fused	2
<b><u>DIVISION 31 – EARTHWORK</u></b>	
31 23 10 Excavating, trenching and backfilling	4
<b><u>ANNEX</u></b>	
Level III Mould Remediation – Section 02 85 00.03	32
<b>END OF SECTION</b>	

---

Specifications, Issued for bid, dated of May 20<sup>th</sup>, 2016 prepared by the following firms :

Architecture :	Bisson Fortin et associés architectes
Food services :	Bernard & associés
Structure :	SDK et associés
Mechanical and electrical :	Pageau Morel
Industrial hygiene :	Le groupe Gesfor Poirier, Pinchin

**ARCHITECTURE DRAWINGS :**

R_067720.600-A01	Front page
R_067720.600-A02	Existing and demolition plan – Basement
R_067720.600-A03	Existing and demolition plan – Ground floor
R_067720.600-A04	New plan – Ground floor
R_067720.600-A05	New plan – Ground floor
R_067720.600-A06	Sections and details
R_067720.600-A07	New plan – Ground floor – Enlarged plan and photos
R_067720.600-A08	Reflected ceiling plan – Ground floor
R_067720.600-A09	Plan of work phases – Ground floor

**FOOD SERVICES DRAWINGS :**

R_067720.600-I01	Existing and demolition plan
R_067720.600-I02	New plan and location of mechanical and electrical services
R_067720.600-I03	Cold rooms sections and details
R_067720.600-I04	Cold rooms sections and details
R_067720.600-I05	Cold rooms sections and details
R_067720.600-I06	Legends

**STRUCTURE DRAWINGS :**

R_067720.600-S01	Generals notes
R_067720.600-S02	Localisation plan and sections

**MECHANICAL DRAWINGS :**

R_067720.600-M01	Legend
R_067720.600-M02	Plumbing – Drain – Basement – Demolition
R_067720.600-M03	Piping and drain – Ground floor – Demolition
R_067720.600-M04	Piping and drain – Ground floor – Modified
R_067720.600-M05	Fire protection – Ground floor – Demolition
R_067720.600-M06	Fire protection – Ground floor - Modified

**ELECTRICAL DRAWINGS :**

R_067720.600-E01	Legend
R_067720.400-E02	Multidisciplinary – Basement – Modified
R_067720.400-E03	Multidisciplinary – Ground floor – Demolition
R_067720.400-E04	Multidisciplinary – Ground floor – Modified

**END OF SECTION**

---



## **PART 1 - GENERAL**

### **1.1 MAINTENANCE OF OPERATIONS**

- .1 The work will not in any case interfere with the operations of the establishment.

### **1.2 WORK BY OTHERS**

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from the Departmental Representative.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of Work.
  - .1 Periodically, maintenance work will be carried out by service suppliers designated by the Departmental Representative. The Contractor will be advised two (2) days in advance, except in case of emergencies at which time these designated suppliers will be given access without delay.
  - .2 Plan for a fire drill done annually at the building and during which all activities must be interrupted for a period representing half a day.

### **1.3 WORK SEQUENCE**

- .1 Construct Work in stages to accommodate the Departmental Representative's use of premises during construction.
- .2 Co-ordinate Progress Schedule.
- .3 Required stages:
  - .1 Refer to phasing plans.
- .4 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .5 Maintain fire access/control.

### **1.4 CONTRACTOR USE OF PREMISES**

- .1 Limit use of premises for Work and for storage to allow:
    - .1 The Departmental Representative occupancy.
    - .2 Work by other contractors.
    - .3 Public usage.
  - .2 Co-ordinate use of premises under direction of Departmental Representative.
  - .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract. Refer to section 01 14 00 and to drawings for spaces made available to the Contractor.
  - .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
  - .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
  - .6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.
-

## **1.5 OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE**

- .1 The Departmental Representative will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with the Departmental Representative in scheduling operations to avoid disturbing normal occupant's activities and to avoid conflicts and to facilitate the Departmental Representative usage.

## **1.6 PARTIAL OCCUPANCY BY THE DEPARTMENTAL REPRESENTATIVE**

- .1 Schedule and substantially complete designated portions of Work for the Departmental Representative's occupancy prior to Substantial Performance of entire Work.
- .2 Execute Certificate of Substantial Performance for each designated portion of Work prior to the occupancy by the Departmental Representative shall allow:
  - .1 Access for the Departmental Representative personnel.
  - .2 Use of parking facilities.
  - .3 Operation of HVAC and electrical systems.
- .3 When present on the premises and for those areas of occupancy, the Departmental Representative will provide:
  - .1 Operation of HVAC and electrical systems.
  - .2 Maintenance.
  - .3 Security.

## **1.7 ITEMS SUPPLIED BY THE DEPARTMENTAL REPRESENTATIVE**

- .1 Contractor Responsibilities:
  - .1 Carry, receive and unload products at site.
  - .2 Inspect deliveries jointly with the Departmental Representative; record shortages, and damaged or defective items.
  - .3 Handle products at site, including unpacking and storage.
  - .4 Protect products from damage.
  - .5 Assemble, install, connect, adjust, and finish products.
  - .6 Provide installation inspections required by public authorities.
  - .7 Repair or replace items damaged by Contractor or subcontractor on site (under his control).
- .2 List of the Departmental Representative furnished items:
  - .1 Granite slabs.

## **1.8 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- .2 For moving workers and material, refer to section 01 14 00.

## **1.9 REQUIRED DOCUMENTS**

- .1 Maintain at job site, one copy each document as follows:
    - .1 Contract Drawings.
    - .2 Specifications.
    - .3 Addenda.
    - .4 Reviewed Shop Drawings.
    - .5 List of Outstanding Shop Drawings.
-



- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

## **PART 2 - PRODUCTS**

### **2.1 NOT USED**

- .1 Not used.

## **PART 3 - EXECUTION**

### **3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

---



## **PART 1 - GENERAL**

### **1.1 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide other temporary means to maintain security of goods and present people.
- .4 The contractor will provide temporary sanitary facilities for use by Contractor's personnel, refer to mobilization plan.
- .5 Closures: protect work temporarily until permanent enclosures are completed.
- .6 A space will be provided on site for the project team only for site meetings.
- .7 Rest zone for Contractor's personnel.
  - .1 Contractor will provide a trailer on site, refer to mobilization plan.

### **1.2 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to building operations, occupants and public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

### **1.3 EXISTING SERVICES**

- .1 Before commencement work, define extent and location of utility pipes located within the work zone and advise Departmental Representative.
  - .2 Submit to the approval of Departmental Representative a detailed timetable related to the interruption or closing of installations or active work, including communication services or electrical power. Respect approved timetable and inform parties affected by this disturbance.
  - .3 When non identified utility piping are found, immediately inform Departmental Representative and prepare a written description.
  - .4 Protect, relocate or maintain in service the utility pipes that are functional. When non-functional pipes are discovered during the work, they are to be capped according to ways authorized by the relevant authorities.
  - .5 Keep log and record location of utility pipes that are maintained, relocated or abandoned.
  - .6 Notify Departmental Representative, public service and utility companies of intended interruption of services and obtain required permission, as prescribed in the Building Orientation Guide (annexed).
  - .7 Where Work involves breaking into or connecting to existing services, give the Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to minimum. Carry out interruptions on the weekends only.
-

- .8 Provide for personnel traffic.
- .9 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures .

#### 1.4 SPECIAL REQUIREMENTS

- .1 All work must be done Monday to Friday from 18:00 to 05:00 hours only.
- .2 Submit schedule in accordance with Section 01 32 16.06 - 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Ingress and egress of Contractor vehicles at site is limited to the delivery platform for this activity only. Contractor personnel pay use toll free outdoor parking subject to availability and Departmental Representative instructions.
- .6 Deliver materials outside of peak traffic hours 8:00 to 11:30 and 13:00 to 16:00 unless otherwise approved by Departmental Representative. The contractor is solely responsible for these deliveries and he or his representative will be on site to receive the material.

#### 1.5 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security escort:
  - .1 Personnel employed on this project must be escorted by a security agent when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.
  - .2 Submit an escort request according to Departmental Representative's procedure at least 7 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.
  - .3 For any cancellation on the security escort company, the notice request and cost will be at the discretion of the escort company.
  - .4 Calculation of costs will be based on average hourly rate of security officer for minimum of four (4) hours per day for late service request and for late cancellations.

### PART 2 – PRODUCTS

#### 2.1 NOT USED

- .1 Not Used.
-

**PART 3 – EXECUTION**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 ADMINISTRATIVE**

- .1 Schedule and administer project meetings throughout the progress of the work.
- .2 Except for the first meeting, distribute written notice for a meeting five (5) days in advance of meeting date to Departmental Representative.
- .3 Meetings will be held at the predetermined room by Departmental Representative.
- .4 Meeting minutes will be written and distributed by the Departmental Representative.
- .5 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

### **1.2 FIRST PRECONSTRUCTION MEETING**

- .1 A few days after award of Contract, the Departmental Representative will request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative or their major representatives, Contractor and elevator Subcontractors, will be in attendance at this meeting (other Subcontractors at the request of the Departmental Representative).
- .3 Agenda of meeting to be prepared by the Departmental Representative.

### **1.3 PROGRESS MEETINGS**

- .1 Establish a calendar of the meetings that will be held every two (2) weeks during course of Work and two (2) weeks prior to project completion.
  - .2 Major Subcontractors involved in Work and Departmental Representative, as well as their major representatives, and site superintendents must be present at these meetings.
  - .3 Notify parties minimum five (5) days prior to first meeting.
  - .4 Meeting minutes will be written and distributed by the Departmental Representative.
  - .5 Agenda to include the following:
    - .1 Review, approval of minutes of previous meeting.
    - .2 Review of Work progress since previous meeting.
    - .3 Field observations, problems, conflicts.
    - .4 Problems which impede construction schedule.
    - .5 Review of off-site fabrication delivery schedules.
    - .6 Corrective measures and procedures to regain projected schedule.
    - .7 Revision to construction schedule.
    - .8 Progress schedule, during succeeding work period.
    - .9 Review submittal schedules: expedite as required.
-

- .10 Maintenance of quality standards.
- .11 Review proposed changes for effects on construction schedule and on completion date.
- .12 Health and security on site.
- .13 Other business.

## **PART 2 – PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 – EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 DEFINITIONS**

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

### **1.2 REQUIREMENTS**

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .3 Submit Project Schedule to Departmental Representative within five (5) working days of receipt of acceptance of Master Plan.

#### **1.4 PROJECT MILESTONES**

- .1 Project milestones form interim targets for Project Work Schedule.
- .2 Contractor's Construction Progress Schedule must identify for each phase (group) the target dates for the following milestones:
  - .1 Dates of preparatory work (beginning and end).
  - .2 Decommissioning start date for each elevator of each group and beginning of work.
  - .3 Equipment delivery date.
  - .4 Commissioning date
  - .5 Partial substantial completion date.

#### **1.5 MASTER PLAN**

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

#### **1.6 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule derived from Master Plan.
  - .2 Ensure detailed Project Schedule per phase (group) includes as minimum milestone and activity types as follows:
    - .1 Award.
    - .2 Shop Drawings, Samples.
    - .3 Permits.
    - .4 Mobilization.
    - .5 Demolition.
    - .6 Structural Steel.
    - .7 Interior Architecture (Walls, Floors and Ceiling).
    - .8 Plumbing.
    - .9 Lighting.
    - .10 Electrical.
    - .11 Millwork.
    - .12 Fire Systems.
    - .13 Vertical transport
    - .14 Testing and Commissioning.
    - .15 Supplied equipment long delivery items.
    - .16 Departmental Representative supplied equipment required dates.
-

## **1.7 PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule to present it at each site meeting, reflecting activity changes and completions, as well as activities in progress. Project schedule is also to be submitted with each monthly progress billing request.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.
- .3 Submit planning of the work to come three (3) weeks in advance.

## **PART 2 – PRODUCTS**

### **2.1 NOT USED**

- .1 Not used.

## **PART 3 – EXECUTION**

### **3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 REFERENCES**

- .1 Not used.

### **1.2 ADMINISTRATIVE**

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

### **1.3 SHOP DRAWINGS AND PRODUCT DATA**

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
  - .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Québec.
  - .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
  - .4 Allow 10 days for Departmental Representative's review of each submission.
-

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

- 
- .13 Submit one (1) electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
    - .2 Certificates must be dated after award of project contract complete with project name.
  - .14 Submit one electronic copy of Manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
    - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
  - .15 Submit one (1) electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
  - .17 Submit six (6) printed copies and one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental.
  - .18 Delete information not applicable to project.
  - .19 Supplement standard information to provide details applicable to project.
  - .20 If upon review by Departmental, no errors or omissions are discovered or if only minor corrections are made, printed and electronic copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
  - .21 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
    - .1 This review shall not mean that the Departmental approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
    - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

#### **1.4 SAMPLES**

- .1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.
  - .2 Deliver samples prepaid to Departmental Representative's business address.
  - .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
  - .4 Where colour, pattern or texture is criterion, submit full range of samples.
-

- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

### **1.5 MOCK-UPS**

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

### **1.6 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic and one (1) hard copy of colour digital photography in jpg format, standard resolution monthly with progress statement and as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints:
  - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: weekly and before concealment of Work, or as directed by Departmental Representative.

### **1.7 CERTIFICATES AND TRANSCRIPTS**

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

## **PART 2- PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 – EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

## **END OF SECTION**

---



## **PART 1 - GENERAL**

### **1.1 PURPOSE**

- .1 To ensure that both the construction project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.

### **1.2 DEFINITIONS**

- .1 "Contraband" means:
  - .1 An intoxicant, including alcoholic beverages, drugs and narcotics,
  - .2 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization,
  - .3 An explosive or a bomb or a component thereof,
  - .4 Currency over any applicable prescribed limit \$25.00, and
  - .5 Any item not described in paragraphs .1 to .4 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.
- .2 "Unauthorized Smoking Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing or snuffing tobacco, cigarette making machines, matches and lighters.
- .3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.
- .4 "CSC" means Correctional Service Canada.
- .5 "Director" means Director or Warden of the Institution as applicable or their representative.
- .6 "Construction employees" means persons working for the general contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
- .7 "Departmental Representative" means the Public Works and Government Services Canada (PWGSC) or the Correctional Service Canada (CSC) project manager depending on project.
- .8 "Perimeter" means the fenced or walled area of the institution that restrains the movement of the inmates.
- .9 "Construction zone" means the area as shown on the contract drawings where the contractor will be allowed to work. This area may or may not be isolated from the security area of the institution.

### **1.3 PRELIMINARY PROCEEDINGS**

- .1 Prior to the commencement of work, the contractor shall meet with the Director to:
  - .1 Discuss the nature and extent of all activities involved in the Project.
  - .2 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.
- .2 The contractor will:
  - .1 Ensure that all construction employees are aware of the CSC security requirements.
  - .2 Ensure that a copy of the CSC security requirements is always prominently on display at the job site.
  - .3 Co-operate with institutional personnel in ensuring that security requirements are observed by all construction employees.

#### 1.4 CONSTRUCTION EMPLOYEES

- .1 Submit to the Director a list of the names with date of birth of all construction employees to be employed on the construction site and a security clearance form for each employee.
- .2 Allow two (2) weeks for processing of security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC institutions are not valid at the institution where the project is taking place and accompanied by a copy of a valid driver's license of a Canadian province for each employee.
- .3 The Director may require that facial photographs may be taken of construction employees and these photographs may be displayed at appropriate locations in the institution or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all construction workers. ID cards will then be left at the designated entrance to be picked up on arrival at the institution and shall be displayed prominently on the construction employees clothing at all time while employees are at the institution.
- .4 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.
- .5 Any person employed on the construction site will be subject to immediate removal from Institutional Property if they:
  - .1 Appear to be under the influence of alcohol, drugs or narcotics.
  - .2 Behave in an unusual or disorderly manner.
  - .3 Are in possession of contraband.

#### 1.5 VEHICLES

- .1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle.
- .2 The director may limit at any time the number and type of vehicles allowed within the Institution.
- .3 Drivers of delivery vehicles for material required by the project shall not require security clearances but must remain with their vehicle the entire time that the vehicle is in the Institution. The director may require that these vehicles be escorted by Institutional staff or Commissionaires while in the Institution.
- .4 If the Director permits trailers to be left inside the secure perimeter of the Institution, these trailer doors will be locked at all times. All windows will be securely locked when left unoccupied. All trailer windows shall be covered with expanded metal mesh. All storage trailers inside and outside the perimeter must be locked when not in use.

#### 1.6 PARKING

- .1 The parking area(s) to be used by construction employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.

#### 1.7 SHIPMENTS

- .1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the institution's own shipments. The contractor must have its own employees on site to receive any deliveries or shipments. CSC staff will **NOT** accept receipt of deliveries or shipments of any material equipment or tools for the contractor.
-

## **1.8 TELEPHONES**

- .1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the institution unless prior approval of the Director is received.
- .2 The Director will ensure that approved telephones, Facsimile machine and computers with Internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an Internet connection to unauthorized personnel.
- .3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, Blackberries, telephones used as 2-way radios, are not permitted within the perimeter of the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit their use by any inmate.
- .4 The Director may approve but limit the use of two way radios.
  - .1 Two-way radio are permitted but under certain conditions. It can be for example required that they don't be used in zones accessible to inmates. A verification of each two-way radio will be carried out by the technical services before authorization.

## **1.9 WORK HOURS**

- .1 Work hours within the Institution are: Monday to Friday: 18h pm to 4h30 am.
- .2 The timeframe for deliveries of materials or waste disposal shall be Monday to Friday from 7h to 11h and 13h15 to 16h.
- .3 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.

## **1.10 OVERTIME WORK**

- .1 No overtime work outside of the timeframe identified at article 1.1.9.2 will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such as the completion of a concrete pour or work to make the construction safe and secure, the contractor shall advise the Director as soon as this condition is known and follow the directions given by the Director. Costs to Canada for such events may be attributed to the contractor.
- .2 When overtime work outside of the timeframe identified at article 1.1.9.2, weekend statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his designate, to maintain the security surveillance. The actual cost of this extra staff may be attributed to the contractor.

## **1.11 TOOLS AND EQUIPMENT**

- .1 Maintain on site a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required.
  - .2 Throughout the construction project maintain an up-to-date list of tools and equipment specified above.
  - .3 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.
-

- .4 Stone all tools and equipment in approved secure locations.
- .5 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the contractor.
- .6 Scaffolding shall be secured and locked when not erected and when erected, shall be secured in a manner agreed upon with the director.
- .7 All missing or lost tools or equipment shall be reported immediately to the Director.
- .8 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:
  - .1 At the beginning and conclusion of every construction project.
  - .2 Weekly, when the construction project extends longer than a one week period.
  - .3 The Institution requires to remove the tools and equipment from the work zone on a daily basis.
- .9 Except if stated otherwise by the head of the room, all the tools and materials will be removed from the site daily.
- .10 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Director's representative at the end of each day.
- .11 If propane or natural gas is used for heating the construction, the institution will require that an employee of the contractor supervise the construction site during non-working hours.

#### **1.12 PRESCRIPTION DRUGS**

- .1 Employees of the contractor who are required to take prescription drugs during the workday shall obtain approval of the Director to bring a one day supply only into the Institution.

#### **1.13 SMOKING RESTRICTIONS**

- .1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.
- .2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist, will be directed to leave the institution.
- .3 Smoking is only permitted outside the perimeter of a correctional facility in an area to be designated by the Director.

#### **1.14 CONTRABAND**

- .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on institutional property.
  - .2 The discovery of contraband on the construction site and the identification of the person(s) responsible for the contraband shall be reported immediately to the Director.
-

- .3 Contractors should be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.
- .4 Presence of arms and ammunitions in vehicles of contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the drivers of the vehicles.

#### **1.15 SEARCHES**

- .1 All vehicles and persons entering institutional property may be subject to search.
- .2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of contraband or unauthorized items, he may order that person to be searched.
- .3 All employees entering the Institution may be subject to screening of personal effects for traces of contraband drug residue.

#### **1.16 ACCESS TO AND REMOVAL FROM INSTUTIONAL PROPERTY**

- .1 Construction personnel and commercial vehicles will not be admitted to the institution after normal working hours, unless approved by the Director.

#### **1.17 MOVEMENT OF VEHICLES**

- .1 Escorted commercial vehicles will be allowed to enter or leave the institution through the vehicle access gate during the following hours:
    - .1 From 7:30 am to 11:30 am
    - .2 From 13:00 pm to 16:00 pm
  - .2 Construction vehicles shall not leave the Institution until an inmate count is completed.
  - .3 Hours for entry and exit of containers:
    - .3 From 7:30 am to 11:30 am
    - .4 From 13:00 pm to 16:00 pm
  - .4 The circulation of containers must always be done under security escort. At the start-up meeting, a circulation management agreement will be taken with the institution.
  - .5 The contractor shall advise the Director twenty four (24) hours in advance to the arrival on the site of heavy equipment such as concrete trucks, cranes, etc.
  - .6 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC staff or Commissionaires working under the authority of the Director.
  - .7 Commercial vehicles will only be allowed access to institutional property when their contents are certified by the Contractor or its representative as being strictly necessary to the execution of the construction project.
  - .8 Vehicles shall be refused access to institutional property if, in the opinion of the Director, they contain any article which may jeopardize the security of the institution.
  - .9 Private vehicles of construction employees will not be allowed within the security perimeter of medium or maximum security institutions without the authorization of the Director
-

- .10 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.
- .11 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another fixed object.

#### **1.18 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY**

- .1 Subject to the requirements of good security, the Director will permit the Contractor and his employees as much freedom of action and movement as is possible.
- .2 However, notwithstanding paragraph above, the Director may:
  - .1 Prohibit or restrict access to any part of the institution.
  - .2 Require that in certain areas of the institution, either during the entire construction project or at certain intervals, construction employees only be allowed access when escorted by a member of the CSC security staff or a Commissionaire.
- .3 During the lunch and coffee/health breaks, all construction employees will remain within the construction site. Construction employees are not permitted to eat in the officer's lounge or the dining room of the institution.

#### **1.19 SURVEILLANCE AND INSPECTION**

- .1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.
- .2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among construction employees and maintained throughout the construction project.

#### **1.20 INTERRUPTION OF WORK**

- .1 The Director may order at any time that the contractor, its employees, sub-contractors and their employees to not enter or to leave the work site immediately due to a security situation occurring within the Institution. The contractor's site supervisor shall note the name of the CSC staff member giving this instruction, the time of the request and obey the order as quickly as possible.
- .2 The contractor shall advise the Departmental Representative of the interruption of the work within 24 hours.

#### **1.21 CONTACT WITH INMATES**

- .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any construction employee doing any of the above will be removed from the site and his security clearance revoked.
  - .2 It is to be noted that cameras are not allowed on CSC property.
-

- .3 Notwithstanding the above paragraph, if the Director approves of the usage of cameras, it is strictly forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this contract. Only photographs necessary to the achievement of the project can be taken with the authorization of the Director or his replacement.

#### **1.22 COMPLETION OF CONSTRUCTION PROJECT**

- .1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.

#### **PART 2 - PRODUCT**

##### **2.1 NOT USED**

- .1 Not used.

#### **PART 3 - EXECUTION**

##### **3.1 NOT USED**

- .1 Not used.

#### **END OF SECTION**

---





## **PART 1 - GENERAL**

### **1.1 REFERENCES**

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

### **1.2 SUBMITTALS**

- .1 Submit the documents required according to section 01 33 00 - Documents and samples to be submitted.
  - .2 Submit to Departmental Representative, the site-specific safety program, as outlined in 1.8 at least 10 days prior to start of work. The Contractor must review his program during the course of the project if any change occurs in work methods or site conditions. The Departmental Representative may, after receiving the program or at any time during the project, ask the Contractor to update or modify the program in order to better reflect the reality of the construction site and activities. The Contractor must make the required changes before work begins.
  - .3 Submit to Departmental Representative the site inspection sheet, duly completed, at the intervals indicated in 1.12.1.
  - .4 Submit to Departmental Representative within 24 hours a copy of any inspection report, correction notice or recommendation issued by federal or provincial inspectors.
  - .5 Submit to Departmental Representative within 24 hours an investigation report for any accident involving injury and any incident exposing a potential hazard.
  - .6 Submit to Departmental Representative all safety data sheets for hazardous material to be used at the site at least three days before they are to be used.
  - .7 Submit to Departmental Representative copies of all training certificates required for application of the safety program, in particular:
    - .1 General construction site safety and health courses;
    - .2 Safety officer attestations;
    - .3 First aid in the workplace and cardiopulmonary resuscitation;
    - .4 Work likely to release asbestos dust;
    - .5 Work in confined spaces;
    - .6 Lockout procedures;
    - .7 Wearing and fitting of individual protective gear;
    - .8 forklift truck;
    - .9 positioning platform;
    - .10 Any other requirement of Regulations or the safety program.
  - .8 Medical examinations : Wherever legislation, regulations, directives, specification or a safety program require medical examinations, Contractor must:
-

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

### 1.3 HAZARDS ASSESSMENT

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

### 1.4 MEETINGS

- .1 Contractor decisional representative must attend any meetings at which site safety and health issues are to be discussed
- .2 Contractor must set up a site safety committee, and convene meetings every in accordance with the Construction Safety Code.

### 1.5 LEGAL AND REGULATORY REQUIREMENTS

- .1 Comply with Section 01 41 00 – Regulatory requirements
-

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

## 1.6 SITE-SPECIFIC CONDITIONS

- .1 At the site, the contractor must take account of the following specific conditions:
  - .1 Permanently occupied buildings, by occupants and public (penitentiary).
  - .2 Restricted access for worker and authorized personnel by CSC (refer to Section 01 35 13 – Special project procedures for Correctional Service Canada Security requirements).
  - .3 Controlled displacement in the building with presence of security guard patrol only.
  - .4 Circulation in parking lot to come to work, to bring tools and to deliver materials.
  - .5 Tools will have to be recorded at the entrance of the establishment and limitation on the use of certain devices (cellphone, etc.)
  - .6 Maintain the work area fenced and secured at all times.
  - .7 Provide temporary lighting to adequately illuminate the work area to facilitate monitoring by security guard patrol.
  - .8 Other specialized contractors might be asked to intervene to assure the maintenance of existing equipments that must remain in operation 24 hours a day.
  - .9 Night and day work.
  - .10 Lockout procedures will be required for this project and must be coordinated with CSC representative.
  - .11 The re-routing of fire alarm must be planned in the work. Coordination must be done with building's management.
  - .12 The project team will have to be informed together with all stakeholders (AAC, PWGSC, CCC, subcontractors, etc.) of the risks pertinent to the site, and of the zones to be considered as construction site, in order to maintain the rules and requirements in the construction areas.
  - .13 Noisy work.
  - .14 Confined spaces: the Contractor must evaluate each one of the existing confined spaces on his site in accordance with the nature of the intervention as well as the type of work (welding, gas, painting, etc.). Evaluation Forms to be used must minimally contain the information required in the ELF 104 Form (Annex D). The Contractor must transmit the risks evaluation forms to the Departmental Representative at least five (5) days before start of work in those confined spaces. He must anticipate all applicable costs related to measures that must be followed and rigorously applied in order to respect the requirements related to the security of confined spaces.
  - .15 Dust-generating work.
  - .16 Heavy machinery (trucks, etc.).

## 1.7 SAFETY AND HEALTH MANAGEMENT

- .1 Acknowledge and assume all the tasks and obligations which customarily devolve upon a principal Contractor under the terms of the Act Respecting Occupational Health and Safety (R.S.Q., chapter S-2.1) and the Construction Safety Code (S-2.1, r.4).
- .2 Develop a site-specific safety program based on the hazards identified and apply it from the start of project work until close-out is completed. The safety program must take account of all information appearing in 1.7 and must be submitted to all parties concerned, in accordance with the provisions set forth in 1.3. At a minimum, the site-specific safety program must include:
  - .1 Company safety and health policy.
  - .2 A description of the work, total costs, schedule and projected workforce curve.
  - .3 Flow chart of safety and health responsibility.

- .4 The physical and material layout of the site.
  - .5 First-aid and first-line treatment standards.
  - .6 Identification of site-specific hazards.
  - .7 Risk assessment for the tasks to be carried out, including preventive measures and the procedures for applying them.
  - .8 Training requirements.
  - .9 Procedures in case of accident/injury
  - .10 Written commitment from all parties to comply with the prevention program.
  - .11 A site inspection schedule based on the preventive measures.
- .3 The contractor must draw up an effective emergency plan based on the characteristics and constraints of the site and its surroundings. Submit the emergency plan to all parties concerned, pursuant to the provisions of 1.3. The emergency plan must include:
- .1 Evacuation procedure;
  - .2 Identification of resources (police, firefighters, ambulance services, etc.);
  - .3 Identification of persons in charge at the site;
  - .4 Identification of those with first-aid training;
  - .5 Training required for those responsible for applying the plan;
  - .6 Any other information needed, in the light of the site characteristics.

## 1.8 RESPONSIBILITIES

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

## 1.9 COMMUNICATIONS AND POSTING

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

### **1.10 UNFORESEEN CIRCUMSTANCES**

- .1 Whenever a source of danger not defined in the specifications or identified in the preliminary site inspection arises as a result of or in the course of the work, immediately suspend work, take appropriate temporary measures to protect the workers and the public and notify Departmental Representative, both verbally and in writing. Then the Contractor must modify or update the site specific safety program in order to resume work in safe conditions.

### **1.11 HEALTH, SAFETY, AND ENVIRONMENT SPECIALIST**

- .1 As soon as the work starts, hire a security guard, in accordance with articles 2.5.3 and 2.5.4 of the Safety Code for work construction work (S-2.1, r.6) and allow the necessary authority and resources for the performance of his duties.
- .2 As soon as the work start, hire a competent person whose task is to ensure compliance and enforcement of all laws, regulations and standards as well as contractual requirements for multidisciplinary work.
- .3 Allow the necessary authority, resources and tools for the performance of his duty.
- .4 The candidate will have to meet the following requirements:
  - .1 Obtain the necessary access authorisation by CSC.
  - .2 Has a competency security card recognized on a construction site.
- .5 The candidate will :
  - .1 Have a thorough knowledge of applicable laws and regulations of the site for multidisciplinary work.
  - .2 Develop and disseminate an awareness program for all employees of the site.
  - .3 Ensure that no worker is allowed on site without taking the awareness program and meets the training program requirements in accordance with applicable legislation and specific prevention program on site.
  - .4 Inspect the work and ensure compliance with all regulatory requirements and those indicated in the contract documents of the prevention program.
  - .5 Keep a daily record of his actions and send a copy to the Departmental Representative once a week.

### **1.12 INSPECTION OF SITE AND CORRECTION OF HAZARDOUS SITUATIONS**

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

### 1.13 BLASTING

- .1 Blasting and other use of explosives are forbidden unless authorized in writing by Departmental Representative.

### 1.14 POWDER ACTUATED DEVICES

- .1 Use of power hammers and other explosive-actuated devices is forbidden.

### 1.15 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 and heating.
- .2 "Hot Work Permit" will not be required, however the Contractor must notify 48 hours in advance.
- .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 shall be appointed to do continuous monitoring of the fire risks for a period of one hour after the end of the shift. This individual shall countersign the permit and give it to the person in charge of the work site (or the individual he/she appoints) after the one hour period.
- .5 The storage of propane cylinders shall comply with the CAN/CSA-B149.2-F00 Propane Storage and Handling Code and meet the specific conditions outlined in this document. The cylinders shall be stored outdoors, in a safe place, away from any unauthorized handling, in a storage cabinet specially designed for this purpose. The cylinders shall be securely kept upright and locked at all times in a place where no vehicles are allowed, unless the cylinders are protected by bars or the equivalent.
- .6 All of the cylinders used or stored on the work site shall be equipped with a collar designed to protect the valve.
- .7 Filling the cylinders on the work site is forbidden, unless a procedure compliant with the CAN/CSA B149.2 standard is approved and authorized by the Engineer.
- .8 Welding and cutting: For welding and cutting activities, the Contractor must assure that the following conditions are met moreover that the ones mentioned above.
  - .1 The works must be carried out in accordance with the sections "3.13 Compressed gas supply" and "3.14 Welding and cutting" of the Safety Code for the construction industry, S-2.1, r. 6.
  - .2 The welding and cutting devices are excessively dangerous with regard to the fire risk on the building work place. The following precautions must be taken at the time of this type of work :
    - .1 Store all compressed gas cylinder on a fireproof fabrics and make sure that the room is well ventilated.
    - .2 Store all oxygen cylinders more than 6 metres from a flammable gas cylinder (ex: acetylene) or a combustibile such as oil or grease, unless the oxygen cylinder is separated from it by a wall made of non-combustible material as mentioned in the article 3.13.4 of the Safety Code for the construction industry, S-2.1, r. 6.
    - .3 Set up fireproof fabrics when work of welding is done in superposition and that there is risk of spark fall.
    - .4 Store the bottles far from all heat sources.
    - .5 Not to store the bottles close to the staircases, exits, corridors and elevators.
    - .6 Not to put acetylene in contact with metals with metals such as silver, mercury, copper and alloys of brass having more than copper 65%, to avoid the risk of an explosive reaction.

- .7 Check that welding equipments with electric arc has the necessary tension and are grounded.
- .8 Ensure that the conducting wire of the electric welding equipments are not damaged.
- .9 Place the welding equipment on a flat ground away from the bad weather.
- .10 Move away or protect the combustible materials which can be near the welding equipment.
- .11 Prohibition to weld or cut any closed container.
- .12 Envisage protection measures when welding or cutting is carried out near drains, tanks or other containers containing inflammable materials.
- .13 Do not perform any cutting, welding or work with naked flame on a container, a tank, a pipe or other container containing a flammable or explosive substance unless:
  - .1 Air Samples indicating that work can be made without danger has been taken; or
  - .2 Provisions to ensure the safety of the workers has been done.

### 1.16 LOCKOUT

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

## 1.17 SPECIFIC CONDITIONS FOR CONFINED SPACES

- .1 Class 1
  - .1 Regarding all class 1 (low-risk) confined spaces, all persons involved shall have followed a basic training. Though it is not necessary to implement special work practices in low-risk confined spaces, the Contractor shall implement methods that ensure the health and general safety of persons who must work in these spaces.
  - .2 Before having access to confined spaces, the manager responsible for the workplace shall be informed of the expected date and time of entry and exit.
  - .3 Persons who have access to low-risk confined spaces must record the relevant information in the Confined Space Entry Log (ELF 103 form – Annex D), ie, all persons entering this class of confined space shall record each entry and each exit.
- .2 Class 2 and 3
  - .1 Regarding all class 2 and 3 confined spaces (medium- and high-risk), the following measures shall be strictly applied.
    - .1 The Contractor's prevention program shall include a written procedure which identifies:
      - .1 Necessary work tools;
      - .2 Instruments, installed or to be installed in the confined space, and measures to take for their installation, use, maintenance, protection and moving;
      - .3 Pipes and conduits entering the confined space;
      - .4 Risks and security measures to be taken depending on the work to be carried out;
      - .5 Hazardous material that may be found in the confined space;
      - .6 Appropriate rescue methods and equipment as well as emergency plan.
    - .2 The Contractor shall complete an access permit (ELF 101 form – Annex D). The permit shall be valid for the duration of a work shift and shall take into account information contained in the assessment report and special conditions related to the work to be carried out. The Contractor may use his own form if it provides all the information that appears on the appended form.
    - .3 The Contractor shall complete a Hot Work Permit when the work to be carried out includes operations such as welding, cutting or any other activity that creates flames or sparks (refer to Building Orientation Guides – Annex A).
    - .4 All persons having access to the confined space and the safety guard shall have the following training certificates:
      - .1 Safety for work in PWGSC confined spaces (ASP Construction or equivalent training)
      - .2 Workplace First Aid and CPR (organization recognized by the CSST)
      - .3 Use of ventilating equipment (ASP Construction or equivalent training)
      - .4 Use of safety harness (ASP Construction or equivalent training)
      - .5 Use and maintenance of respiratory protection equipment (ASP Construction or equivalent training)
      - .6 Gas detection equipment (ASP Construction or equivalent training)
      - .7 When the use of air adduction respirators or autonomous respirators is planned for, thorough training in the preparation, maintenance and use of such equipment (Manufacturer, supplier or recognized organization).
      - .8 In remote areas where no local rescue and emergency intervention unit is available, the Contractor shall designate persons who are capable of carrying out rescue operations in confined spaces. First-aid attendant designated by the Contractor shall have relevant training in the use of rescue equipment.
    - .5 All persons who must use air adduction respirators or autonomous respirators shall present a medical certificate confirming that they are fit to use this kind of equipment. This certificate shall be valid for two years.



- .6 Employees who are required to work in sewage collection systems or other similar systems shall be immunized against infectious diseases, in compliance with the immunization program prescribed by Health Canada, which is, against diphtheria and tetanus and for work to be done at the Correctional Service Canada, against hepatitis « B ».
  - .7 The antidiphtheria-tetanus vaccination is strongly recommended, though it is not mandatory.
  - .8 The Contractor shall establish emergency and rescue procedures in co-operation with municipal and ambulance services. These procedures, together with the relevant phone numbers and the whereabouts of the nearest phone shall be conspicuously posted near the work station.
  - .9 Before entry into a confined space, and every 15 minutes thereafter, the Contractor shall take readings of oxygen concentration, flammable gases and all toxic gases likely to be present, carbon monoxide and hydrogen sulphide in particular. These readings shall be recorded in a register, unless the detecting devices are equipped with an alarm and operate on a continuous basis. Detecting devices that are used shall be calibrated and adjusted by a competent person according to the manufacturer's directives, so that the alarms comply with the limits set out on the permit. NOTE: for welding and cutting tasks, readings of concentration must be done on a continuous basis.
  - .10 The Contractor is responsible for the provision and maintenance of gas detecting devices. The Engineer may at any time require the Departmental Representative equipment to be checked for accuracy by a qualified person. In the event of failure of a detecting device, work shall be suspended immediately and all workers shall leave the confined space. In these circumstances, no claim for time lost shall be accepted.
  - .11 If a detecting device alarm is set off, all workers shall leave the confined space. The Contractor shall then find the source of contamination, neutralize it, ventilate the confined space to eliminate contaminant residues and authorize access to the confined space only when concentrations of oxygen and gas have returned to normal.
  - .12 Compressed gas cylinders or welding equipment shall not be brought into confined spaces: this equipment shall remain outside and shall not block entrances or exits; all cylinders shall be properly secured.
  - .13 Tools and electrical devices used to gain access to confined spaces shall be grounded and, when necessary, designed to be explosion-proof. All equipment must be connected to a ground fault interrupter outlet or to a step-down transformer. The Contractor shall, at his own cost, hire a qualified electrician to adjust power receptacles and/or circuit breakers that he intends to use which do not meet these criteria.
  - .14 The Contractor shall provide a ventilation system to keep concentrations of contaminants below admissible limits.
  - .15 The Contractor shall put up posters to prevent unauthorized persons from entering the confined space.
  - .16 When it is impossible to maintain the noise level under 85 dB, the Contractor shall provide all workers with ear protection adapted to the desired level of attenuation and work to be carried out.
  - .17 The Contractor shall ensure that all workers wear the required personal protection equipment.
-

- .18 The Contractor shall assign a competent person to assume the function of safety guard. The safety guard shall:
  - .1 Be properly informed of work procedures in a confined space.
  - .2 Ensure constant communication with all workers in the confined space. The instructions that are applied shall be adapted to confined spaces. The Contractor shall choose means of communication according to identified risks and other relevant factors, that is the protection equipment the workers must wear, noise levels in confined spaces and surrounding areas, remoteness, lighting conditions, etc.
  - .3 Be familiar with gas detecting devices and see to their proper functioning for the duration of the work.
  - .4 Be familiar with auxiliary ventilation systems and see to their proper functioning for the duration of the work.
  - .5 Be familiar with emergency procedures.
  - .6 Ensure that:
    - .1 All workers who enter the confined space respect the Contractor's work procedure.
    - .2 The working conditions and the environment inside the confined space are in no way detrimental to workers' health and safety.
- .19 The safety guard shall, at all times, be posted at the entrance of the confined space and shall not leave his station as long as there is a worker inside the confined space.
- .20 The Contractor shall designate a person to be in charge of the safety of the confined space. This person shall be present at all times on the job site.
- .21 The same person may act as a security guard and be responsible for the safety of confined spaces, provided all requirements of both functions are met.

#### 1.18 SILICA

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

#### 1.19 SPECIAL REQUIREMENTS – SCAFFOLDING

- .1 Foundation:
  - .1 Scaffolding shall be installed on a solid foundation so that it does not slip or rock.

- 
- .2 Contractors wishing to install scaffolding on a roof, overhang, canopy or awning shall submit their calculations and loads to the Departmental Representative and shall obtain permission from the Departmental Representative before beginning installation.
  - .2 Assembly, bracing and mooring:
    - .1 All scaffolding shall be assembled, braced and moored in accordance with the manufacturer's instructions and the provisions of the *Safety Code for the construction industry*.
    - .2 Where a situation requires the removal of part of the scaffolding (e.g., crosspieces), the Contractor shall submit an assembly procedure signed and sealed by an engineer member of OIQ 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 3 m, the Contractor shall provide an assembly plan signed and sealed by an engineer member of OIQ.
  - .3 Protection against falls during assembly:
    - .1 Workers working above the ground shall be protected against falls at all times during assembly.
    - .2 Before the work begins, the Contractor shall submit to the Departmental Representative a procedure stating the protective measures used and, if applicable, identifying the anchor points for the safety cables or moorings. This procedure shall be in accordance with sections 3.9.4.5, 2.9.1 and 2.10.12 of the *Safety Code for the construction industry* (amended on August 2, 2001).
  - .4 Platforms:
    - .1 Scaffolding platforms shall be designed and installed in accordance with the provisions of the *Safety Code for the construction industry*.
    - .2 If planks are used, they shall be approved and stamped in accordance with section 3.9.8 of the *Safety Code for the construction industry* (in force January 1, 2002).
    - .3 The platforms shall cover the entire surface protected by the guardrails.
    - .4 The above notwithstanding, scaffolding 4 sections (or 6 metres) high or higher shall have a full platform covering the entire surface of the putlogs every 3 m or fraction thereof, and the components of that platform shall not be moved at any time to create an intermediate landing.
  - .5 Guardrails:
    - .1 A guardrail shall be installed on every landing.
    - .2 Cross braces shall not be considered guardrails.
    - .3 Where scaffolding 4 sections (or 6 metres) high or higher requiring full platforms is used, guardrails shall be installed on each landing at the start of work and shall remain in place until the work is completed.
  - .6 Access:
    - .1 The Contractor shall ensure that access to the scaffolding does not compromise worker safety.
    - .2 Where the platforms of the scaffolding are comprised of planks, ladders shall be installed in such a way that planks extending beyond the platform do not block the way up or down.
    - .3 Notwithstanding the provisions of the *Safety Code for the construction industry*, stairs shall be installed on all scaffolding that has 6 or more rows of uprights or is 6 sections (or 9 metres) high or higher.
  - .7 Protection of the public and occupants:
    - .1 The Contractor shall identify the boundaries of and barricade the work area so as to limit access to authorized workers only.
    - .2 The Contractor shall install covered walkways, nets or other similar devices to protect the public or the occupants against falling objects.
-

- .8 Use of public thoroughfares:
  - .1 Where it is necessary to encroach on a public thoroughfare, the Contractor shall obtain at the Contractor's expense any authorizations and permits required by the competent authority.
  - .2 The Contractor shall install at the Contractor's expense any signage, barricades or other devices needed to ensure the safety and security of the public and the Contractor's own facilities.

#### **1.20 WORK IN HEIGHT**

- .1 The Contractor must ensure that any person carrying out work that poses a risk of falling more than 2,4 m use fall protection equipment.
- .2 Plan and organize work so as to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment. When personal fall protection is required, workers must use a safety harness that complies with CSA standard CAN/CSA Z-259.10 M90. A safety belt must not be used as fall protection.
- .3 Every person using an elevating platform must have a training regarding this equipment.
- .4 Wearing of safety harness is obligatory in any elevating platform with telescopic , articulated or rotary boom.
- .5 Delimit a danger zone in any place where equipment for work in height is used.
- .6 Everyone who works within 3 meters from the edge of a roof must use a safety harness in accordance with the regulation, unless there is presence of a guardrail on the perimeter of the roof which is between 900 mm to 1100 mm high.

#### **1.21 LIFTING MATERIAL**

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

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

## **PART 2 – PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 – EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 REFERENCES AND CODES**

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

### **1.2 HAZARDOUS MATERIAL DISCOVERY**

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Ministry Representative. Wait for a written instruction in this regard of the Departmental Representative before resuming the work.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Ministry Representative.
- .3 Mold: stop work immediately when material resembling mold is encountered during demolition work. Notify Ministry Representative.

### **1.3 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions and municipal by-laws.
- .2 Comply to Building Orientation Guides (Annex A).

## **PART 2– PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 – EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

## **END OF SECTION**

---





## **PART 1 – GENERAL**

### **1.1 INSPECTION**

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

### **1.2 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect, correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

### **1.3 ACCESS TO WORK**

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

### **1.4 PROCEDURES**

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
  - .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
  - .3 Provide labor and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
-

## **1.5 REJECTED WORK**

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

## **1.6 REPORTS**

- .1 Submit inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor and manufacturers of work being inspected or tested.

## **1.7 TESTS AND MIX DESIGNS**

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

## **1.8 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct mock-ups in locations acceptable to Departmental Representative as specified in specific Section.
- .3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

## **1.9 MILL TESTS**

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

## **1.10 MATERIAL, EQUIPMENT AND SYSTEMS**

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

**PART 2- PRODUCTS**

**2.1 NOT USED**

.1 Not Used.

**PART 3 – EXECUTION**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 REFERENCES**

- .1 Not used.

### **1.2 TEMPORARY HEATING AND VENTILATION**

- .1 The Departmental Representative will assume the costs associated to the necessary ventilation and heating for the work.

### **1.3 TEMPORARY POWER AND LIGHT**

- .1 Departmental Representative will provide and pay for temporary power during construction for temporary lighting and operating of power tools. The electrical supply available on site is 120/208v, 3phases, 4f, 30A.
- .2 Arrange for connection with appropriate connection to the existing electrical services in accordance with the Canadian Electrical Code and provide for communication equipment. Assume cost for installation, maintenance and disconnection.
- .3 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lux.
- .4 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Ministry Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

### **1.4 TEMPORARY COMMUNICATION FACILITIES**

- .1 Provide and pay for temporary telephone and data hook up, lines equipment necessary for own use and use of Departmental Representative.

### **1.5 FIRE PROTECTION**

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

## **PART 2 – PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.
-

**PART 3 – EXECUTION**

**3.1 NOT USED**

.1 Not used.

**END OF SECTION**

---

## **PART 1 – GENERAL**

### **1.1 REFERENCES**

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

### **1.2 INSTALLATION AND REMOVAL**

- .1 Provide, put in place and build necessary construction facilities necessary for carrying out Work as soon as possible. Refer to section 01 14 00 Work Restrictions.
- .2 Remove from site all such work after use.
- .3 Prepare an overall plan indicating the proposed location for the site office and storage and show the path of circulation for the workers and materials. Refer to section 01 14 00 - Regulatory requirements.

### **1.3 SCAFFOLDING**

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ladders, swing staging and platforms necessary for carrying out Work.

### **1.4 LIFTING EQUIPMENT**

- .1 Supply, install, maintain and maneuver the winches to be used by construction personnel and for transporting of materials and equipment. Take necessary financial arrangements with subcontractors for the use of lifting equipment.
- .2 Operation of winches to be entrusted to skilled workers.

### **1.5 SITE STORAGE/LOADING**

- .1 Use storage space provided for that purpose and as shown on the drawings and according to requirements prescribed in section 01 14 00 - Work Restrictions.
  - .2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
  - .3 Do not load or permit to load any part of Work with weight or force that will endanger Work.
-

**1.6 OFFICES**

- .1 Set up office in space as prescribed in section 01 14 00 - Work Restrictions.
- .2 Provide marked and fully stocked first-aid case in a readily available location.

**1.7 SANITARY FACILITIES**

- .1 Use of public sanitary facilities as prescribed in section 01 14 00 - Work Restrictions.

**1.8 CONSTRUCTION SIGNAGE**

- .1 No other signs or advertisements, other than warning signs, are permitted on site.

**1.9 CLEAN-UP**

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

**1.10 CONTAINERS**

- .1 Contractor may install a garbage container at the location provided for that purpose on the mobilization plan.
- .2 Refer to section 01 74 21 Construction/Demolition waste management and disposal.

**1.11 PARKING HEIGHT CLEARANCE**

- .1 Take note that the public parking maximum clearance height is 2.1 meters.

**PART 2 – PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 – EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 08 11 00 – Metal doors and frames.
- .2 Section 09 21 99 – Partition for minor works.
- .3 Section 09 91 99 – Painting for minor works.

### **1.2 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.

### **1.3 INSTALLATION AND REMOVAL**

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

### **1.4 DUST TIGHT SCREENS / TEMPORARY PARTITIONS - GENERAL**

- .1 Provide dust tight screens or partitions in compliance with prescription in article 1.5 to localize dust generating activities, and for protection of workers, finished areas of Work and public.
  - .2 The Contractor must agree on the temporary installation type for each of the identified work areas on the plans, while respecting the standard attached to these documents. The types of installation must be approved by the Departmental Representative.
  - .3 Maintain and relocate protection until such work is complete.
  - .4 Build and maintain temporary partitions according to following prescriptions:
    - .1 Partitions and temporary facilities must be installed in order to prevent building occupants and the public from moving them.
    - .2 A duplicate of the keys for temporary partition doors locks will be provided to Departmental Representative.
    - .3 Unless otherwise indicated, install temporary partitions at 1200 mm in front of landing doors and at 300 mm on each side of them, allowing access to call buttons for elevators that are not subject to the Work in the current phase, making certain that the corridor width does not get reduced to less than 1100 mm. Access to exists must be maintained at all times.
    - .4 Coordinate in advance with Departmental Representative the installation of any temporary partition.
  - .5 Screen dust (polyethylene only):
    - .1 For the type, the location and phasing of temporary partitions, refer to the plan of work phases.
    - .2 Before any demolition or construction, install a polyethylene wall with masking tape at the top (ceiling), bottom (floor) and at each junction of two polyethylene panels to prevent dust out of the enclosure of the work site. The screen will be completely dust-proof to prevent its dispersion for the duration of all work and all phases of the work. This wall must be dismantled daily at the end of each working day and installed at the beginning of each working day.
-

- .3 The Contractor shall provide and install all ventilation devices necessary to maintain negative pressure in work areas at all times. These devices will have to be equipped with HEPA filters. Only hoses with flexibles fabrics will be accepted. Plastic casing will be systematically refused. Ventilation equipment must be designed for industrial use 24h/24h, be in good condition and connected to the electrical network in accordance with applicable rules.
    - .1 Maintain ventilation equipment in good condition for the duration of the work. The contractor will be responsible for moving and reinstalling as needed to perform certain work. He will also be responsible for providing and changing them regularly.
    - .2 For the duration of the work, seal of all ventilation grids inside of the premises or construction area. Seal with polythene and duct tape. Polythene and tape must be removed at the end of the work.
    - .3 Maintain negative pressure 24h/24h.
  - .4 Two polyethylene overlapping sections, 915mm minimum overlapping, will serve as an access to the site.
  - .5 A dust mat will be installed at every site access. Ensure that the first two steps out of the work site are made on this dust mat.
    - .1 The dust mat films must be changed at least five (5) times per day depending on conditions yard or at the request of the Departmental Representative. The top film should never be saturated with dust of other debris. If this is the case. It should be replaced immediately.
    - .2 Dust mat will be moved to a lockable area at the end of each working day.
  - .6 Vacuum with HEPA filters will be available for the following cases:
    - .1 Clean clothes to each access to the site. The vacuum cleaner must be permanently be in the construction area, protected by a dust shield. Workers whose clothes are dusty must be cleaned with a vacuum cleaner.
    - .2 Cleaning during the digging, cutting and demolition of existing or new work who could make dust.
  - .7 If temporary partitions have to be modified to adapt to the evolution of the work, these changes will be made by the Contractor, in order the preserve the tightness of the site at all times.
  - .8 The Contractor will remove the temporary polyethylene partitions at the end of each working day and reinstall at the beginning of each working day.
  - .9 The Contractor will perform cleaning of the site to the satisfaction of the Departmental Representative on all wall, floor and ceiling surfaces at the end of each working day before dismantling the temporary partition.
  - .10 The Contractor shall ensure that the temporary partition remains sealed throughout the site.
- .6 Fixed temporary partition and dust screen
- .1 For the type, the location and phasing of temporary partitions, refer to the plan of work phases.
  - .2 Before any demolition or construction, install a wood or steel stud with a 16mm plywood on the outside of the site and polyethylene on the inside of the wall, with tape at the top (ceiling), bottom (floor) and each junction of two panels of polyethylene to prevent dust from leaving the enclosure of the site, refer to plan. Paint the plywood and apply sealant around the perimeter. The partition will be completely dust-proof to prevent dispersion of dust for the duration of all stages of the work.
  - .3 The Contractor shall provide and install all ventilation devices necessary to maintain negative pressure in work areas at all times. These devices will have to be equipped with HEPA filters. Only hoses with flexibles fabrics will be accepted. Plastic casing will be systematically refused. Ventilation equipment must be designed for industrial use 24h/24h, be in good condition and connected to the electrical network in accordance with applicable rules.
-

- 
- .1 Maintain ventilation equipment in good condition for the duration of the work. The contractor will be responsible for moving and reinstalling as needed to perform certain work. He will also be responsible for providing and changing them regularly.
  - .2 For the duration of the work, seal of all ventilation grids inside of the premises or construction area. Seal with polythene and duct tape. Polythene and tape must be removed at the end of the work.
  - .3 Maintain negative pressure 24h/24h.
  - .4 Install a proper size door adapted for usage with door closer, neoprene dust cup on three sides and bottom of the door and required hardware. It will be perfectly dust-proof to avoid dispersion of the dust for the entire duration of the work.
  - .5 A dust mat will be installed at every site access. Ensure that the first two steps out of the work site are made on this dust mat.
    - .1 The dust mat films must be changed at least five (5) times per day depending on conditions yard or at the request of the Departmental Representative. The top film should never be saturated with dust or other debris. If this is the case. It should be replaced immediately.
    - .2 Dust mat will be moved to a lockable area at the end of each working day.
  - .6 Vacuum with HEPA filters will be available for the following cases:
    - .1 Clean clothes to each access to the site. The vacuum cleaner must be permanently be in the construction area, protected by a dust shield. Workers whose clothes are dusty must be cleaned with a vacuum cleaner.
    - .2 Cleaning during the digging, cutting and demolition of existing or new work who could make dust.
  - .7 If temporary partitions have to be modified to adapt to the evolution of the work, these changes will be made by the Contractor, in order to preserve the tightness of the site at all times.
  - .8 The Contractor shall ensure that the temporary partitions remain sealed throughout the work.
- .7 Mobile temporary partition:
- .1 For the type, the location and phasing of temporary partitions, refer to the plan of work phases.
  - .2 Before any demolition or construction, first install a movable partition on wood or metal stud, with two 16mm plywood on the outside of the work site bolted to steel angles chemically bolted to the floor and ceiling, refer to plan. Paint exterior plywood. Paint the steel angle bright yellow for security purposes. This wall must be removed at the beginning of each working day and reinstalled at the end of each working day. The angles will remain in place for the duration of the project.
  - .3 The Contractor shall provide and install all ventilation devices necessary to maintain negative pressure in work areas at all times. These devices will have to be equipped with HEPA filters. Only hoses with flexible fabrics will be accepted. Plastic casing will be systematically refused. Ventilation equipment must be designed for industrial use 24h/24h, be in good condition and connected to the electrical network in accordance with applicable rules.
    - .1 Maintain ventilation equipment in good condition for the duration of the work. The contractor will be responsible for moving and reinstalling as needed to perform certain work. He will also be responsible for providing and changing them regularly.
    - .2 For the duration of the work, seal of all ventilation grids inside of the premises or construction area. Seal with polythene and duct tape. Polythene and tape must be removed at the end of the work.
    - .3 Maintain negative pressure 24h/24h.
-

- .4 Install a proper size door adapted for usage with door closer, neoprene dust cup on three sides and bottom of the door and required hardware. It will be perfectly dust-proof to avoid dispersion of the dust for the entire duration of the work.
- .5 A dust mat will be installed at every site access. Ensure that the first two steps out of the work site are made on this dust mat.
  - .1 The dust mat films must be changed at least five (5) times per day depending on conditions yard or at the request of the Departmental Representative. The top film should never be saturated with dust or other debris. If this is the case. It should be replaced immediately.
  - .2 Dust mat will be moved to a lockable area at the end of each working day.
- .6 Vacuum with HEPA filters will be available for the following cases:
  - .1 Clean clothes to each access to the site. The vacuum cleaner must be permanently be in the construction area, protected by a dust shield. Workers whose clothes are dusty must be cleaned with a vacuum cleaner.
  - .2 Cleaning during the digging, cutting and demolition of existing or new work who could make dust.
- .7 If temporary partitions have to be modified to adapt to the evolution of the work, these changes will be made by the Contractor, in order to preserve the tightness of the site at all times.

#### **1.5 PROTECTION OF BUILDING FINISHES**

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

#### **1.6 WASTE MANAGEMENT AND DISPOSAL**

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

### **PART 2 – PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

### **PART 3 – EXECUTION**

#### **3.1 NOT USED**

- .1 Not Used.

### **END OF SECTION**

---

## **PART 1 – GENERAL**

### **1.1 REFERENCES**

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

### **1.2 QUALITY**

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

### **1.3 AVAILABILITY**

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
  - .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.
-

#### **1.4 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet and panel materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

#### **1.5 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

#### **1.6 MANUFACTURER'S INSTRUCTIONS**

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

#### **1.7 QUALITY OF WORK**

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

- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

#### **1.8 CO-ORDINATION**

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

#### **1.9 CONCEALMENT**

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

#### **1.10 REMEDIAL WORK**

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

#### **1.11 LOCATION OF FIXTURES**

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

#### **1.12 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

#### **1.13 FASTENINGS - EQUIPMENT**

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

- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

#### **1.14 PROTECTION OF WORK IN PROGRESS**

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

#### **1.15 EXISTING UTILITIES**

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

### **PART 2 – PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.

### **PART 3 – EXECUTION**

#### **3.1 NOT USED**

- .1 Not Used.

### **END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 REFERENCES**

- .1 Not used.

### **1.2 EXISTING SERVICES**

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings. The Contractor must coordinate at least 48 hours in advance a visit to verify the installations with the building's maintenance personnel during the day, between 8:00 am and 16:00 pm.
- .2 Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

### **1.3 LOCATION OF EQUIPMENT AND FIXTURES**

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain approval for actual location.

## **PART 2 – PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 – EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
  - .1 Structural integrity of elements of project.
  - .2 Integrity of weather-exposed or moisture-resistant elements.
  - .3 Efficiency, maintenance, or safety of operational elements.
  - .4 Visual qualities of sight-exposed elements.
  - .5 Work of Owner or separate contractor.
- .3 Include in request:
  - .1 Identification of project.
  - .2 Location and description of affected Work.
  - .3 Statement on necessity for cutting or alteration.
  - .4 Description of proposed Work, and products to be used.
  - .5 Alternatives to cutting and patching.
  - .6 Effect on Work of Owner or separate contractor.
  - .7 Written permission of affected separate contractor.
  - .8 Date and time work will be executed.

### **1.2 MATERIALS**

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

### **1.3 PREPARATION**

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

### **1.4 EXECUTION**

- .1 Execute cutting, fitting, patching, excavation and fill, to complete Work.
  - .2 Fit several parts together, to integrate with other Work.
  - .3 Uncover Work to install ill-timed Work.
  - .4 Remove and replace defective and non-conforming Work.
-

- .5 Remove samples of installed Work for testing .
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

#### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

#### **PART 2 – PRODUCTS**

##### **2.1 NOT USED**

- .1 Not Used.

#### **PART 3 – EXECUTION**

##### **3.1 NOT USED**

- .1 Not Used.

#### **END OF SECTION**

---

## **PART 1 – GENERAL**

### **1.1 REFERENCES**

- .1 The Workplace Hazardous Materials Information System (WHMIS) / Health Canada.
  - .1 Material Safety Data Sheet (MSDS).

### **1.2 PROJECT CLEANLINES**

- .1 Proceed to daily cleaning of public spaces that have been soiled consecutively to the execution of work.
- .2 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
- .3 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .4 Make necessary arrangements and obtain required permits from the relevant authorities in order to eliminate debris and waste materials.
  - .1 For recycling refer to section 01 74 21 – Construction/Renovation/Demolition (CRD) waste management and disposal.
  - .2 Eliminate debris and waste materials outside of work site.
- .5 On site, provide for only one container for debris and waste material evacuation. The container shall be installed at the delivery dock, as prescribed in the Building Orientation Guide.
- .6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

### **1.3 CLEANING WORK**

- .1 The Contractor shall conform to the Workplace Hazardous Materials Information System (WHMIS) legislation and assure that the Material Safety Data Sheet of all dangerous products that he uses be permanently kept in the building where such products are stored, that they are kept up to date when he buys his products and that each container be properly labelled. The Contractor shall demonstrate to the Departmental Representative, to his satisfaction, that all employees have completed with satisfaction the WHMIS training.
  - .2 The Contractor must ensure that non compatible chemical products be stored in a way that they don't get in contact with one another.
-

- .3 Ensure that workers wear appropriate gloves when using cleaning products.
- .4 Ensure protection to public from slipping on wet floors when they are being washed.

#### **1.4 FINAL CLEANING**

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and ceilings, elevator cab, floors as well as any other material and equipment incorporated in the work.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 .Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 .Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .13 Remove dirt and other disfiguration from exterior surfaces.
- .14 Broom clean and wash hard surfaces affected by the work.
- .15 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment affected by the work.

#### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse/recycling in accordance with Section 01 74 21 - Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

### **PART 2 – PRODUCTS**

#### **2.1 NOT USED**

- .1 Not Used.
-

**PART 3 – EXECUTION**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

---





## **PART 1 - GENERAL**

### **1.1 RESIDUAL MATERIAL MANAGEMENT GOALS**

- .1 PWGSC's Residual Material Management Goal is to reduce total construction/renovation/demolition (CRD) residual materials sent to landfill sites by 75%. Provide the Departmental Representative with documentation certifying that CRD residual material management has been extensively practiced (recycling, reuse of recyclable and reusable materials).

### **1.2 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by the Departmental Representative.
- .2 Unless specified otherwise, materials for removal become the Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate waste from salvaged items. Transport and deliver waste to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify the Departmental Representative.
- .7 Protect surface drainage, mechanical and electrical facilities from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
  - .1 On-site source separation is recommended.
  - .2 Provide waybills for separated materials.

### **1.3 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Remove materials on-site as Work progresses.

### **1.4 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference with, or disturbance to, normal use of premises.
- .2 Maintain security measures established by existing facility.

### **1.5 SCHEDULING**

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

### **1.6 CLEANING**

- .1 Separate at source residual materials to be reused or recycled and put them in the locations indicated.
-

- .2 Clean-up work area as work progresses.
- .3 Remove tools and residual and waste materials on completion of Work, and leave work area in a clean and orderly condition.

**1.7 JOB SITE WASTE STATEMENT (JSWS)**

- .1 Annex A – Job Site Waste Statement (JSWS) for construction/renovation/demolition projects.

Materials	Rerouted actual weight (tons)		Destination and final use of rerouted materials	Total buried weight (tons)	TOTAL WEIGHT (tons)	Rerouted rate
	Reused	Recycled				
Masonry and pavement						
Walls and ceilings						
Metals						
Mechanics						
HVAC						
Plumbing						
Sanitary equipment						
Others						
Doors and windows						
Wood						
Woodwork and millwork						
Floor covering						
Electricity						
Wiring						
Lighting						
Others						
Roofing						
Specialties and miscellaneous items						
Cardboard						
Other packaging						
Mixed recycling						
General Waste						
Others						
<b>TOTAL</b>						

END OF SECTION

---

## **PART 1 – GENERAL**

### **1.1 ADMINISTRATIVE REQUIREMENTS**

- .1 Partial acceptance of phases and of Work Procedures:
  - .1 Contractor must present and submit the list of incorporated work at each phase and integrate it in the schedule of cost breakdown.
  - .2 Contractor's Inspection: Contractor must conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2 Request Departmental Representative's inspection.
  - .3 Departmental Representative's Inspection:
    - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
    - .2 Contractor to correct Work as directed.
  - .4 Completion Tasks: submit written certificates in English and French that tasks have been performed as follows:
    - .1 Work: completed and inspected for compliance with Contract Documents.
    - .2 Defects: corrected and deficiencies completed.
    - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
    - .4 Certificates required by Utility companies: submitted.
    - .5 Operation of systems: demonstrated to Departmental Representative.
    - .6 Commissioning of mechanical systems: completed in accordance with 01 91 13 - General Commissioning (Cx) Requirements and copies of final Commissioning Report submitted to Departmental Representative.
    - .7 Work: complete and ready for final inspection.
  - .5 Final Inspection:
    - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
    - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
  - .6 Declarations of Substantial Performances: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
  - .7 Commencement of Lien and Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
  - .8 Final Payment:
    - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .9 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

**1.2 FINAL CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

**PART 2 – PRODUCTS**

**2.1 NOT USED**

- .1 Not Used.

**PART 3 – EXECUTION**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

---

## **PART 1 – GENERAL**

### **1.1 REFERENCES**

- .1 Not used.

### **1.2 ADMINISTRATIVE REQUIREMENTS**

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

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

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

### **1.4 FORMAT**

- .1 Organize data as instructional manual.
  - .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
  - .3 When multiple binders are used correlate data into related consistent groupings.
    - .1 Identify contents of each binder on spine.
  - .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
  - .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
-

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

## **1.5 CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents for Each Volume: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: refer to Section 01 91 41 – Commissioning training.

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

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

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

### **1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

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

### **1.8 EQUIPMENT AND SYSTEMS**

- .1 For each item of equipment and each system include description of unit or system, and component parts.
    - .1 Give function, normal operation characteristics and limiting conditions.
    - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
  - .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
  - .3 Include installed color coded wiring diagrams.
  - .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
    - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
    - .2 Include summer, winter, and any special operating instructions.
-

- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed color coded piping diagrams.
- .12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .13 Include test and balancing reports as specified in Section 01 45 00 - Quality Control and 01 91 13 - General Commissioning (Cx) Requirements.
- .14 Additional requirements: as specified in individual specification sections.

## 1.9 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and color and texture designations.
  - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Additional requirements: as specified in individual specifications sections.

## 1.10 MAINTENANCE MATERIALS

- .1 Spare Parts:
  - .1 Provide spare parts, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to [site] [location as directed]; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
  - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to location as directed by Departmental Representative; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative .
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.



- .3 Special Tools:
  - .1 Provide special tools, in quantities specified in individual specification section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to [site] [location as directed]; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.

#### **1.11 DELIVERY, STORAGE AND HANDLING**

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

#### **1.12 WARRANTIES AND BONDS**

- .1 The 12 months warranty period will enter into force on the date stated for the partial substantial completion date.
- .2 For maintenance service for the elevator, refer to sections 14 20 06 – Hydraulic elevator and 14 90 00 – Elevator and freight elevator maintenance.
- .3 Develop warranty management plan to contain information relevant to Warranties.
- .4 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative's approval.
- .5 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .6 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .7 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .8 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within [ten] days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .9 Leave date of beginning of time of warranty until Date of Substantial Performance is determined.

- .10 Four (4) months warranty inspections to be planned, measured from time of partial acceptance, to be made together with Departmental Representative.
- .11 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include notably the elevators and freight elevator, the pumps, motors, transformers and commissioning services.
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.
    - .5 Names, addresses and telephone numbers of sources of spare parts.
    - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
    - .7 Cross-reference to warranty certificates as applicable.
    - .8 Starting point and duration of warranty period.
    - .9 Summary of maintenance procedures required to continue warranty in force.
    - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
    - .11 Organization, names and phone numbers of persons to call for warranty service.
    - .12 Typical response time and repair time expected for various warranted equipment.
  - .4 Contractor's plans for attendance at ten (10) months post-construction warranty inspections.
  - .5 Procedure and status of tagging of equipment covered by extended warranties.
  - .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .12 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .13 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

## **PART 2 – PRODUCTS**

### **2.1 NOT USED**

- .1 Not Used.

## **PART 3 – EXECUTION**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

---

**Part 1            General**

**1.1                ADMINISTRATIVE REQUIREMENTS**

- .1        Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of substantial performance.
- .2        Owner: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3        Preparation:
  - .1        Verify conditions for demonstration and instructions comply with requirements.
  - .2        Verify designated personnel are present.
  - .3        Ensure equipment has been inspected and put into operation.
  - .4        Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements and equipment and systems are fully operational.
- .4        Demonstration and Instructions:
  - .1        Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the equipment location.
  - .2        Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
  - .3        Review contents of manual in detail to explain aspects of operation and maintenance.
  - .4        Prepare and insert additional data in operations and maintenance manuals when needed during instructions.
- .5        Time Allocated for Instructions: ensure amount of time required for instruction of each item, equipment or system.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3 QUALITY ASSURANCE**

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
  - .1 Instruct Owner's personnel.
  - .2 Provide written report that demonstration and instructions have been completed.

**Part 2 Products**

**2.1 NOT USED**

**Part 3 Execution**

**3.1 NOT USED**

**END OF SECTION**

## **Part 1 General**

### **1.1 SUMMARY**

- .1 Section Includes:
  - .1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.
- .2 Acronyms:
  - .1 AFD - Alternate Forms of Delivery, service provider.
  - .2 BMM - Building Management Manual.
  - .3 Cx - Commissioning.
  - .4 EMCS - Energy Monitoring and Control Systems.
  - .5 O M - Operation and Maintenance.
  - .6 PI - Product Information.
  - .7 PV - Performance Verification.
  - .8 TAB - Testing, Adjusting and Balancing.

### **1.2 GENERAL**

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
  - .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
  - .2 Ensure appropriate documentation is compiled into the BMM.
  - .3 Effectively train O M staff.
- .2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
  - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
  - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.
- .4 AFD managed projects the term Departmental Representative in Cx specifications to be interpreted as AFD Service Provider.

### **1.3 COMMISSIONING OVERVIEW**

- .1 Section 01 91 31 - Commissioning (Cx) Plan.
- .2 For Cx responsibilities refer to Section 01 91 31 - Commissioning (Cx) Plan.
- .3 Cx to be a line item of Contractor's cost breakdown.
- .4 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .5 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.
- .6 Departmental Representative will issue Interim Acceptance Certificate when:
  - .1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
  - .2 Equipment, components and systems have been commissioned.
  - .3 O M training has been completed.

### **1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS**

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

### **1.5 PRE-CX REVIEW**

- .1 Before Construction:
  - .1 Review contract documents, confirm by writing to Departmental Representative.
    - .1 Adequacy of provisions for Cx.
    - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
  - .1 Co-ordinate provision, location and installation of provisions for Cx.
- .3 Before start of Cx:
  - .1 Have completed Cx Plan up-to-date.
  - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
  - .3 Fully understand Cx requirements and procedures.
  - .4 Have Cx documentation shelf-ready.

- .5 Understand completely design criteria and intent and special features.
  - .6 Submit complete start-up documentation to Departmental Representative.
  - .7 Have Cx schedules up-to-date.
  - .8 Ensure systems have been cleaned thoroughly.
  - .9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.
  - .10 Ensure "As-Built" system schematics are available.
- .4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

## **1.6 CONFLICTS**

- .1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

## **1.7 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit no later than 4 weeks after award of Contract:
    - .1 Name of Contractor's Cx agent.
    - .2 Draft Cx documentation.
    - .3 Preliminary Cx schedule.
  - .2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
  - .3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.
  - .4 Provide additional documentation relating to Cx process required by Departmental Representative.

## **1.8 COMMISSIONING DOCUMENTATION**

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use.
- .2 Departmental Representative to review and approve Cx documentation.
- .3 Provide completed and approved Cx documentation to Departmental Representative.

## **1.9 COMMISSIONING SCHEDULE**

- .1 Provide detailed Cx schedule as part of construction schedule.
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
  - .1 Approval of Cx reports.
  - .2 Verification of reported results.

- .3 Repairs, retesting, re-commissioning, re-verification.
- .4 Training.

**1.10 COMMISSIONING MEETINGS**

- .1 Convene Cx meetings following project meetings as specified herein.
- .2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.
- .4 At 60% construction completion stage. Departmental Representative to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:
  - .1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
  - .2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.
- .5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.
- .6 Meeting will be chaired by Contractor or it's Cx Agent, who will record and distribute minutes.
- .7 Ensure subcontractors and relevant manufacturer representatives are present at 60% and subsequent Cx meetings and as required.

**1.11 STARTING AND TESTING**

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

**1.12 WITNESSING OF STARTING AND TESTING**

- .1 Provide 14 days notice prior to commencement.
- .2 Departmental Representative to witness of start-up and testing.
- .3 .3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

**1.13 MANUFACTURER'S INVOLVEMENT**

- .1 Factory testing: manufacturer to:
  - .1 Coordinate time and location of testing.
  - .2 Provide testing documentation for approval by Departmental Representative.
  - .3 Arrange for Departmental Representative to witness tests.
  - .4 Obtain written approval of test results and documentation from Departmental Representative before delivery to site.



- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative
  - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
  - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
- .3 Integrity of warranties:
  - .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
  - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
  - .1 Experienced in design, installation and operation of equipment and systems.
  - .2 Ability to interpret test results accurately.
  - .3 To report results in clear, concise, logical manner.

#### **1.14 PROCEDURES**

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
  - .1 Included in delivery and installation:
    - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
    - .2 Visual inspection of quality of installation.
  - .2 Start-up: follow accepted start-up procedures.
  - .3 Operational testing: document equipment performance.
  - .4 System PV: include repetition of tests after correcting deficiencies.
  - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.
- .4 Document require tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
  - .1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.
  - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.
  - .3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
    - .1 Rejected equipment to be remove from site and replace with new.

- .2 Subject new equipment/systems to specified start-up procedures.

**1.15 START-UP DOCUMENTATION**

- .1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.
- .2 Start-up documentation to include:
  - .1 Factory and on-site test certificates for specified equipment.
  - .2 Pre-start-up inspection reports.
  - .3 Signed installation/start-up check lists.
  - .4 Start-up reports,
  - .5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

**1.16 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS**

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

**1.17 TEST RESULTS**

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

**1.18 START OF COMMISSIONING**

- .1 Notify Departmental Representative at least 21 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

**1.19 INSTRUMENTS / EQUIPMENT**

- .1 Submit to Departmental Representative for review and approval:
  - .1 Complete list of instruments proposed to be used.
  - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .2 Provide the following equipment as required:
  - .1 2-way radios.
  - .2 Ladders.

- .3 Equipment as required to complete work.

## **1.20 COMMISSIONING PERFORMANCE VERIFICATION**

- .1 Carry out Cx:
  - .1 Under accepted simulated operating conditions, over entire operating range, in all modes.
  - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

## **1.21 WITNESSING COMMISSIONING**

- .1 Departmental Representative to witness activities and verify results.

## **1.22 AUTHORITIES HAVING JURISDICTION**

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to Departmental Representative within 5 days of test and with Cx report.

## **1.23 COMMISSIONING CONSTRAINTS**

- .1 Since access into secure or sensitive areas will be very difficult after occupancy it is necessary to complete Cx of occupancy, weather, and seasonal sensitive equipment and systems in these areas before issuance of the Interim Certificate, using, if necessary, simulated thermal loads.

## **1.24 EXTRAPOLATION OF RESULTS**

- .1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

## **1.25 EXTENT OF VERIFICATION**

- .1 Elsewhere:
  - .1 Provide manpower and instrumentation to verify up to 30 % of reported results, unless specified otherwise in other sections.
- .2 Number and location to be at discretion of Departmental Representative.
- .3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

- .4 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.
- .5 Perform additional commissioning until results are acceptable to Departmental Representative.

**1.26 REPEAT VERIFICATIONS**

- .1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:
  - .1 Verification of reported results fail to receive Departmental Representative's approval.
  - .2 Repetition of second verification again fails to receive approval.
  - .3 Departmental Representative deems Contractor's request for second verification was premature.

**1.27 SUNDRY CHECKS AND ADJUSTMENTS**

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

**1.28 DEFICIENCIES, FAULTS, DEFECTS**

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.
- .2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

**1.29 COMPLETION OF COMMISSIONING**

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

**1.30 ACTIVITIES UPON COMPLETION OF COMMISSIONING**

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

**1.31 TRAINING**

- .1 In accordance with Section 01 91 41 - Commissioning (Cx) - Training.

**1.32 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS**

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

**1.33 OCCUPANCY**

- .1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.

**1.34 INSTALLED INSTRUMENTATION**

- .1 Use instruments installed under Contract for TAB and PV if:
  - .1 Accuracy complies with these specifications.
  - .2 Calibration certificates have been deposited with Departmental Representative.
- .2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

**1.35 PERFORMANCE VERIFICATION TOLERANCES**

- .1 Application tolerances:
  - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
- .2 Instrument accuracy tolerances:
  - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
  - .1 Unless otherwise specified actual values to be within +/- 2% of recorded values.

**1.36 OWNER'S PERFORMANCE TESTING**

- .1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

**Part 2 Products**

**2.1 NOT USED**

**Part 3 Execution**

**3.1 NOT USED**

**END OF SECTION**



**Part 1 General**

**1.1 SUMMARY**

- .1 Section Includes:
  - .1 Description of overall structure of Cx Plan and roles and responsibilities of Cx team.

**1.2 REFERENCES**

- .1 American Water Works Association (AWWA)
- .2 National Fire Protection Association (NFPA)
  - .1 NFPA-13, Installation of Sprinkler Systems Handbook.
  - .2 NFPA-14, Automatic Sprinkler Systems Handbook.
  - .3 NFPA-20, Standard for the Installation of Stationary Fire Pumps for Fire Protection.
- .3 Public Works and Government Services Canada (PWGSC)
  - .1 PWGSC - Commissioning Guidelines CP.4 -3rd edition.
- .4 Underwriters' Laboratories of Canada (ULC)

**1.3 GENERAL**

- .1 Provide a fully functional facility:
  - .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
  - .2 Facility user and O M personnel have been fully trained in aspects of installed systems.
  - .3 Optimized life cycle costs.
  - .4 Complete documentation relating to installed equipment and systems.
- .2 Term "Cx" in this section means "Commissioning".
- .3 Use this Cx Plan as master planning document for Cx:
  - .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
  - .2 Communicates responsibilities of team members involved in Cx Scheduling, documentation requirements, and verification procedures.
  - .3 Sets out deliverables relating to O M, process and administration of Cx.
  - .4 Describes process of verification of how built works meet design requirements.
  - .5 Produces a complete functional system prior to issuance of Certificate of Occupancy.
  - .6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:

- .1 Overview of Cx.
- .2 General description of elements that make up Cx Plan.
- .3 Process and methodology for successful Cx.
- .4 Acronyms:
  - .1 Cx - Commissioning.
  - .2 BMM - Building Management Manual.
  - .3 EMCS - Energy Monitoring and Control Systems.
  - .4 MSDS - Material Safety Data Sheets.
  - .5 PI - Product Information.
  - .6 PV - Performance Verification.
  - .7 TAB - Testing, Adjusting and Balancing.
  - .8 WHMIS - Workplace Hazardous Materials Information System.
- .5 Commissioning terms used in this Section:
  - .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
  - .2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

#### **1.4 DEVELOPMENT OF 100% CX PLAN**

- .1 Cx Plan to be 95% completed before added into Project Specifications.
- .2 Cx Plan to be 100% completed within 8 weeks of award of contract to take into account:
  - .1 Approved shop drawings and product data.
  - .2 Approved changes to contract.
  - .3 Contractor's project schedule.
  - .4 Cx schedule.
  - .5 Contractor's, sub-contractor's, suppliers' requirements.
  - .6 Project construction team's and Cx team's requirements.
- .3 Submit completed Cx Plan to Departmental Representative and obtain written approval.

#### **1.5 REFINEMENT OF CX PLAN**

- .1 During construction phase, revise, refine and update Cx Plan to include:
  - .1 Changes resulting from Client program modifications.
  - .2 Approved design and construction changes.
- .2 Revise, refine and update every 6 weeks during construction phase. At each revision, indicate revision number and date.
- .3 Submit each revised Cx Plan to Departmental Representative for review and obtain written approval.
- .4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.



## **1.6 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM**

- .1 Departmental Representative to maintain overall responsibility for project and is sole point of contact between members of commissioning team.
- .2 Project Manager will select Cx Team consisting of following members:
  - .1 PWGSC Design Quality Review Team: during construction, will conduct periodic site reviews to observe general progress.
  - .2 PWGSC Quality Assurance Commissioning Manager: ensures Cx activities are carried out to ensure delivery of a fully operational project including:
    - .1 Review of Cx documentation from operational perspective.
    - .2 Review for performance, reliability, durability of operation, accessibility, maintainability, operational efficiency under conditions of operation.
    - .3 Protection of health, safety and comfort of occupants and O M personnel.
    - .4 Monitoring of Cx activities, training, development of Cx documentation.
    - .5 Work closely with members of Cx Team.
  - .3 Departmental Representative is responsible for:
    - .1 Organizing Cx.
    - .2 Monitoring operations Cx activities.
    - .3 Witnessing, certifying accuracy of reported results.
    - .4 Witnessing and certifying TAB and other tests.
    - .5 Developing BMM.
    - .6 Ensuring implementation of final Cx Plan.
    - .7 Performing verification of performance of installed systems and equipment.
    - .8 Implementation of Training Plan.
  - .4 Construction Team: contractor, sub-contractors, suppliers and support disciplines, is responsible for construction/installation in accordance with contract documents, including:
    - .1 Testing.
    - .2 TAB.
    - .3 Performance of Cx activities.
    - .4 Delivery of training and Cx documentation.
    - .5 Assigning one person as point of contact with Consultant and PWGSC Cx Manager for administrative and coordination purposes.
  - .5 Contractor's Cx agent implements specified Cx activities including:
    - .1 Demonstrations.
    - .2 Training.
    - .3 Testing.
    - .4 Preparation, submission of test reports.
  - .6 Property Manager: represents lead role in Operation Phase and onwards and is responsible for:
    - .1 Receiving facility.

.2 Day-To-Day operation and maintenance of facility.

### 1.7 CX PARTICIPANTS

- .1 Employ the following Cx participants to verify performance of equipment and systems:
  - .1 Installation contractor/subcontractor:
    - .1 Equipment and systems except as noted.
  - .2 Equipment manufacturer: equipment specified to be installed and started by manufacturer.
    - .1 To include performance verification.
  - .3 Specialist subcontractor: equipment and systems supplied and installed by specialist subcontractor.
  - .4 Specialist Cx agency:
    - .1 Possessing specialist qualifications and installations providing environments essential to client's program but are outside scope or expertise of Cx specialists on this project.
  - .5 Client: responsible for intrusion and access security systems.
  - .6 Ensure that Cx participant:
    - .1 Could complete work within scheduled time frame.
    - .2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O M personnel, including:
      - .1 Modify ventilation rates to meet changes in off-gassing.
      - .2 Changes to heating or cooling loads beyond scope of EMCS.
      - .3 Changes to EMCS control strategies beyond level of training provided to O M personnel.
      - .4 Redistribution of electrical services.
      - .5 Modifications of fire alarm systems.
      - .6 Modifications to voice communications systems.
  - .7 Provide names of participants to Departmental Representative and details of instruments and procedures to be followed for Cx 3 months prior to starting date of Cx for review and approval.

### 1.8 EXTENT OF CX

- .1 Cx Structural and Architectural Systems:
  - .1 Equipment:
    - .1 Kitchen equipment installed under contract.
- .2 Commission mechanical systems and associated equipment:
  - .1 Plumbing systems:
    - .1 Domestic CWS and HWS.
    - .2 Regular sanitary waste systems.

- .2 HVAC and exhaust systems:
  - .1 HVAC systems.
  - .2 General exhaust systems.
- .3 Fire and life safety systems:
  - .1 Special fire suppression systems
  - .2 Wet pipe sprinkler systems.
- .4 IAQ environmental control systems:
  - .1 Indoor conditions in areas listed herein:
- .3 Commission electrical systems and equipment:
  - .1 Low voltage below 750 V:
    - .1 Low voltage equipment.
    - .2 Low voltage distribution systems.
  - .2 Lighting systems:
    - .1 Lighting equipment.
    - .2 Distribution systems.
    - .3 Emergency lighting systems, including battery packs.
    - .4 Fire exit emergency signage.
  - .3 Fire alarm systems, equipment:
    - .1 Annunciators.
    - .2 Control panels.
    - .3 Fire alarm battery banks.
  - .4 Other systems and equipment:
    - .1 Intrusion and access security and safety systems as follows:

## **1.9 DELIVERABLES RELATING TO O M PERSPECTIVES**

- .1 General requirements:
  - .1 Compile English or French documentation.
  - .2 Documentation to be computer-compatible format ready for inputting for data management.
- .2 Provide deliverables:
  - .1 Warranties.
  - .2 Project record documentation.
  - .3 Inventory of spare parts, special tools and maintenance materials.
  - .4 Maintenance Management System (MMS) identification system used.
  - .5 WHMIS information.
  - .6 MSDS data sheets.
  - .7 Electrical Panel inventory containing detailed inventory of electrical circuitry for each panel board. Duplicate of inventory inside each panel.

## **1.10 DELIVERABLES RELATING TO THE CX PROCESS**

- .1 General:
  - .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.
- .2 Definitions:
  - .1 Cx as used in this section includes:
    - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
    - .2 Factory inspections and performance verification tests.
- .3 Deliverables: provide:
  - .1 Cx Specifications.
  - .2 Startup, pre-Cx activities and documentation for systems, and equipment.
  - .3 Completed installation checklists (ICL).
  - .4 Completed product information (PI) report forms.
  - .5 Completed performance verification (PV) report forms.
  - .6 Results of Performance Verification Tests and Inspections.
  - .7 Description of Cx activities and documentation.
  - .8 Description of Cx of integrated systems and documentation.
  - .9 Tests of following witnessed by PWGSC Design Quality Review Team:
  - .10 Tests performed by Owner.
  - .11 Training Plans.
  - .12 Cx Reports.
  - .13 Prescribed activities during warranty period.
- .4 Departmental Representative to witness and certify tests and reports of results provided to Departmental Representative.
- .5 Departmental Representative to participate.

## **1.11 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION**

- .1 Items listed in this Cx Plan include the following:
  - .1 Pre-Start-Up inspections: by Departmental Representative prior to permission to start up and rectification of deficiencies to Departmental Representative's satisfaction.
  - .2 Departmental Representative to use approved check lists.
  - .3 Departmental Representative will monitor[some] [all] of these pre-start-up inspections.
  - .4 Include completed documentation with Cx report.
  - .5 Conduct pre-start-up tests: conduct pressure, static, flushing, cleaning, and "bumping" during construction as specified in technical sections. To be witnessed and certified by Departmental Representative and does not form part of Cx specifications.

- .6 Departmental Representative will monitor some of these inspections and tests.
- .7 Include completed documentation in Cx report.
- .2 Pre-Cx activities - MECHANICAL:
  - .1 Plumbing systems:
    - .1 "Bump" each item of equipment in its "stand-alone" mode.
    - .2 Complete pre-start-up checks and complete relevant documentation.
    - .3 After equipment has been started, test related systems in conjunction with control systems on a system-by-system basis.
  - .2 HVAC equipment and systems:
    - .1 "Bump" each item of equipment in its "stand-alone" mode.
    - .2 At this time, complete pre-start-up checks and complete relevant documentation.
    - .3 After equipment has been started, test related systems in conjunction with control systems on a system-by-system basis.
    - .4 Perform TAB on systems. TAB reports to be approved by Departmental Representative.
  - .3 EMCS:
    - .1 EMCS trending to be available as supporting documentation for performance verification.
    - .2 Perform point-by-point testing in parallel with start-up.
    - .3 Carry out point-by-point verification.
    - .4 Demonstrate performance of systems, to be witnessed by Departmental Representative prior to start of 30 day Final Acceptance Test period.
    - .5 Perform final Cx and operational tests during demonstration period and 30 day test period.
    - .6 Only additional testing after foregoing have been successfully completed to be "Off-Season Tests".
- .3 Pre-Cx activities - LIFE SAFETY SYSTEMS
  - .1 Include equipment and systems identified above.
  - .2 Reports of test results to be witnessed and certified by Departmental Representative before verification.
- .4 Pre-Cx activities - ELECTRICAL:
  - .1 Low voltage distribution systems under 750 V:
    - .1 Requires independent testing agency to perform pre- energization and post-energization tests.
  - .2 Lighting systems:
    - .1 Emergency lighting systems:
      - .1 Tests to include verification of lighting levels and coverage, initially by disrupting normal power.
  - .3 Fire alarm systems: test after other safety and security systems are completed. Testing to include a complete verification in accordance with ULC requirements.

Departmental Representative has witnessed and certified report, demonstrate devices and zones to Departmental Representative.

- .4 Low voltage systems: these include:
  - .1 Clock, communications, low voltage lighting control systems and data communications systems.
  - .2 Special systems such as Simultaneous Translation systems, MPs Call systems, Messenger Call systems.
- .5 Security, surveillance and intrusion alarm systems: to include verification by Departmental Representative.
- .6 Lightning protection systems.
- .7 Watchman's tour systems.

### **1.12 START-UP**

- .1 Start up components, equipment and systems.
- .2 Equipment manufacturer, supplier, installing specialist sub-contractor, as appropriate, to start-up, under Contractor's direction, equipment and systems:
- .3 Departmental Representative to monitor some of these start-up activities.
  - .1 Rectify start-up deficiencies to satisfaction of Departmental Representative.
- .4 Performance Verification (PV):
  - .1 Approved Cx Agent to perform.
    - .1 Repeat when necessary until results are acceptable to Departmental Representative.
    - .2 Use procedures modified generic procedures to suit project requirements.
    - .3 Departmental Representative to witness and certify reported results using approved PI and PV forms.
    - .4 Departmental Representative to approve completed PV reports and provide to Departmental Representative.
    - .5 Departmental Representative reserves right to verify up to 30% of reported results at random.
    - .6 Failure of randomly selected item shall result in rejection of PV report or report of system startup and testing.

### **1.13 CX ACTIVITIES AND RELATED DOCUMENTATION**

- .1 Perform Cx by specified Cx agency using procedures developed by Departmental Representative and approved by Departmental Representative.
- .2 Departmental Representative to monitor Cx activities.
- .3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.
- .4 Departmental Representative to witness, certify reported results of, Cx activities and forward to Departmental Representative.
- .5 Departmental Representative reserves right to verify a percentage of reported results at no cost to contract.

**1.14 CX OF INTEGRATED SYSTEMS AND RELATED DOCUMENTATION**

- .1 Cx to be performed by specified Cx specialist, using procedures developed by Departmental Representative and approved by Departmental Representative.
- .2 Tests to be witnessed by Departmental Representative and documented on approved report forms.
- .3 Upon satisfactory completion, Cx specialist to prepare Cx Report, to be certified by Departmental Representative and submitted to Departmental Representative for review.
- .4 Departmental Representative reserves right to verify percentage of reported results.
- .5 Integrated systems to include:
  - .1 HVAC and associated systems forming part of integrated HVAC systems.
  - .2 Environmental space conditions.
  - .3 Fire alarm systems.
  - .4 Voice communications systems.
  - .5 Emergency lighting systems.
- .6 Identification:
  - .1 In later stages of Cx, before hand-over and acceptance Departmental Representative, Contractor and Cx Manager to co-operate to complete inventory data sheets and provide assistance to PWGSC in full implementation of MMS identification system of components, equipment, sub-systems, systems.

**1.15 INSTALLATION CHECK LISTS (ICL)**

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

**1.16 PRODUCT INFORMATION (PI) REPORT FORMS**

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

**1.17 PERFORMANCE VERIFICATION (PV) REPORT**

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

**1.18 DELIVERABLES RELATING TO ADMINISTRATION OF CX**

- .1 General:
  - .1 Because of risk assessment, complete Cx of occupancy, weather and seasonal-sensitive equipment and systems in these areas before building is occupied.

**1.19 CX SCHEDULES**

- .1 Prepare detailed critical path Cx Schedule and submit to Departmental Representative for review and approval same time as project Construction Schedule. Include:
  - .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:

- .1 Design criteria, design intents.
- .2 Pre-TAB review: 28 days after contract award, and before construction starts.
- .3 Cx agents' credentials: 60 days before start of Cx.
- .4 Cx procedures: 3 months after award of contract.
- .5 Cx Report format: 3 months after contract award.
- .6 Discussion of heating/cooling loads for Cx: 3 months before start-up.
- .7 Submission of list of instrumentation with relevant certificates: 21 days before start of Cx.
- .8 Notification of intention to start TAB: 21 days before start of TAB.
- .9 TAB: after successful start-up, correction of deficiencies and verification of normal and safe operation.
- .10 Notification of intention to start Cx: 14 days before start of Cx.
- .11 Notification of intention to start Cx of integrated systems: after Cx of related systems is completed 14 days before start of integrated system Cx.
- .12 Identification of deferred Cx.
- .13 Implementation of training plans.
- .14 Cx reports: immediately upon successful completion of Cx.
- .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to Property Manager.
- .3 6 months in Cx schedule for verification of performance in all seasons and wear conditions.
- .2 After approval, incorporate Cx Schedule into Construction Schedule.
- .3 Consultant, Contractor, Contractor's Cx agent, and Departmental Representative will monitor progress of Cx against this schedule.

## **1.20 CX REPORTS**

- .1 Submit reports of tests, witnessed and certified by Departmental Representative to Departmental Representative who will verify reported results.
- .2 Include completed and certified PV reports in properly formatted Cx Reports.
- .3 Before reports are accepted, reported results to be subject to verification by Departmental Representative.

## **1.21 ACTIVITIES DURING WARRANTY PERIOD**

- .1 Cx activities must be completed before issuance of Interim Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period, including:
  - .1 Fine tuning of HVAC systems.
  - .2 Adjustment of ventilation rates to promote good indoor air quality and reduce deleterious effects of VOCs generated by off-gassing from construction materials and furnishings.
  - .3 Full-scale emergency evacuation exercises.



**1.22 TRAINING PLANS**

- .1 Refer to Section 01 91 41 - Commissioning (Cx) - Training]

**1.23 FINAL SETTINGS**

- .1 Upon completion of Cx to satisfaction of Departmental Representative lock control devices in their final positions, indelibly mark settings marked and include in Cx Reports.

**Part 2 Products**

**2.1 NOT USED**

**Part 3 Execution**

**3.1 NOT USED**

**END OF SECTION**



**Part 1            General**

**1.1                SUMMARY**

- .1        Section Includes:
  - .1        Commissioning forms to be completed for equipment, system and integrated system.

**1.2                INSTALLATION/START-UP CHECK LISTS**

- .1        Include the following data:
  - .1        Product manufacturer's installation instructions and recommended checks.
  - .2        Special procedures as specified in relevant technical sections.
  - .3        Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
- .2        Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Departmental Representative supplemental additional data lists will be required for specific project conditions.
- .3        Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.
- .4        Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to Departmental Representative]. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project.
- .5        Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

**1.3                PRODUCT INFORMATION (PI) REPORT FORMS**

- .1        Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.
- .2        Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain Departmental Representative's approval.

**1.4                PERFORMANCE VERIFICATION (PV) FORMS**

- .1        PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.
- .2        PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.

- .3 Prior to PV of integrated system, complete PV forms of related systems and obtain Departmental Representative's approval.

## **1.5 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS**

- .1 When additional forms are required, but are not available from Departmental Representative develop appropriate verification forms and submit to Departmental Representative for approval prior to use.
  - .1 Additional commissioning forms to be in same format as provided by Departmental Representative

## **1.6 COMMISSIONING FORMS**

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
  - .1 Departmental Representative provides Contractor project-specific Commissioning forms with Specification data included.
  - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
  - .3 Confirm operation as per design criteria and intent.
  - .4 Identify variances between design and operation and reasons for variances.
  - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
  - .6 Record analytical and substantiating data.
  - .7 Verify reported results.
  - .8 Form to bear signatures of recording technician and reviewed and signed off by Departmental Representative.
  - .9 Submit immediately after tests are performed.
  - .10 Reported results in true measured SI unit values.
  - .11 Provide Departmental Representative with originals of completed forms.
  - .12 Maintain copy on site during start-up, testing and commissioning period.
  - .13 Forms to be both hard copy and electronic format with typed written results in Building Management Manual in accordance with Section 01 91 51 - Building Management Manual (BMM).

## **1.7 LANGUAGE**

- .1 To suit the language profile of the awarded contract.

**Part 2            Products**

**2.1                NOT USED**

**Part 3            Execution**

**3.1                NOT USED**

**END OF SECTION**



**Part 1 General**

**1.1 SUMMARY**

- .1 Section Includes:
  - .1 This Section specifies roles and responsibilities of Commissioning Training.

**1.2 TRAINEES**

- .1 Trainees: personnel selected for operating and maintaining this facility. Includes Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

**1.3 INSTRUCTORS**

- .1 Departmental Representative will provide:
  - .1 Descriptions of systems.
  - .2 Instruction on design philosophy, design criteria, and design intent.
- .2 Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
  - .1 Start-Up, operation, shut-down of equipment, components and systems.
  - .2 Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
  - .3 Instructions on servicing, maintenance and adjustment of systems, equipment and components.
- .3 Contractor and equipment manufacturer to provide instruction on:
  - .1 Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

**1.4 TRAINING OBJECTIVES**

- .1 Training to be detailed and duration to ensure:
  - .1 Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
  - .2 Effective on-going inspection, measurements of system performance.
  - .3 Proper preventive maintenance, diagnosis and trouble-shooting.
  - .4 Ability to update documentation.
  - .5 Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

**1.5 TRAINING MATERIALS**

- .1 Instructors to be responsible for content and quality.

- .2 Training materials to include:
  - .1 "As-Built" Contract Documents.
  - .2 Operating Manual.
  - .3 Maintenance Manual.
  - .4 Management Manual.
  - .5 TAB and PV Reports.
- .3 Project Manager, Commissioning Manager and Facility Manager will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to same degree of detail.
- .5 Supplement training materials:
  - .1 Transparencies for overhead projectors.
  - .2 Multimedia presentations.
  - .3 Manufacturer's training videos.
  - .4 Equipment models.

## **1.6 SCHEDULING**

- .1 Include in Commissioning Schedule time for training.
- .2 Deliver training during regular working hours, training sessions to be 3 hours in length.
- .3 Training to be completed prior to acceptance of facility.

## **1.7 RESPONSIBILITIES**

- .1 Be responsible for:
  - .1 Implementation of training activities,
  - .2 Coordination among instructors,
  - .3 Quality of training, training materials,
- .2 Departmental Representative will evaluate training and materials.
- .3 Upon completion of training, provide written report, signed by Instructors, witnessed by Departmental Representative.

## **1.8 TRAINING CONTENT**

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.
- .2 Content includes:
  - .1 Review of facility and occupancy profile.
  - .2 Functional requirements.
  - .3 System philosophy, limitations of systems and emergency procedures.
  - .4 Review of system layout, equipment, components and controls.
  - .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.



- .6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
  - .7 Maintenance and servicing.
  - .8 Trouble-shooting diagnosis.
  - .9 Inter-Action among systems during integrated operation.
  - .10 Review of O M documentation.
- .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

**1.9 VIDEO-BASED TRAINING**

- .1 Manufacturer's videotapes to be used as training tool with Departmental Representative's review and written approval 3 months prior to commencement of scheduled training.
- .2 On-Site training videos:
  - .1 Videotape training sessions for use during future training.
  - .2 To be performed after systems are fully commissioned.
  - .3 Organize into several short modules to permit incorporation of changes.
- .3 Production methods to be professional quality.

**Part 2 Products**

**2.1 NOT USED**

**Part 3 Execution**

**3.1 NOT USED**

**END OF SECTION**



## **Part 1        General**

### **1.1            SUMMARY**

- .1    Section Includes:
  - .1        This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.
- .2    Acronyms:
  - .1        BMM - Building Management Manual.
  - .2        Cx - Commissioning.
  - .3        HVAC - Heating, Ventilation and Air Conditioning.
  - .4        PI - Product Information.
  - .5        PV - Performance Verification.
  - .6        TAB - Testing, Adjusting and Balancing.
  - .7        WHMIS - Workplace Hazardous Materials Information System.

### **1.2            GENERAL REQUIREMENTS**

- .1    Standard letter size paper 216 mm x 279 mm.
- .2    Methodology used to facilitate updating.
- .3    Drawings, diagrams and schematics to be professionally developed.
- .4    Electronic copy of data to be in a format accepted and approved by Departmental Representative.

### **1.3            APPROVALS**

- .1    Prior to commencement, co-ordinate requirements for preparation, submission and approval with Departmental Representative.

### **1.4            GENERAL INFORMATION**

- .1    Provide Departmental Representative the following for insertion into appropriate Part and Section of BMM:
  - .1        Complete list of names, addresses, telephone and fax numbers of contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.
  - .2        Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of BMM.
    - .1            Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.
  - .3        Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.
  - .4        System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM..

- .5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.
- .6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.
- .7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.
- .8 Operating and maintenance manual - Section 3.2 of BMM.
- .9 Final commissioning plan as actually implemented.
- .10 Completed commissioning checklists.
- .11 Commissioning test procedures employed.
- .12 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Departmental Representative.
- .13 Commissioning reports.

## **1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL**

- .1 For detailed requirements refer to Section 01 78 00 - Closeout Submittals.
- .2 Departmental Representative to review and approve format and organization within 12 weeks of award of contract.
- .3 Include original manufactures brochures and written information on products and equipment installed on this project.
- .4 Record and organize for easy access and retrieval of information contained in BMM.
- .5 Include completed PI report forms, data and information from other sources as required.
- .6 Inventory directory relating to information on installed systems, equipment and components.
- .7 Approved project shop-drawings, product and maintenance data.
- .8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O M, shutdown and training materials.
- .9 Inventory and location of spare parts, special tools and maintenance materials.
- .10 Warranty information.
- .11 Inspection certificates with expiration dates, which require on-going re-certification inspections.
- .12 Maintenance program supporting information including:
  - .1 Recommended maintenance procedures and schedule.
  - .2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

## **1.6 LIFE SAFETY COMPLIANCE (LSC) MANUAL**

- .1 Samples of LSC Manual will be available from Departmental Representative.

- .2 Content of Manual:
  - .1 All possible Emergency situations modes including: presence of fire and smoke, power failure, lose of water or pressure, chemical spills and refrigerant release.
  - .2 Failure of elevators and escalators.
  - .3 HVAC emergencies and fuel supply failures.
  - .4 Intrusion and security breach.
  - .5 Emergency provisions for natural disasters, bomb threats and other disruptive situations.
  - .6 Dedicated emergency generators for high security projects, medical facilities and computer systems.
  - .7 Emergency control procedures for fire, power and major equipment failure.
  - .8 Emergency contacts and numbers.
  - .9 Manual to be readily available and comprehensible to non- technical readers.

## **1.7 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES**

- .1 Provide Departmental Representative supporting documentation relating to installed equipment and system, including:
  - .1 General:
    - .1 Finalized commissioning plan.
    - .2 WHMIS information manual.
    - .3 Approved "as-built" drawings and specifications.
    - .4 Procedures used during commissioning.
    - .5 Cross-Reference to specification sections.
  - .2 Architectural and structural:
    - .1 Inspection certificates, construction permits.
    - .2 Roof anchor log books.
    - .3 PV reports.
  - .3 Fire prevention, suppression and protection:
    - .1 Test reports.
    - .2 Smoke test reports.
    - .3 PV reports.
  - .4 Mechanical:
    - .1 Installation permits, inspection certificates.
    - .2 Piping pressure test certificates.
    - .3 Ducting leakage test reports.
    - .4 TAB and PV reports.
    - .5 Charts of valves and steam traps.
    - .6 Copies of posted instructions.
  - .5 Electrical:
    - .1 Installation permits, inspection certificates.

- .2 TAB and PV reports.
  - .3 Electrical work log book.
  - .4 Charts and schedules.
  - .5 Locations of cables and components.
  - .6 Copies of posted instructions.
- .2 Assist Departmental Representative with preparation of BMM.

**1.8 LANGUAGE**

- .1 English and French Language to be in separate binders.

**1.9 USE OF CURRENT TECHNOLOGY**

- .1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.
- .2 Obtain Departmental Representative's approval before starting Work.

**Part 2 Products**

**2.1 NOT USED**

**Part 3 Execution**

**3.1 NOT USED**

**END OF SECTION**

## **PART 1 – GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 04 04 99 – Masonry for minor works.
- .2 Division 23 - HVCA

### **1.2 REFERENCES**

- .1 CSA International
  - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures and 01 74 21 - Construction/Demolition Waste Management Disposal.
- .2 Submit demolition drawings:
  - .1 Submit for review and approval by Departmental Representative shoring and underpinning drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec Canada, showing proposed method.

### **1.4 SITE CONDITIONS**

- .1 Review "Designated Substance Report" and take precautions to protect environment.
- .2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.
  - .1 Proceed only after receipt of written instructions have been received from Departmental Representative.
- .3 Notify Departmental Representative before disrupting [building] access or services.

## **PART 2 – PRODUCTS**

### **2.1 NOT USED**

- .1 Not used.

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- .1 Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
  - .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
  - .3 Notify and obtain approval of utility companies before starting demolition.
-

- .4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
  - .1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.
  - .2 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

### 3.2 PREPARATION

- .1 Protection of In-Place Conditions:
  - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, landscaping features, and parts of building to remain in place. Provide bracing and shoring required.
  - .2 Keep noise, dust, and inconvenience to occupants to minimum.
  - .3 Protect building systems, services and equipment.
  - .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
  - .5 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Demolition/Removal:
  - .1 Remove items as indicated.
  - .2 Cut at a right angle adjacent areas of existing floor slabs not affected by the work, by a saw or other means approved by the Departmental Representative.
  - .3 Remove parts of existing building to permit new construction.
  - .4 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

### 3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

---



## **PART 1 - GENERAL**

### **1.1 GENERAL CLAUSES**

- .1 General Clauses and Complementary General Clauses apply to works described in this section.

### **1.2 RELATED WORKS**

- .1 Concrete reinforcement Section 03 20 00
- .2 Cast-in-place concrete Section 03 30 00

### **1.3 REFERENCE STANDARDS**

- .1 Unless otherwise noted, do concrete formwork in accordance with latest following standards:
  - .1 National Building Code.
  - .2 AC1 347 "Recommended Practice for concrete formwork".
  - .3 CAN3-A23 Series.
  - .4 CSA 0121.

### **1.4 SCOPE OF WORK**

- .1 Work will include all execution, necessary materials, equipment, tools, installation and services to complete all works relative to formwork for cast-in-place concrete (including concrete work indicated on mechanical/ electrical drawings), as established by drawings and defined by the present document. This includes scaffolding, braces, shores and struts, fasteners, templates, sleeves, openings, installation of anchors and steel structure bolts and installation of inserts in concrete. Installation of electrical and plumbing sleeves is included in the works of the present section.

### **1.5 DRAWING COORDINATION**

- .1 Check all details and dimensions shown on drawings and ensure conformity with architectural drawings. Report any omission or mistake before beginning work.
- .2 Advise structural Departmental representative of mechanical/ electrical sleeves or opening location not shown on his drawings.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 B.C. cedar plywood, grade "B", to CSA 0121 and CAN3-A23, with a minimum thickness of 20 mm in five (5) layers, must be used for formworks. A sheet of triplex of 6 mm thick is required for lining. Plywood may be epoxy painted (US Product Standard PS 1-66).
  - .2 Form release agent: chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.
-

- .3 Form ties: removable or snap-off metal ties, of fixed or adjustable length, free of devices leaving holes larger than 25 mm in diameter in concrete surface. The ties must have a resistance of 13 kN and will be designed so as to break inside the concrete, at 25 mm from the surface. In no case shall a twisted metal wire be used.

### **PART 3 - EXECUTION**

#### **3.1 TYPE, STRENGTH, STIFFNESS AND FORM ALIGNMENT**

- .1 Except where otherwise noted on drawings, formworks will be made of 20 mm thick plywood, without patches, for exposed horizontal surfaces.
- .2 Strength and stiffness of formworks must be sufficient to support all concrete and wind loads and shall support forces caused by construction method, considering pouring speed. Ensure that finished concrete will conform to shapes, lines and dimensions of members indicated on drawings.
- .3 Formworks will produce a dense concrete surface, exempt of honeycombs, depressions or bulges.
- .4 Check and correct corners and shoring, horizontally and vertically, during concrete placing. For wall concrete placing, provide a control steel wire, parallel to wall plan. Assign at least one competent carpenter to continually check formwork alignment during concrete placing. Special attention to be given to alignment of exterior apparent columns and beams.

#### **3.2 SHORING AND BRACING**

- .1 Formworks stability system must be continually maintained by sufficient bracing according to safety standards of rule No 1390 relative to shoring of concrete formworks.
- .2 Support, shore or reinforce all completed constructions where new construction loads will be applied.

#### **3.3 JOINTS IN FORMWORKS**

- .1 All joints must be watertight so as to prevent all concrete leaks particularly at corners and joints between two plates in apparent concrete. Do not use ribbon for architectural concrete. Reduce number of joints in formwork to a minimum.
- .2 Clean all sides and contact surfaces before assembling.

#### **3.4 FORMWORK CLEANING**

- .1 Clean all formworks before placing concrete. Completely remove sawdust, snow, ice or other foreign material by compressed air or by steam. Allow for cleaning holes in all inaccessible parts of formwork.

#### **3.5 FORMWORK SURFACES TREATMENT**

- .1 Use untreated formworks if concrete is to receive plaster or stucco finishing. If formworks are susceptible to be affected by shrinkage or water absorption, wet interior surfaces. Keep formworks wet before placing concrete.
-

### **3.6 MULTIPLE USE OF FORMWORKS**

- .1 Plywood and steel formworks can be re-used after all nails are removed and all contact surfaces are cleaned and restored. Conform to CAN3-A23.

### **3.7 DISMANTLING FORMWORK**

- .1 Except otherwise indicated on drawings, walls vertical formworks may be removed only when concrete is able to support its own weight but not before three days after placing concrete. If formwork dismantling is done before the 7th day after concrete placing, apply surface treatment with a protective coating against water evaporation. Refer to section 03300 for coating application.
- .2 Dismantling both sides of a construction joint on a distance equal to one and a half span is not permitted until concrete has attained 70% of its specified strength.
- .3 Forms and shores must be left in place until the concrete has attained sufficient strength to safely support its own weight combined with all construction loads likely to be imposed. Contractor is completely responsible for formwork dismantling and prevention of possible damages due to an early dismantling including possible excessive deflection.

### **3.8 VERTICAL TOLERANCES**

- .1 Relative position of vertical elements will conform to following requirements:
  - .1 The difference between two adjacent vertical elements will not exceed 12 mm and 25 mm between any two vertical elements.

### **3.9 CONCRETE DIMENSIONS**

- .1 Dimension variation, in relation with theoretical dimensions of any member, will not exceed the following limits: Less than 5 mm or more than 10 mm.
- .2 The Departmental representative may ask for formwork rectification if dimension variation exceed the limits defined in this document.

### **3.10 FORMWORK TIE HOLES**

- .1 Unless otherwise indicated in architectural documents, fill formwork tie holes with non-shrink mortar.

**FIN DE SECTION**

---



## **PART 1 - GENERAL**

### **1.1 GENERAL CLAUSES**

- .1 General Clauses and Complementary General Clauses apply to works described in this section.

### **1.2 RELATED WORKS**

- .1 Concrete formwork: Section 03 10 00
- .2 Cast-in-place concrete: Section 03 30 00

### **1.3 REFERENCE STANDARDS**

- .1 Do reinforcing work in accordance with latest CAN3-A23.3, CAN3-A23.1 and ACI-315 and welding of reinforcing with CSA W186-M1990, except where specified otherwise.

### **1.4 SUBSTITUTES**

- .1 Substitution of different size bars permitted only upon written approval of the Departmental representative.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Reinforcing steel: billet steel, grade 400, deformed bars to CSA G30.18 unless indicated otherwise.
- .2 Welded steel wire fabric: to CSA G30.5.
- .3 Chairs, bolsters, bar supports, spacers: to CAN3-A23.1. Chairs and supports as well as spacers to be plastified in apparent concrete.
- .4 Shrinkage reinforcement in slabs and reinforcement walls to be spliced with length specified in A23.3 but no shorter than 24 bar diameter.

### **2.2 FABRICATION**

- .1 Fabricate reinforcing in accordance with CAN3-A23.1. Bending of reinforcing bars shall be done according to the typical bending indicated on drawings.
  - .2 Reinforcing steel shall be fabricated within tolerances as defined by "Reinforcing Steel Manual of Standard Practice".
  - .3 Ship bundles of bar reinforcement, clearly identified in accordance with barlist.
-

### **PART 3 - EXECUTION**

#### **3.1 FIELD BENDING**

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

#### **3.2 PLACING REINFORCEMENT**

- .1 Place reinforcing steel as indicated on examined shop drawings and in accordance with CAN3-A23.1.
- .2 Obtain the Departmental representative's approval of reinforcing steel and position.
- .3 Clean all reinforcing steel prior to concreting.
- .4 Maintain reinforcing steel at 100 mm from edges and undowelled joints or as indicated in the general notes on structural drawings.
- .5 Reinforcing steel shall be placed exactly as shown on plans and indicated in these specifications. It shall be supported by enough chairs, bar supports or spacers and shall be firmly fastened so as to prevent any displacement until and during concrete placement in the formwork.
- .6 Footing and slab-on-grade reinforcing steel shall be supported by concrete blocks or other material approved by the Departmental representative.
- .7 Permissible divergence in the reinforcing steel position are:
  - .1 Transversely: , slabs, less than 600 mm deep: + 5 mm
  - .2 Longitudinally: + 10 mm

### **FIN DE SECTION**

---

## **PART 1 - GENERAL**

### **1.1 GENERAL CLAUSES**

- .1 General Clauses and Complementary General Clauses apply to works described in this section.

### **1.2 RELATED WORKS**

- .1 Concrete formwork Section 03 10 00
- .2 Concrete reinforcement Section 03 20 00

### **1.3 REFERENCE STANDARDS**

- .1 Do cast-in-place concrete work in accordance with CSA/CAN-A23.1, and testing in accordance with CSA/CAN-A23.2, except where specified otherwise.

### **1.4 QUALITY CONTROL**

- .1 Submit proposed quality control procedures for the Departmental representative's approval.

### **1.5 SCOPE OF WORK**

- .1 Provide all necessary labour, materials, equipment and tools for supply, transport, pouring cast-in-place, curing and protection of concrete, as prescribed on drawings and defined in these specifications, including: concrete, chemical admixtures, curing compound, protection, heating and cooling.

### **1.6 COORDINATION**

- .1 Obtain from other trades all necessary information and instructions concerning surface finishing, materials and anchors which could affect work under this section.

### **1.7 INSPECTION**

- .1 Collaborate with inspector and laboratory representative to facilitate their work.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Portland cement: type GU, to CSA A3001.
  - .2 Water: to CSA/CAN-A23.1.
  - .3 Aggregates: to CSA/CAN-A23.1. Coarse aggregates to be normal density.
  - .4 Air entraining admixture: to CSA/CAN-A3000 and A23.1/A23.2.
  - .5 Chemical admixtures: to CSA/CAN-A3000 and A23.1/A23.2. The Departmental representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
-

- .6 Dry pack: premixed or non premixed composition of non metallic aggregate, Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compression strength of 50 MPa at 28 days.
- .7 Curing compound: to CSA/CAN-A23.1.

## 2.2 MIXING AND DELIVERY

- .1 Except with special authorization from the Departmental representative, all concrete used for this project shall be the product of an approved ready-mix-plant.

Each load of concrete shall be accompanied by a delivery ticket stating the strength of mix of the concrete, the slump, the maximum size of the coarse aggregate, the admixtures and the time when the ready-mixed concrete was loaded into the delivery truck.

Measuring, mixing and shipment practices shall conform to the latest CSA A23.1 and ASTM C94 specifications.

Each class of concrete shall have the required compressive strength at 28 days as specified on structural drawings.

- .2 The water-cement ratio must be determined by taking into consideration the compressive strength at 28 days, the grading of the aggregates, the slump as well as the amount of entrained air. However, unless otherwise noted or approved by Engineer, the water-cement ratio for each class of concrete shall conform to the values recommended in sections 14 and 15 of the latest A23.1 specification. In no case, shall the water-cement ratio exceed 0,60.

The average of all tests for compressive strength at 28 days for each class of concrete must be greater than or equal to the required strength and not more than 10 per cent of the tests shall have values of less than the required strength.

The average of any five (5) consecutive strength tests, must be equal to or greater than the specified strength. In no case shall a single test be less than 85% of the required strength.

If the concrete should fail to meet these requirements, the Departmental representative shall have the right to order changes in the mix proportions.

In addition, he may require at the Contractor's expense, the following tests:

- .1 A core specimen drilled from the structure and tested in accordance with good practice to verify the compressive strength.
- .2 Load testing of the structural element in accordance with the National Building Code to ascertain if it can carry the load it was designed for.
- .3 Except where otherwise noted on the drawings or in these specifications, the concrete shall have the following slump:

Type of elements	Slump in mm
Beams, columns and structural slabs:	80
Massive works:	40
Others:	80



The slumps specified above are these obtained by the standard slump test as described in specification A23.2-5C.

Permissible tolerances in slump are 20 mm more or less than the specified value. Concrete not satisfying these standards shall be refused.

.4 No addition of water to ready-mix concrete will be tolerated at the building-site. All concrete to which water has been added, shall be refused.

.5 Concrete submitted to conditions of severe weathering such as exterior walls, slabs or stairs, shall contain an amount of 6% of entrained air.

An air entraining agent shall be added to the mix in a manner that the concrete will reach the required air content at the building-site.

A variation of 1% more or less in tests for air content shall be acceptable.

.6 A set retarding admixture may be added to the mix only when specified on the drawings or in this specification or with the Departmental representative's approval. However, when the ambient temperature is warm or when the placing of concrete conditions are difficult or delicate, the Departmental representative may require that a set-retarding agent be added to the mix in order to ease the placing of concrete.

### **2.3 CONCRETE MIX PROPORTIONS**

.1 Approvals will not free Contractor from responsibility for manageability and final strength of each class of concrete.

.2 Contractor must change concrete mix proportions if strength, slump, air content or/and hardening do not conform to establish values.

.3 All mix proportions will provide a uniform, malleable concrete with strength, slump, air content and hardening that conform to limits indicated in the present document.

.4 Aggregates maximum size shall conform to A23.1.

.5 Strength shall be as indicated on structural drawings.

.6 Reducing water admixture, if required, will be added to mix, according to approved percentage.

## **PART 3 - EXECUTION**

### **3.1 WORKMANSHIP**

.1 Concrete placing shall conform to this specification and the latest CSA/CAN-A23.1 and ACI specifications. Concrete placing shall be done by qualified and experienced workmen.

.2 Do not start concrete placing before formwork and reinforcing steel have been inspected by the Departmental representative. Notify the Departmental representative at least 24 hours in advance.

.3 Place concrete with adequate mechanical equipment, in order to control the concreting sessions.

.4 Flush all equipment used in transporting and placing of the concrete with water before and after each use. Discharge water used for this purpose outside the forms.

- 
- .5 Deposit concrete in the forms in layers not exceeding 450 mm and as near as possible to its final position to avoid segregation.
- .6 Free dropping of concrete for heights exceeding 1.5 m will not be permitted. Use chutes for heights exceeding 1.5 m.
- Chute length shall not exceed 4.5 m. The slope shall range between 1 vertical in 3 horizontal to 1 vertical in 1 horizontal.
- .7 Perform concrete placing continuously between any two construction joints. Prepare a concreting program for the day. Execute construction joints at the locations shown on the structural drawings.
- Obtain the Departmental representative's approval to add or remove one or several construction joints. When concreting is finished, level the surface of the joint and clean protruding reinforcing.
- Construction joints in visible concrete shall be straight, level will coincide with formwork joint and with details shown on structural drawings. In cases where joints are not shown in drawings check with the Departmental representative for appropriate location.
- At the Departmental representative's request, Contractor to supply and install, at Contractor's expense, keys and dowels in construction joints not indicated on drawings.
- A minimum of two (2) hour delay shall elapse between the pouring of walls or columns and the pouring of beams and slabs supported by the former.
- .8 Compact concrete with internal vibrators as soon as the concrete is placed.
- At least one vibrator will be required for each ready-mix truck delivering concrete. One spare vibrator shall be kept at hand in case of breakdown.
- Internal vibrator should be operated at a minimum frequency of 7000 cycles per minute and should be operated by skilled and experienced men. Insert vibrators vertically in the fresh concrete at intervals of about 300 mm and shall penetrate a few inches in the previous layer.
- Execute consolidation of concrete at a regular rate and each square meter of concrete surface shall receive a minimum of 4 minutes of vibration, taking into account the overlapping influence of vibrators.
- In no case shall vibrators be used to move concrete horizontally in the forms or in the chutes.
- Exercise care to avoid excessive vibration, disturbing reinforcing steel, segregation or vibration of concrete that has already started its initial set.
- .9 Finish horizontal surfaces such as floors, sidewalks and stairs as specified on the Architect's drawings and specifications.
- Level and brush surfaces that are to receive a concrete topping to remove excess water, laitance and impurities and to provide a rough surface ("wooden trowel surface").
- .10 Cure all concrete for at least 7 days. Cover exposed concrete surfaces with tarpaulins or wetted burlap and formwork shall be sprinkled frequently. For curing of slabs, Contractor may use a polyethylene membrane installed as soon as concreting is finished with a minimum of 250 mm overlap at joints.
-

Use curing compounds with the the Departmental representative's approval. Do not use curing compound on slabs to be finished with a concrete topping or other finishing product.

Start curing treatment as soon as possible after concrete has sufficiently set, generally 4 hours after the end of the pouring session.

.11 Hot weather concrete placing

The temperature of fresh concrete placed when the outside temperature is above 27o C shall not exceed 30o C.

Concrete shall not stay in the ready-mix trucks for more than one hour. All concrete with an initial set shall be rejected.

Place concrete as fast as possible to avoid cold joints, honeycombing and other defects.

Start curing as soon as the concrete can support the weight of a man to avoid the drying of the concrete and shrinkage cracks. During the first 24 hours, the only acceptable method will be water curing.

Loosen forms and allow water to run between concrete and form.

Avoid drying of concrete between water applications. Cover all exposed concrete surfaces with tarpaulins or burlap.

Use a set-retarding admixture in the concrete only when specified or allowed by the Departmental representative.

### 3.2 FINISHING

.1 Finish concrete in accordance with CSA/CAN-A23.1 and with the Departmental representative's specifications.

.2 "Non visible" concrete finishing

In case of "non visible" concrete, finishing will be smooth and uniform. If case arises, execute work as following:

- .1 Repair cavities and honeycombs according to the state of the art and considering safety of structure.
- .2 Cut and break surfaces to be repaired up to sound concrete.
- .3 Flood surfaces to be repaired and spread mortar in successive layers.
- .4 In case of 25 mm deep holes and more, use a mortar with same color and composition as concrete for repairs.
- .5 Fill cavities with mortar and repair surfaces.
- .6 Do not begin concrete finishing before permitting initial shrinkage.
- .7 Fill formwork tie holes with mortar, after washing surface with detergent and water.

### 3.3 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Departmental representative.

.2 Submit to the laboratory for testing small and coarse aggregate samples as well as the mixing formulae as per CSA/CAN-A23.2.

- .3 For each pouring and for each class of concrete used, a series of three (3) standard 150 x 300 mm cylinders will be sampled as per the following table:

1 to 50 m3: 1 series

1 to 100 m3: 2 series

More than 100 m3: 2 series plus one series for each additional 100 m3 or fraction of 100 m3.

Sample will be carried out in accordance with specification A23.2-1C and 3C.

- .4 Compression test shall be performed according to specification A23.2-9C. One specimen will be tested at 7 days and the two others at 28 days. One supplementary cylinder per series shall be taken during cold weather concrete placing. This cylinder shall be kept in construction site conditions and shall be tested at 7 days.

The report for the compression tests shall be submitted directly and with as little delay as possible to the Departmental representative.

- .5 For each set of 3 samples taken, one slump test will be performed according to specification A23.2-5C. The concrete used for this test shall not be used in the cylinders.

- .6 When air-entrained concrete is specified, one air content test will be performed for each series of 3 cylinders taken.

This test shall conform to specification A23.2-4C.

The concrete used for this purpose shall not be used in the cylinders.

- .7 Owner will pay costs of tests.

**FIN DE SECTION**

---

## **PART 1 – GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 99 – Demolition – For minor work.
- .2 Section 09 91 99 – Painting – For minor work.

### **1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM A 496/A 496M-07, Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
- .2 CSA International
  - .1 CAN/CSA-A82-[06], Fired Masonry Brick Made From Clay or Shale.
  - .2 CAN/CSA-A165 SERIES-04(R2009), CSA Standards on Concrete Masonry Units covers: A165.1, A165.2, A165.3.
  - .3 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
  - .4 CAN/CSA-A370-04(R2009), Connectors for Masonry.
  - .5 CAN/CSA A371-04(R2009), Masonry Construction for Buildings.
  - .6 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
  - .7 CSA S304.1-04(R2009), Design of Masonry Structures.
- .3 Green Seal Environmental Standards (GS)
  - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry products and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 1 copie of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
    - .1 Indicate VOC's in g/L for epoxy coatings and galvanized protective coatings and touch-up products to be applied within building envelope.
- .3 Samples:
  - .1 Submit for review and acceptance of each unit.

### **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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect masonry products from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **PART 2 – PRODUCTS**

### **2.1 MASONRY UNITS**

- .1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1).
  - .1 Classification: H / 15 / C / 0.
  - .2 Size: modular.

### **2.2 MORTAR AND GROUT**

- .1 Mortar: to CAN/CSA-A179.
  - .1 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
  - .2 Colour: ground coloured natural aggregates or metallic oxide pigments.
- .2 Following applies regardless of mortar types and uses specified above:
  - .1 Mortar for grouted reinforced masonry: type S based on property specifications.
- .3 Grout: to AN/CSA-A179, Table 3.
  - .1 Mortar Type: S based on property specifications
  - .2 Fill with mortar the following masonry elements: reinforced masonry by filling with concrete vertically all cells over the entire height of the concrete block wall every block at 800mm between H axis and each of the blocks at the extremities of the wall.

### **2.3 ACCESSORIES**

- .1 Nailing Inserts: 0.5 mm minimum thickness, galvanized.
  - .2 Bolts: 12 mm diameter x 150 mm long with ends bent 50 mm at 90 degrees.
  - .3 Bottom seam for contraction joints: Special manufactured elastomer. Proper hardness in accordance with ASTM D2240, sizes and shapes prescribed.
  - .4 Buffers: 0.6mm thick galvanized steel strips, manufactured for this purpose, embedded in the mortar joints.
  - .5 Welded closure plate for structural lintel, refer to structural.
  - .6 Primers and paint : VOC limit 50 g/L maximum to SCAQMD Rule 1113.
  - .7 Coatings: VOC limit 100 g/L maximum to SCAQMD Rule 1113.
-

---

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Departmental Representative.

### **3.2 INSTALLATION**

- .1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
  - .1 Bond: running stretcher bond with vertical joints in perpendicular alignment and centred on adjacent stretchers above and below.
  - .2 Coursing height: 200 mm for one block and one joint for three bricks and three joints.
  - .3 Jointing: tool where exposed or where paint or other finish coating is specified to provide smooth compressed.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment.
- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

### **3.3 CONSTRUCTION**

- .1 Exposed masonry:
    - .1 Remove chipped, cracked, and otherwise damaged units, in exposed masonry and replace with undamaged units.
    - .2 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects. Make cuts straight, clean, and free from uneven edges.
  - .2 Building-in:
    - .1 Install masonry connectors and reinforcement where indicated on drawings.
    - .2 Build in items required to be built into masonry.
    - .3 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
    - .4 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
    - .5 Install loose steel lintels over openings where indicated.
  - .3 Concrete block lintels:
    - .1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated, refer to structural
    - .2 End bearing: not less than 200 mm as indicated on drawings.
  - .4 Support of loads:
    - .1 Use concrete, where concrete fill is used in lieu of solid units. Refer to structural documents.
    - .2 Use grout to CAN/CSA-A179 where grout is used in lieu of solid units.
    - .3 Install building paper below voids to be filled with concrete or grout; keep paper 25 mm back from faces of units.
-

- .5 Provision for movement:
  - .1 Leave 3 mm space below shelf angles.
  - .2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
  - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.
- .6 Interface with other work:
  - .1 Cut openings in existing work as indicated.
  - .2 Openings in walls: approved Departmental Representative.
  - .3 Make good existing work. Use materials to match existing.
- .7 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 600 mm on centre.

### **3.4 REINFORCING AND CONNECTING**

- .1 Install masonry connectors and reinforcement in accordance with CAN/CSA-A370, CAN/CSA-A371 and CSA S304.1 unless indicated otherwise.
- .2 Prior to placing concrete, mortar or grout, obtain Departmental Representative's approval of placement of reinforcement and connectors.

### **3.5 BONDING AND TYING**

- .1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA-A371, CSA S304.1 and as indicated.
- .2 Tie masonry veneer to backing in accordance with NBC, CAN/CSA-A371, CSA S304.1 and as indicated.

### **3.6 REINFORCED LINTELS AND BOND BEAMS**

- .1 Reinforce masonry lintels and bond beams as indicated, refer to structural.
- .2 Place and grout reinforcement in accordance with CAN/CSA-A179, CAN/CSA-A371 and CSA S304.1. Refer to structural engineer documents.

### **3.7 GROUTING**

- .1 Grout masonry in accordance with CAN/CSA-A179, CAN/CSA-A371 and CSA S304.1 and as indicated. Refer to structural engineer documents.

### **3.8 ANCHORS**

- .1 Supply and install metal anchors as indicated.

### **3.9 LATERAL SUPPORT AND ANCHORAGE**

- .1 Supply and install lateral support and anchorage in accordance with CSA S304.1 and as indicated.

### **3.10 SITE TOLERANCES**

- .1 Tolerances of CAN/CSA-A371 apply.
-



### **3.11 FIELD QUALITY CONTROL**

- .1 Inspection and testing will be carried out by Testing Laboratory designated by Departmental Representative.

### **3.12 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and/or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.13 PROTECTION**

- .1 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.
- .2 Repair damage to adjacent materials caused by masonry products installation.

**END OF SECTION**

---



## **PART 1 - GENERAL**

### **1.1 GENERAL CLAUSES**

- .1 General Clauses and Complementary General Clauses apply to works described in this section.

### **1.2 REFERENCE STANDARDS**

- .1 Do structural steel work in accordance with CAN3-S16.1, except where specified otherwise.
- .2 Do welding in accordance with CSA W59, except where specified otherwise.
- .3 Welder certification: in accordance with ACNOR W47.1.
- .4 Steel Sub-Contractor to be a certified member of CWB (section 2.1) as per CSA W47.1 standard.

### **1.3 SOURCE QUALITY CONTROL**

- .1 If required by the Departmental representative, submit two (2) certified copies of mill reports covering chemical and physical properties of steel used in this work.

### **1.4 DESIGN OF DETAILS AND CONNECTIONS**

- .1 Design details and connections in accordance with requirements of ACNOR S16.1 to resist loads indicated.
- .2 The Departmental representative may require welding procedures for examination.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- .1 Structural steel: to CAN/CSA-G40.21, grade as indicated on structural drawings. HSS to be as per ASTM A500 grade C.
- .2 Anchor bolts: to CAN/CSA-G40.21.
- .3 Bolts, nuts and washers: to ASTM A325M.
- .4 Welding materials: to ACNOR W59.
- .5 Shop paint primer: to 1-73a.

## **PART 3 - EXECUTION**

### **3.1 FABRICATION**

- .1 Fabricate structural steel, as indicated, in accordance with CAN3-S16.1 and in accordance with shop drawings.
  - .2 Provide punched holes from 11 to 27 mm in diameter for attachment of other work. Refer to drawings for details and locations.
-

- .3 Reinforce openings to maintain required design strength.

### **3.2 CONNECTION TO EXISTING WORK**

- .1 Verify dimensions of existing work before commencing fabrication.

### **3.3 SHOP PAINTING**

- .1 Clean, prepare surfaces and shop prime structural steel in accordance with CAN3-S16.1, except where members are to be encased in concrete.

### **3.4 MARKING**

- .1 Mark materials in accordance with CAN/CSA-G40.20. Do not use die stamping. The use of a punch is permitted only for material with a thickness over 20 mm. If 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 joints for fit and match.

### **3.5 ERECTION**

- .1 Erect structural steel as indicated in accordance with CAN3-S16.1 and in accordance with shop drawings. Steel framework shall be erected straight and plumb within specified tolerances. Temporary bracing shall be installed and be kept in place so long as required by the safety of the work. Erection tolerances shall not exceed those specified in the CAN3-S16.1.
- .2 If indicated on drawings, seal members by continuous welds. Grind smooth.
- .3 No welding is to be done when ambient temperature is below -18o C without the Departmental representative's approval.
- .4 Obtain written permission of the Departmental representative prior to field cutting or altering of structural members not shown on drawings.
- .5 Touch-up shop primer to bolts, rivets, welds and burned or scratched surfaces at completion of erection.
- .6 Anchor bolts to be furnished by the structural steel Sub-contractor and set in place by the General Contractor. The dry pack under the column bases shall be placed by General Contractor immediately after the steel erection has been completed.
- .7 Unless otherwise indicated, tighten high strength bolts to obtain a firm contact between all layers in contact ("snug tight"). Bolts indicated on drawings to be pre-tensioned or that the connexion is indicated to be "friction type" are to be tightened with a direct tension indicator or according to the turn-of-nut method to obtain tensions in bolts as specified in clause 23.4 of S16.1 standard. Refer to clauses 23.5 and 23.6 of S16.1 standard for tightening methods.

### **3.6 FIELD QUALITY CONTROL**

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by the Departmental representative.
  - .2 The Departmental representative may require inspections and/or testing of welds to be carried out by a specialist designated by the Departmental representative.
-

.3 Owner will pay cost of tests.

**FIN DE SECTION**

---



## **PART 1 - GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 04 04 99 – Masonry – For minor work.
- .2 Section 09 91 99 – Paint – For minor work.

### **1.2 REFERENCES**

- .1 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.
  - .3 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .4 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding) (Metric).
- .2 Environmental Choice Program
  - .1 CCD-047-98(R2005), Architectural Surface Coatings.
  - .2 CCD-048-98(R2006), Surface Coatings - Recycled Water-borne.
- .3 Green Seal Environmental Standards (GS)
  - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - current edition.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedure.
  - .2 Product Data:
    - .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing and bolts and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Submit two copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
      - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.
  - .3 Shop Drawings:
    - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
    - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
-

#### **1.4 WELDING COMPAGNIES CERTIFICATION**

- .1 Welding companies must be certified under section 2.1 of CSA W47.1 standards in the case where there is fusion welding or CSA W55.3 where there is resistance welding. Submit company certification evidence.

#### **1.5 QUALITY ASSURANCE**

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A 53/A 53M extra strong galvanized finish.
- .3 Welded steel mesh : compliant with CSA G30.5.
- .4 Welding materials: to CSA W59.
- .5 Welding electrodes: to CSA W48 Series.
- .6 Bolts and anchor bolts: to ASTM A 307.
- .7 Aluminum sheet: proprietary utility sheet, plain minimum 20 gage thickness, finish and colour as existing aluminium sheets.

#### **2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
  - .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
  - .3 Where possible, fit and shop assemble work, ready for erection.
-



- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

### 2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m<sup>2</sup> to CAN/CSA-G164.
- .2 Chromium plating: chrome on steel with plating sequence of 0.009 mm thickness of copper 0.010 mm thickness of nickel and 0.0025 mm thickness of chromium.
- .3 Shop coat primer: MPI- INT 5.1A and 5.1B, in accordance with chemical component limits and restrictions requirements and VOC limits of CCD-047a, CCD-048 and GS-11.

### 2.4 ISOLATION COATING

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

### 2.5 SHOP PAINTING

- .1 Primer: VOC limit 250 g/L maximum to GS-11.
- .2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.
- .4 Clean surfaces to be field welded; do not paint.

### 2.6 ANGLE LINTELS

- .1 Steel angles: Refer to Section 05 12 23 – Structural Steel for building.

### 2.7 METAL SCREEN

- .1 Provide complete electronic shop drawing for the metal screen system.
  - .2 The frame structure will be suspended to the existing building structure. No weight can be resting on the new refrigerator or freezer. Refer to structural for brackets.
  - .3 Screen: painted galvanized expanded metal mesh 3.5mm caliber (10 gauge) with mesh of 5mm x 12.7mm.
  - .4 Frame: painted galvanized steel angle. 32mm x 32mm, 5mm thick.
  - .5 Anchorage: screen welded to angle frame. No mechanical anchorage can be visible from the outside.
  - .6 Color: Consultant's choice, according to the standard range of the manufacturer.
  - .7 Hatch hardware:
    - .1 Hinges
    - .2 Galvanized rings or eyelets welded to the angle frame for padlocks.
-

- .8 Provide padlocks, make and model as establishment standards or at request of the Departmental Representative.
- .9 Provide a minimum of 10 copies of the key for each padlock to the Departmental Representative.

## **2.8 TUBULAR BUMPER**

- .1 Galvanized steel tubular support painted as existing: 38mm x 38mm, shape according to the indicated shapes and dimensions.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 ERECTION**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16 or Weld field connection.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion of:
  - .1 Primer: maximum VOC limit 250 g/L to GS-11.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
  - .1 Primer: maximum VOC limit 250 g/L to GS-11.

### **3.3 TUBULAR BUMPER**

- .1 Install the bumpers and supports at the indicated locations.

### **3.4 METAL SCREEN**

- .1 Install fences to close the access above the refrigerator or freezer where indicated.
-

- .2 Provide the access hatch as shown on plans.

### **3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and/or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.6 PROTECTION**

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

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 REFERENCES**

- .1 ASTM International
  - .1 ASTM C 919-08, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
  - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
  - .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
  - .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3 General Services Administration (GSA) - Federal Specifications (FS)
  - .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

### **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Product Data:
    - .1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Manufacturer's product to describe:
      - .1 Caulking compound.
      - .2 Primers.
      - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
    - .3 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
  - .3 Samples:
    - .1 Submit 2 samples of each type of material and colour.
    - .2 Cured samples of exposed sealants for each colour where required to match adjacent material.
  - .4 Manufacturer's Instructions:
    - .1 Submit instructions to include installation instructions for each product used.
-

### 1.3 CLOSEOUT SUBMITTALS

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

### 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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### 1.5 SITE CONDITIONS

- .1 Ambient Conditions:
  - .1 Proceed with installation of joint sealants only when:
    - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
    - .2 Joint substrates are dry.
    - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions:
  - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
  - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

### 1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.
  - .2 Departmental Representative will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants.
-

---

## **PART 2 – PRODUCTS**

### **2.1 SEALANT MATERIALS**

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

### **2.2 SEALANT MATERIAL DESIGNATIONS**

- .1 Type n° 1 :
  - .1 Polyurethane terpolymer sealing epoxy putty with three (3) components, with chemical polymerization. Choice of color by Consultant and complies with RCAN/ONGC-19.24-M90.
  - .2 Applications :
    - .1 Joints between exterior door frames, windows, curtain walls and shutters or other and external masonry walls.
    - .2 Joint between concret structures.
    - .3 All the various joints required on plans but not covered by other sections.
- .2 Type n° 2:
  - .1 Sealant joint in polyurethane, multi-component, self-leveling. Choice of color by Consultant and complies with U.S. Federal Specification TT-S-00227E, ASTM C920-79, type M, Grade P, Class 25, SS-S-200D, type H.
  - .2 Applications
    - .1 Contraction or control joints in the ceramic floors granite or concrete.
    - .2 Horizontal joints subject to traffic, such as door sill, sidewalks, ramps, etc.

### **2.3 SEALANT SELECTION**

- .1 Perimeters of exterior openings where frames meet exterior facade of building (i.e. brick, block, precast masonry): sealant type: 3.
- .2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: sealant type: 1.
- .3 Expansion and control joints in exterior surfaces of precast, architectural wall panels: sealant type: 1.
- .4 Control and expansion joints in exterior surfaces of unit masonry walls: sealant type: 3.
- .5 Coping joints and coping-to facade joints: sealant type: 4.
- .6 Joints between the base of the ventilation bumper surrounding the refrigerator or freezer: sealant type 2.

### **2.4 JOINT CLEANER**

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
-

- .2 Primer: in accordance with sealant manufacturer's written recommendations.

### **PART 3 – EXECUTION**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

#### **3.3 PRIMING**

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

#### **3.4 BACKUP MATERIAL**

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

#### **3.5 MIXING**

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

#### **3.6 APPLICATION**

- .1 Sealant:
    - .1 Apply sealant in accordance with manufacturer's written instructions.
    - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
    - .3 Apply sealant in continuous beads.
-



- .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
- .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.

### **3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean adjacent surfaces immediately.
  - .3 Remove excess and droppings, using recommended cleaners as work progresses.
  - .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for [reuse] [and] [recycling] in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.8 PROTECTION**

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

### **END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 07 92 00 – Joint sealants
- .2 Section 09 91 99 – Painting for minor works.

### **1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM C 1396/C 1396M-09a, Standard Specification for Gypsum Wallboard.
  - .2 ASTM C 475/C 475M-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - .3 ASTM C 514-04(2009)e1, Standard Specification for Nails for the Application of Gypsum Board.
  - .4 ASTM C 645-09a, Standard Specification for Nonstructural Steel Framing Members.
  - .5 ASTM C 754-09a, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
  - .6 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.
  - .7 ASTM C 954-10, 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 0.122 in. (2.84 mm) in Thickness.
  - .8 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.
  - .9 ASTM C 1047-10, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  - .10 ASTM C 1178/C 1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
- .2 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .3 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-07, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Product Data:
    - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum, framing, sealants and include product characteristics, performance criteria, physical size, finish and limitations.
  - .3 Samples:
    - .1 Submit for review and acceptance of each unit.
    - .2 Submit duplicate 300 x 300 mm size samples of gypsum board and 300 mm long samples of corner and casing beads shadow mould.
-

## 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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store materials inside, level, under cover. Protect from weather, damage from construction operations and other causes, in accordance with manufacturer's printed instructions.
  - .3 Handle materials to prevent damage to edges or surfaces. Protect metal accessories and trim from being bent or damaged.
  - .4 Store and protect partition materials from nicks, scratches, and blemishes.
  - .5 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

## PART 2 – PRODUCTS

### 2.1 MATERIALS

- .1 Performance / Design Criteria:
  - .1 Partition assembly to be non-combustible construction and fire resistance rated.
- .2 Gypsum Board:
  - .1 Standard board: to ASTM C 1396/C 1396M regular, 16 mm thick and Type X, 16 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges tapered.
  - .2 Fur metal profiles, suspensions rods, mounting wire, patches and anchors, comply with BNQ 3349-80.
  - .3 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
  - .4 Steel tapping screw: compliant with ASTM C 514.
  - .5 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, metal, zinc-coated by hot-dip process, 0.5 mm base thickness, perforated flanges, one piece length per location.

### 2.2 ACCESSORIES

- .1 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
    - .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.
  - .2 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
-

### **2.3 GYPSUM PANEL FRAME**

- .1 Metal furr U profile (profile, suspension rods, anchor wire, anchor) comply with ASTM C-1047-94, galvanized.
- .2 Drywall metal furrs: galvanized steel sheet, 0.53 thickness (gauge 25 US) dimension 68 x 22mm or other according to what is required for screw drywall panels.
- .3 Suspension: 4.8mm zinc coated.
- .4 Furring channel staples.

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to partition installation.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 ERECTION OF FRAMING**

- .1 Install steel framing members to receive screw-attached gypsum board in accordance with ASTM C 754 except where specified otherwise.
  - .2 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
  - .3 Place studs vertically at 400 mm on centre and maximum of 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
  - .4 Erect metal studding to tolerance of 1:1000.
  - .5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
  - .6 Include two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
  - .7 Install heavy gauge single jamb studs at openings.
  - .8 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
-

- .9 Include 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .10 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .11 Extend partitions to ceiling height except where indicated.
- .12 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use double track slip joint.
- .13 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .14 Install insulating strip under studs and tracks around perimeter of sound control partitions.

### **3.3 ERECTION OF GYPSUM BOARD AND ACCESSORIES**

- .1 Do application and finishing of gypsum board in accordance with ASTM C 840 except where specified otherwise.
- .2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C 840 except where specified otherwise.
- .3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .4 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
- .5 Install 19 mm x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
- .6 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .7 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .8 Install wall furring for gypsum board wall finishes in accordance with ASTM C 840, except where specified otherwise.
- .9 Install acoustical insulation and sealant in sound rated partitions to correspond with tested assembly.
- .10 Install gypsum boards in direction that will minimize number of end-butt joints. Stagger end joints 250 mm minimum.

### **3.4 APPLICATION**

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.
  - .2 Apply single layer gypsum board to metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm on centre. Stagger joints of second layer where applicable.
-

### **3.5 INSTALLATION**

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install access doors to electrical and mechanical fixtures specified in respective sections.
  - .1 Rigidly secure frames to furring or framing systems.
- .5 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .6 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .7 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .8 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

### **3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and/or recycling in accordance with Section 01 74 21 - Construction/Renovation/Demolition (CRD) Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.7 PROTECTION**

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

**END OF SECTION**

---





## **PART 1 – GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 99 - Demolition – For minor work.

### **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 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.
  - .3 CAN/CGSB-75.1-M88, Tile, Ceramic.
  - .4 CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
  - .2 CAN/CSA-A3000-[03(R2006)], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .4 Terrazzo Tile and Marble Association of Canada (TTMAC)
  - .1 Tile Specification Guide 09 30 00 2006/2007, Tile Installation Manual.
  - .2 Tile Maintenance Guide 2000.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

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

- .4 Adhere tile samples to 13 mm thick plywood and grout joints to represent project installation.

#### 1.4 QUALITY ASSURANCE

- .1 Quality Assurance Submittals:
  - .1 Manufacturer's Instructions: manufacturer's installation instructions.
  - .2 Manufacturer's Field Reports: manufacturer's field reports specified.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

#### 1.6 AMBIENT CONDITIONS

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

#### 1.7 MAINTENANCE

- .1 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide minimum 10% of each type and colour of tile required for project for maintenance use. Store where directed by Departmental Representative.
  - .3 Maintenance material same production run as installed material.

### PART 2 – PRODUCTS

#### 2.1 FLOOR TILE

- .1 Unglazed quarry tiles, type 1:
  - .1 150mm x 150mm x 8.6mm thick,
  - .2 Comply with CAN/CGSB-75.1 and ANSI A137.1-2012 DC0F
  - .3 Type 4, category MR 1
  - .4 Product:
    - .1 Collection METRO series QUARRY Color MAYFLOWER RED 310 distributed by TUILES OPYMPIA.
- .2 Unglazed quarry tiles, type 2:
  - .1 300mm x 300mm by thickness to adjust to existing tiles,
  - .2 Comply with CAN/CGSB-75.1 and ANSI A137.1-2012 DC0F
  - .3 Type 4, category MR 1
  - .4 Color and finish to pair with existing.

- .5 Color and product to be approved by Consultant and Departmental Representative.

## **2.2 BASE TILE**

- .1 Existing to remain
- .2 Base tiles to repair: choice of tile depending of location. Color dimension and height, to pair with existing.

## **2.3 MORTAR AND ADHESIVE MATERIALS**

- .1 Walls and floor adhesive:
  - .1 Composed of 2 components flexible adhesive
  - .2 Maximum VOC limit 65 g/L to SCAQMD Rule 1168.

## **2.4 GROUT**

- .1 Colouring Pigments:
  - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C 979.
  - .2 Colouring pigments to be added to grout by manufacturer.
  - .3 Job coloured grout are not acceptable.
  - .4 Use in Commercial Cement Grout, Dry-Set Grout, and Latex Cement Grout.
- .2 Cement Grout: to ANSI A108.1, ANSI A118.3 and ANSI A118.7, as TEC POWER GROUT distributed by TEC.

## **2.5 ACCESSORIES**

- .1 Refer to Food Services' documents.
- .2 Vapour barrier:
  - .1 Polyethylene film to CGSB 51-34, 0.15mm thickness.
- .3 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
  - .1 Sealants: maximum VOC limit 250 g/L to SCAQMD Rule 1168.

## **2.6 MIXES**

- .1 Adhesive: determined according to the manufacturer's instructions
- .2 Coating boding, smoothing and grout: determined according to the manufacturer's instructions.
- .3 Adjust water volumes to suit water content of sand.

## **2.7 CLEANING COMPOUNDS**

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
  - .2 Materials containing acid or caustic material are not acceptable.
-

### **PART 3 – EXECUTION**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

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

#### **3.2 WORKMANSHIP**

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile or backing coats to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and as wide as existing tiles, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles as indicated on plans.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .9 Install divider strips at junction of tile flooring and dissimilar materials.
- .10 Allow minimum 24 hours after installation of tiles, before grouting.
- .11 Clean installed tile surfaces after installation and grouting cured.

#### **3.3 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

#### **3.4 CLEANING**

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

**END OF SECTION**

---

## **PART 1 - GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 11 41 10 – Chambre de réfrigération et de congélation.

### **1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM F 1066-04, Standard Specification for Vinyl Composition Floor Tile.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for flooring, adhesive, primer, sealer, and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Samples will be returned for inclusion into work.
  - .3 Submit duplicate 300 x 300 mm sample pieces of sheet material.
  - .4 Submit duplicate full size samples of each type of tile.
  - .5 Submit 300 mm long edge strips.

### **1.4 CLOSEOUT SUBMITTALS**

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

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
  - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .3 Storage and Handling Requirements:
    - .1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Store and protect resilient flooring from nicks, scratches, and blemishes.
    - .3 Replace defective or damaged materials with new.
  - .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
-

## 1.6 SITE CONDITIONS

- .1 Ensure high ventilation rate, with maximum outside air, during installation.
  - .1 Vent directly to outside.
  - .2 Do not let contaminated air recirculate through a district or whole building air distribution system.
  - .3 Maintain extra ventilation for 1 month minimum after building occupation.

## PART 2 - PRODUCTS

### 2.1 RESILIENT SHEET FLOORING MATERIALS

- .1 Homogeneous vinyl sheet flooring with the characteristics below:
  - .1 Complies with ASTM F 1913 Standard Specification for Vinyl Sheet Floor Covering Without Backing;
    - .1 Skid-resistant particles uniformly distributed throughout the thickness of the product;
    - .2 Non-directional pattern;
    - .3 couche d'usure renforcée;
    - .4 sheet width : 6 pi 6 po (2 m);
    - .5 Wear layer thickness : 0,080 po (2,0 mm);
    - .6 ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring : results higher than 0,6;
    - .7 ASTM F 970, Standard Test Method for Static Load Limit – 250 lb/po<sup>2</sup>;
    - .8 ASTM E 648, Standard Test method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source – results equal or higher than 0,45 watts/cm<sup>2</sup>.
    - .9 Color approved by Consultant according to the manufacturer's standard range.

### 2.2 ACCESSORIES

- .1 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade
  - .1 2 components urethane adhesive;
  - .2 Approved product: Adhesive for resilient flooring TK-975 by Jonsonite or approved equivalent.
- .2 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .3 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section, co-ordinate with Section 01 71 00 - Examination and Preparation.
  - .2 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
    - .1 Visually inspect substrate in presence of Departmental Representative.
-

- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Departmental Representative.
- .3 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

### 3.2 PREPARATION

- .1 Prepare for installation in accordance with manufacturer's written recommendations.
- .2 The HVAC system shall be operational during installation and set to a minimum of 20 degrees Celcius for 72hours before and during installation.
- .3 The flooring sheet shall be acclimated to site conditions for a minimum of 72hours prior to be installed.
- .4 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface.
  - .1 Prohibit traffic until filler is completely cured and dry.
- .5 Prime sub-floor as recommended by resilient flooring manufacturer's written instructions.

### 3.3 APPLICATION: FLOORING

- .1 Follow manufacturer's instructions for the installation of the resilient flooring.
  - .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive that can be covered by flooring before initial set takes place.
  - .3 Resilient sheet flooring:
    - .1 Lay flooring with seams parallel to the cold room or freezer to produce minimum number of seams.
    - .2 Border widths: 1/3 minimum width of full material.
  - .4 Run sheets in direction of traffic. Double cut sheet joints and heat weld according to manufacturer's written instructions.
  - .5 As installation progresses, and after installation roll flooring with 45 kg minimum roller in 3 sections and both way of the flooring to ensure full adhesion.
  - .6 Cut flooring neatly around fixed objects.
  - .7 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
  - .8 Continue flooring over areas which will be under built-in furniture.
  - .9 Terminate resilient flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
  - .10 Install metal edge strips at unprotected or exposed edges where flooring terminates.
  - .11 Wait 72 hours after completion of the flooring installation before turning on chilling system of the cold room and/or freezer.
-

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove excess adhesive from floor, base and wall surfaces without damage.
  - .2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.5 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Protect new floors in accordance with manufacturer's printed instructions.
- .3 Repair damage to adjacent materials caused by resilient flooring installation.

**END OF SECTION**

---



## **PART 1 – GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 04 04 99 - Masonry for minor works.

### **1.2 REFERENCES**

- .1 Green Seal Environmental Standards (GS)
  - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - current edition.
  - .2 Maintenance Repainting Manual - current edition.
- .4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for paint and coating products and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Submit duplicate 200 mm x 300 mm sample panels of each with specified paint or coating in colors, gloss/sheen and textures required to MPI Painting Specification Manual standards.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

### **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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .3 Storage and Handling Requirements:
    - .1 Provide and maintain dry, temperature controlled, secure storage.
    - .2 Store painting materials and supplies away from heat generating devices.
-

- .3 Store materials and equipment in a well ventilated area with temperature as recommended by manufacturer.
- .4 Fire Safety Requirements:
  - .1 Supply one 9 kg Type ABC fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Renovation/Demolition (CRD) Waste Management and Disposal.

## 1.5 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
  - .2 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
  - .3 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Apply paint finishes when ambient air and substrate temperatures at location of installation can be satisfactorily maintained during application and drying process, within MPI and paint manufacturer's prescribed limits.
  - .2 Test concrete, masonry and plaster surfaces for alkalinity as required.
  - .3 Apply paint to adequately prepared surfaces, when moisture content is below paint manufacturer's prescribed limits.
- .3 Additional application requirements:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative, such that painted surfaces will have dried and cured sufficiently before occupants are affected.

## PART 2 – PRODUCTS

### 2.1 MATERIALS

- .1 Supply paint materials for paint systems from single manufacturer.
  - .2 Conform to latest MPI requirements for painting work including preparation and priming.
  - .3 Materials in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual "Approved Product" listing.
    - .1 Use MPI listed materials having E3 rating where indoor air quality requirements exist.
    - .2 Primer: VOC limit 100 g/L maximum to GS-11 and SCAQMD Rule 1113.
    - .3 Paint: VOC limit 100 g/L maximum to GS-11 and SCAQMD Rule 1113.
  - .4 Colours:
    - .1 Submit proposed Colour Schedule to Departmental Representative.
-

- .2 Base color schedule on selection of 5 base colors and 3 accent colors.
- .5 Mixing and tinting:
  - .1 Perform color tinting operations prior to delivery of paint to site, in accordance with manufacturer's written recommendations. Obtain written approval from Departmental Representative for tinting of painting materials.
  - .2 Use and add thinner in accordance with paint manufacturer's recommendations.
    - .1 Do not use kerosene or similar organic solvents to thin water-based paints.
  - .3 Thin paint for spraying in accordance with paint manufacturer's written recommendations.
  - .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.
- .6 Gloss/sheen ratings:
  - .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:
 

Gloss Level-Category	Gloss at 60 degrees	Sheen at 85 degrees
Gloss Level 1 – Matte finish	Max. 5	Max. 10
Gloss Level 2 – Velvet	Max. 10	10 to 35
Gloss Level 3 - Eggshell	10 to 25	10 to 35
Gloss Level 4 – Satin	20 to 35	Min. 35
Gloss Level 5 – Semi-gloss	35 to 70	
Gloss Level 6 – Gloss	70 to 85	
Gloss Level 7 – High gloss	More than 85	
  - .2 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.
- .7 Exterior re-painting:
  - .1 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
    - .1 Prepare the surfaces according the article 3.3.
    - .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
    - .3 REX 5.3G – High performance acrylic product, level 5 gloss level finish. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
- .8 Interior painting – new work:
  - .1 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.
    - .1 Prepare the surfaces according the article 3.3.
    - .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
    - .3 INT 5.1E – Alkyd resin product, level 5 gloss level finish. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
  - .2 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
    - .1 Prepare the surfaces according the article 3.3.
    - .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
    - .3 INT 5.3C – Alkyd resin product, level 5 gloss level finish (on water base binder sealer). Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
  - .3 Plaster and Gypsum Board: gypsum wallboard, drywall, "sheet rock" type material, etc.
    - .1 Prepare the surfaces according the article 3.3.

- .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
- .3 RIN 9.2A – Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
- .4 RIN 9.2C – Alkyd resin product, level 5 gloss level finish. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
- .5 RIN 9.2M – Product for collective establishment, low odor emanation and low level of VOC, level 5 gloss level finish. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
- .4 Concrete masonry elements: smooth or split-face brick and bloc.
  - .1 Prepare the surfaces according the article 3.3.
  - .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
  - .3 INT 4.2A - Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
- .9 Interior re-painting:
  - .1 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
    - .1 Prepare the surfaces according the article 3.3.
    - .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
    - .3 INT 5.3C – Alkyd resin product, level 5 gloss level finish (on water base binder sealer). Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
  - .2 Plaster and Gypsum Board: gypsum wallboard, drywall, "sheet rock" type material, etc.
    - .1 Prepare the surfaces according the article 3.3.
    - .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
    - .3 RIN 9.2A – Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.
- .1 Concrete masonry elements: smooth or split-face brick and bloc.
  - .1 Prepare the surfaces according the article 3.3.
  - .2 Apply the manufacturer's recommended primer and insure the compatibility with the substrate and the finish coat.
  - .3 INT 4.2A - Latex, level 5 gloss level finish, on latex sealer. Provide one (1) coat of primer and a minimum of two (2) coats finish, up to full color saturation.

## **PART 3 – EXECUTION**

### **3.1 GENERAL**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
- .2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.

### **3.2 EXAMINATION**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavorable conditions before proceeding with work.
-

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

### 3.3 PREPARATION

- .1 Protection of in-place conditions:
  - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
  - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
  - .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
  - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
  - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
  - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
  - .4 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.
  - .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
  - .6 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
    - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
    - .2 Apply wood filler to nail holes and cracks.
    - .3 Tint filler to match stains for stained woodwork.
  - .7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
  - .8 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.
  - .9 Touch up of shop primers with primer as specified.

### 3.4 APPLICATION

- .1 Paint only after prepared surfaces have been accepted by Departmental Representative.
  - .2 Use method of application approved Departmental Representative.
    - .1 Conform to manufacturer's application recommendations.
  - .3 Apply coats of paint in continuous film of uniform thickness.
    - .1 Repaint thin spots or bare areas before next coat of paint is applied.
  - .4 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
  - .5 Sand and dust between coats to remove visible defects.
-

- .6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .7 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .8 Finish closets and alcoves as specified for adjoining rooms.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- .10 Mechanical/Electrical Equipment:
  - .1 Unless indicated otherwise, paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.
  - .2 Do not paint over nameplates.
  - .3 Keep sprinkler heads free of paint.
  - .4 Paint fire protection piping red.
  - .5 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
  - .6 Paint natural gas piping yellow.
  - .7 Paint both sides and edges of backboards for telephone and electrical equipment before installation.
    - .1 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

### 3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Renovation/Demolition (CRD) Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .4 Place paint and primer defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

**END OF SECTION**

---

**PART 1 GENERAL**

**1.1 GENERAL**

- .1 Refer to all items in this section, to the general conditions, to all sections in divisions 00 and 01 which apply to and form part of all sections of work.

**1.2 BIDDING DOCUMENTS**

- .1 Visualize the complete scope of work and conditions. Carefully study jointly all written documents and drawings. These documents form an integral part of the work for section 11 41 10 - Walk-in freezers and coolers.

**1.3 REFERENCES**

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
    - .1 ANSI/ASME B16.26-2006, Cast Copper Alloy Fittings for Flared Copper Tubes.
    - .2 ANSI/ASME B16.29-2007, Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings-DWV.
  - .2 American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
    - .1 ANSI/NFPA 255-2006, Standard Method of Test of Surface Burning Characteristics of Building Materials.
  - .3 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 480/A 480M-11a, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
      - .1 Finish for sheet: No. 4 Finish-General purpose polished finish, one or both sides.
    - .4 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.
    - .5 ASTM B 88M-09, Standard Specification for Seamless Copper Water Tube Metric.
    - .6 ASTM B 280-08, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
    - .7 ASTM E 84-11a, Standard Test Method for Surface Burning Characteristics of Building Materials.
    - .8 ASTM E 162-11a, Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
-

- .4 Canada Green Building Council (CaGBC)
  - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations (including Addendum 2007).
  - .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): Green Building Rating System for Commercial Interiors.
  - .4 LEED Canada-EB: O&M-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.
- .5 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-19.13-M87, Sealing Compound, One-Component, Elastomeric, Chemical Curing.
- .6 CSA International
  - .1 CSA C22.2 No.137-M1981(R2004), Electric Luminaires for Use in Hazardous Locations.
- .7 Society of Automotive Engineers (SAE)
- .8 Underwriters' Laboratories of Canada
  - .1 CAN/ULC-S704-11, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  - .2 CAN/ULC-S705.1-2001, Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.

#### 1.4 WORK TO BE DONE

- .1 The supply of all labour, materials, plant, tools, crating, transportation, delivery, uncrating and set-in-place of all work required to completely install the food service equipment specified and/or as shown on drawings and specifications.
  - .2 Prefabricated cold rooms:
    - .1 Supply and install all prefabricated cold rooms and their respective mechanical refrigeration systems to operate at the specified temperatures.
    - .2 Supply and install painted condensate drain lines (complete with traps) from blower coils. Run drainlines inside the cold rooms and come out exactly over the funnel drains.
    - .3 Supply and install electrical wiring between time clocks and blower coils. Install time clocks on top of cold room near the door. Provide a removable access panel for easy access. Refer to detail #RA-1.
    - .4 Supply and install floor panels constructed as to be an integral part of the prefabricated cold room.
-



- .5 Supply all panels for all cold rooms from the same manufacturer.
- .6 Supply and install all refrigeration lines, insulation and refrigerant.

## 1.5 MECHANICAL AND ELECTRICAL SERVICE DRAWINGS AND SHOP DRAWINGS

- .1 The mechanical and electrical requirements schedule and a drawing showing the location of connections is provided by the Ministerial Representative. All sizes and loads specified indicate actual requirements at point of connection. All trades must provide space for the installation of valves, traps, fittings, switches, disconnects, etc. Connect all equipment horizontally to walls and partitions wherever possible.
- .2 Design drawings prepared by the Ministerial Representative show basic equipment details and are a guide only.
- .3 Submit for review:
  - .1 Illustrated technical data sheets for condensing units, blower coil, etc.
  - .2 Mechanical and electrical services location drawings and floor depressions.
  - .3 Detailed shop drawings for cold rooms.
- .4 Submit one (1) copy and one (1) reproducible print of the shop drawings for verification and review by the Ministerial Representative.
- .5 Provide fully dimensioned mechanical and electrical services location drawings, not less than 1:50 scale, for all equipment. Include schematics and installation diagrams where required.
- .6 Provide fully dimensioned drawings, not less than 1:50 scale, locating floor depressions, wall openings required for equipment.
- .7 Provide plan and elevation views of equipment not less than 1:25 scale. Provide sections, no less than 1:10 scale, in sufficient number to clearly illustrate construction method. Half of full size scale for details or fittings. Clearly indicate all welds, supports and fasteners.
- .8 Once the requested shop drawings have been verified by the Ministerial Representative, provide the number of sets determined. Do not proceed with any part of the fabrication until the drawings have been reviewed by the Ministerial Representative.
- .9 Review of these drawings by the Ministerial Representative is general. It is not intended to serve as a final check and does not relieve the Contractor from the responsibility of checking the drawings or from furnishing the specified materials.
- .10 Coordinate all mechanical and electrical requirements with all concerned trades. Match the equipment plugs with the electrical outlets furnished and installed by the Electrical Contractor.

## 1.6 DIMENSIONS

- .1 Consider all dimensions shown on drawings and in specifications as a guide only: check them on the job-site and coordinate any necessary adjustments.
  - .2 Coordinate with the General Contractor for exact size and location of floor depressions, and sleeves required in walls and floors for services and refrigeration lines and wall reinforcement.
-

## **1.7 SAMPLES**

- .1 Upon request from the Ministerial Representative, provide samples of any piece of hardware, painted steel or any other finish or material.

## **1.8 TECHNICAL DATA SHEETS**

- .1 Before commencing processing orders for the cold rooms, condensing units and blower coils, submit three (3) bound sets of technical data sheets in French for review by the Ministerial Representative.
- .2 Technical data sheets must include item number, description of equipment giving manufacturers name, model, quantity, options and accessories, and capacity.
- .3 Bind sheets in itemized numerical order in a press-board binder appropriately labelled to identify the project and the contents of the binder.
- .4 Unless advised otherwise, do not process or order any item requested for verification until a reviewed set of data sheets has been returned from the Ministerial Representative.
- .5 Upon receipt of the REVIEWED set, submit the required number of corrected sets for distribution.

## **1.9 CERTIFICATES OF APPROVAL**

- .1 Regard all work and material specified or shown on drawings as the minimum requirements. Comply with the latest electrical codes, C.S.A., and any municipal, provincial and federal regulations.
- .2 Comply with these regulation and fulfil all necessary changes or additions with no extra charge even if not specified or shown on the drawings. If the equipment supplied is not C.S.A. approved, obtain the approval from local electrical inspectors.
- .3 Furnish and install all equipment in compliance with the latest provincial, municipal and federal regulations. Furnish items required by these regulations, even if not specified or shown on the drawings, with no extra charge.

## **1.10 INSTRUCTIONS OF OPERATION**

- .1 Upon completion of installation, supply three (3) bound manuals of operational instructions, maintenance instructions and spare parts list for each item of equipment. Include the name and phone number of the appropriate service company for each item at the beginning of the manual. Submit these information in French during the demonstration. The operation instruction plates on the equipment must be in French.
  - .2 Also supply specific instructions for the maintenance of equipment (i.e. condensing units, blower coils, etc.), the frequency of maintenance, functioning operations to be verified, parts that are maintained and kept clean, etc. These documents must be part of the three (3) manuals of operational instructions as specified in the preceding paragraph.
  - .3 These documents must be submitted to the Ministerial Representative before the equipment demonstration.
-

### **1.11 GUARANTEE**

- .1 Issue a written Guarantee for the period of one (1) year, including parts and labour, from the date of acceptance. Respect all manufacturers' guarantees exceeding this one (1) year period until expiry dates. For the items #11 et #13, the guarantee period of 12 months as described under paragraph CG3.13 of the general conditions « C » is extended of 48 months for a total of 60 months (5 years). Labour is not included in that four (4) years guarantee.
- .2 This Guarantee applies solely to new purchases and to fabricated equipment specified under this section. Repair or replace, at no cost (parts and labour included), any and all defective equipment within the guarantee period.

### **1.12 ASEISMIC INSTALLATION**

- .1 The equipment shall be installed to meet aseismic installation.
- .2 Unless indicated otherwise, aseismic installation has to be designed and selected to meet the requirements of the last edition of the Building National Code and is supplement.
- .3 The Food Service Equipment Contractor has to retain the services of a aseismic specialist to perform the calculation and develop the aseismic installation details for each equipment of component.
- .4 In the case where after the verification on site by the specialized aseismic specialist, there is correction to apply, the Food Service Equipment Contractor has to provide an inspection report and explain the steps to correct the deficiencies.
- .5 At the end of the work, the Food Service Equipment Contractor shall submit to the Ministerial Representative a certificate of approval provided by an aseismic specialist.

### **1.13 AS BUILT DRAWINGS**

- .1 Supply at the demonstration time one reproducible drawing and CD (CAD version) of as built drawings showing all changes done by addenda or change notice or all changes done during the construction. Drawing shall be identified "as built drawing".
-

---

## **PART 2 PRODUCTS**

### **2.1 PREFABRICATED WALK-IN COOLERS AND FREEZERS**

- .1 Equipment: Supply and install all cold rooms and accessories as specified. The prefabricated cold room shall comply with refrigeration code CSA B52-2013 and the panels shall be homologated to fire as per CAN-ULCS102 AND CAN-ULCS138 (ULC-ORD C 376). The index of flame propagation of 25 or less for the panels and 500 or less for insulation. A seal homologation must be affixed on each panel. All electrical services shall be homologated as per CSA standard. Panels shall carry a minimum of the following approvals: NSF, UL, C-UL, CSA et ULC.
  - .2 Construction:
    - .1 Factory fabricate the exterior and interior panels of walls, ceilings and floors using a steel die. Check for uniformity. All to be locked together by cam-type locking devices.
    - .2 Foamed-in place rigid urethan insulation, injected into the panels 75 mm thick, or as specified, urethane having a density of 40 kg per cubic meter. Panel interiors covered with adhesive to obtain a perfect bond with the blown insulation; to form a solid, rigid wall free of cavities and without internal wood structures. The factor of thermal conductivity (k) for this insulation not to exceed 0.86 watts per sq. meter per degree Kelvin for a temperature difference of 38 °C. Polyurethane foam shall be CFC and HCFC free
    - .3 Floor panels able to withstand a spreading load of 1,225 kg per sq meter. The outside surface of the floor sandwich panel must be 1.6 mm thick galvanized steel and 12.5 mm thick plywood under the galvanized steel.
    - .4 The floor panels shall be covered with hardi backer fibro concrete board of 13 mm thick and screwed to the floor. Apply "Lepage" PL glue on the cold room floor panels, apply the fibro concrete board on that glue, and then screw the fibro concrete board on the insulated cold room floor with countersunk zinc steel screws. Joints staggered with those in the cold room floor.
    - .5 All interior and exterior surfaces of walls and ceiling apparent or not are fabricated with galvanized steel of 0.6 mm thick. All interior and exterior surfaces of walls and ceiling including doors shall be painted with two coats of white baked enamel "epoxy" coated polyester of 0.02 mm thick.
    - .6 Fabricate each panel from a single sheet of steel, without joint or overlap.
  - .3 Enclosure panels: Supply and install enclosures panels, with the same finish as the exterior of the boxes, between the top of the boxes and the ceiling and between wall panels and architectural walls, columns, etc.
  - .4 Panel edges: Joining edges of panels with integral matching tongue and groove profile, formed in the foaming operation. Accurately shaped to provide a continuous foam to foam airtight contact without the use of gaskets or other sealers. Lock panels in position using eccentric locking devices built into foamed edges from inside the rooms (to permit mounting of sections at a distance not exceeding 40 mm from all walls and columns).
  - .5 Sleeves:
    - .1 Drill holes through pre-fabricated wall and ceiling panels for refrigeration lines, electrical wiring and drain lines.
-

- 
- .2 Coordinate with other Divisions for the exact location of these holes.
  - .3 The sleeves, the scaling compound and holes for all mechanical and electrical conduits are by Food Service Equipment Contractor. Fit all refrigeration lines, electrical wiring and drain lines holes with sleeves and fill completely with sealing compound.
  - .6 Doors:
    - .1 Recessed doors are insulated. Dimensions 865 mm x 1980 mm or as specified and the same construction as the wall panels. Fix 1.6 mm stainless steel kickplates 1220 mm high, finish #4, to the interior and exterior of each door. Equip each door with a "thermopane" glass window of 380 mm x 510 mm at 1550 mm centre line from finished floor for all refrigerators (freezers not included).
    - .2 The lock are to be designed that they may be re-keyed in the field using a Best Lock key way. The lock shall have on interior assembly as to allow safe aggress. Secure Guard. Best interchangeable care lock cylinders. The lock shall be selectable to allow for keyless entry or automatically lock each time doors closed.
    - .3 For each freezer room, supply and install a micro-switch which shut down the evaporator of the blower coil and the condensing unit when the door is open and the refrigeration system will restart when the door is closed.
  - .7 Hardware for cold rooms:
    - .1 Hinges: All hardware's of heavy duty moulded zinc covered with brushed chrome. Self-closing type hinges, two (2) per door, with stainless steel zinged pins and nylon cams and one hung being spring loaded hold in place with non reversible screws for correctional application self classing type with zinc plated and nylon cam-type bearing. The handle, when pulled, breaks away from the magnetic force of the magnetic gasket, and permits the use of lock. Complete with a latch release mechanism allowing opening of door from inside, even when the door is locked. The lock will be equivalent to Kason #57 for hinged doors.
    - .2 Gaskets: each door complete with a removable thermoplastic gasket with a magnetic band of metal in the centre, at the top and sides. Adjustable sliding gasket on the bottom of each door. The magnetic force of the gasket must be sufficient to keep the door closed and airtight. Removable gaskets.
    - .3 Heating cable: equip door jambs of walk-in refrigerators and freezers and thresholds of walk-in freezer with of sufficient wattage within panels to prevent frosting and condensation on exterior surfaces. Wire to junction box of the light inside the walk-in cold room.
    - .4 Lighting: coordinate location of luminaries with evaporators. Lighting: two (2) LED array of 39 Watts, 3770 lumens total. 96 lumens/watt. 4500K Color temperature, Rated 50,000 hours. No Ultraviolet emission. Constant current LED. Fixture are cULus listed. Clas 2 power supply is an ANSI / UL-CSA recognized with components and bears the RoHS and CE marks. Specifically design for wet and low temperature environments. Ideal operating temperature from -40°C to 40°C. Fixture: rating IP-65 for wet and cold environments. Housing: Constructed of heavy gauge injection molded polycarbonate. Supplied with integrated gasket, one 22 mm diameter hole provided with 22 mm diameter knockout on opposite end, and three 22 mm diameter knockouts on back. Complies with NEC regulations. Diffuser: clear molded shatterproof high impact polycarbonate. Latches: stainless steel, eight (8) supplied per fixture. Power: 100VAC-277VAC at 50/60 Hz. Mounting: «EZ» mounting system consists of two mounting brackets (included with fixture) that are mounted to the ceiling with 900 mm spacing, mount conduit hub, or hole plug and snap fixture in place. Manufacturer Kason and model #1810LX LED.
-

- 
- .5 Heated exhaust port: equip each freezer door section with a heated exhaust port. Wire to junction box of light above door. If access to freezer is through a refrigerator, than the door of that refrigerator shall also be equipped with a heat exhaust port also.
  - .8 Bumper guards:
    - .1 On all exposed exterior walls, supply and install bumper guards made from 25 mm x 200 mm x 1.6 mm stainless steel welded and polished all corners, #4 finish, and installed at the same height as the kitchen plinth. Weld and polish corners. Seal all around with silicone. Extend bumper as closest to door opening as possible. Fasten to walk-in boxes with matching brackets and countersunk screws.
    - .2 Install plates 400 mm high, 1.6 mm thick, stainless steel #4 finish all around the interior of each cold room.
    - .3 Install a 1.3 mm galvanized steel reinforcement inside the insulated wall panels to mount exterior and interior bumpers.
  - .9 Corner guards: Provide and install 2 mm stainless steel, #4 finish guards, 150 mm x 150 mm x 1830 mm high on all exposed exterior and interior corners. Fix with stainless steel countersunk screws and seal all around with silicone.
  - .10 Panic alarm: In addition to high and low temperature alarms, equip each walk-in refrigerator and freezer with a panic alarm consisting of an illuminated vapour proof push button, located inside the cold room near the door and connected to an alarm bell located outside the cold room above the door. Connection between the alarm panic button and the alarm bell are included.
  - .11 Alarm system with battery:
    - .1 Supply and install one (1) high and low temperature alarm system for each cold room to create an audible signal and warning light when actuated by any change in temperature. Equip this alarm system with a digital read-out thermometer. Install this alarm system is plugged into the electrical outlet provided on top of the cold room by the Electrical Contractor.
    - .2 This alarm system shall automatically control the lighting fixture inside the cold rooms. This system will control the time required to close the lighting following the closure of the door.
    - .3 If a freezer door is located within a refrigerator, install the control box of the freezer unit outside the refrigerator. Identify each alarm system when two (2) or more are grouped together.
    - .4 Supply and install a temperature sensor inside the cold room and connect to the alarm system control box. Install this temperature sensor at approximately 2 metres from the door. All wiring for the temperature sensor shall be covered with a stainless steel "U" molding.
  - .12 Threshold: Equip each doorway with a removable, 2.8 mm stainless steel or extruded aluminium threshold of 6 mm thick
  - .13 Door closer: Equip each door with piston action closer, spring type, installed outside the cold room above the door.
-

## 2.2 MECHANICAL REFRIGERATION SYSTEMS

- .1 Installation: Supply and install refrigeration systems in strict compliance with all applying refrigeration, electrical and safety codes. Run all necessary relief to meet the requirements. Comply also with manufacturers recommendations. Condensing unit shall be installed to provide easy access for cleaning and services.
  - .2 Refrigeration line installation: While braising refrigeration lines, inject a small amount of dry nitrogen into the line to prevent scale deposits. Always use A.C.R. nitrogenized piping. Avoid sagging, and properly slope all refrigeration lines to prevent trapping oil.
  - .3 Testing: Upon completion of piping, test all refrigeration systems. Evacuate system with high capacity vacuum pumps. When it is certain that the systems are leak free, add sufficient charges of refrigerant to give specified operating temperatures. Temperature in freezer rooms to be -18 °C and in refrigerator to be 2.2 °C.
  - .4 Evaporators: Construct evaporators entirely of non-corrosive materials exterior is white baked enamel. Low velocity fan motors (permanently lubricated) with thermal overload protection and built-in heat exchanger. Evaporators specified with electric defrost complete with defrost elements, time clock, fan delay thermostat and defrost termination thermostat. Non corrosive, cadmium-plated steel support rods. Provide a P-trap in the suction line where it connects to the evaporator. Supply and install all interwiring between time clocks and the evaporators. The evaporators are complete with disconnect switch integrated in the unit. Refer to detail RA-1.
  - .5 Evaporator drains: Pitch drain lines at 1:25 minimum slope. Copper tubing for all drain pipes. Equip all evaporator drain lines for freezers with a drain line heater cable, complete with a thermostat. Connect drain line heater to a junction box installed inside the cold room connection by the Electrical Contractor. All drain line shall be insulated with 13 mm thick insulation and covered with white PVC finish and welded joints.
  - .6 Condensing units:
    - .1 Semi-hermetic condensing unit as specified in description of item including the contactor consisting of base, motor-compressor assembly, suction and discharge valves, oil separator, valve on oil return line, high and low pressure controls and electrical protection devices. Operating with R404A for all refrigerators freezers or as specified. Identify condensing units with the name and item number of their corresponding cold rooms. Screw 16 mm x 65 mm Bakelite identification plates to condensing units and cold rooms. All wiring and controls are interconnected to a common junction box, including magnetic starter, ready for connection by the Electrical Contractor.
    - .2 Issue a Guarantee for the period of one (1) year from the date of acceptance.. Respect all manufacturers' guarantees exceeding this one (1) year period until expiry dates. For the items #11 et #13, the guarantee period of 12 months as described under paragraph CG3.13 of the general conditions « C » is extended of 48 months for a total of 60 months (5 years). Labor is not included in this additional guarantee.
    - .3 Supply and install high density rubber pads under the shelving legs of the condensing units.
  - .7 Expansion valves: Thermostatic type expansion valves. All metal, moisture proof with gas charged bulb clamped to suction end of coil. Freezers with 69 KPa expansion valves.
  - .8 Room thermostat: Equip each refrigerator and freezer with a thermostat to control solenoid valve.
-

- .9 Solenoid valves: Mount solenoid valves on liquid lines, close to the cooling unit, to control flow of refrigerant.
  - .10 Dryer and moisture indicator: Supply and install a dryer on the liquid line of each system. Include liquid and moisture indicators on each liquid line after the dryer.
  - .11 Control wiring: Supply and install all accessories, controls and control wiring for the refrigerators, freezers, condensing units and defrost systems.
  - .12 Refrigerant piping:
    - .1 Size refrigerant piping to obtain a pressure drop equivalent to  $-16.6^{\circ}\text{C}$  or less in suction lines and equivalent to  $-17.2^{\circ}\text{C}$  in liquid lines. To increase the velocity and assure proper oil return, install smaller diameter vertical risers on suction lines.
    - .2 On the riser suction, supply and install a "P" trap on the bottom and the top of the riser suction which exceed 4570 mm. Install a double "P" trap at each 4570 mm riser suction.
    - .3 All refrigerant piping: Type "L", hard copper with "Silfos" brazed joints, verified free of leaks. Thoroughly dehydrate piping before charging with refrigerant. Supply and install a vibration eliminator on each refrigeration line.
    - .4 Insulate all refrigerant lines with "Armaflex" (Type-AP), 13 mm thick for refrigerators and 19 mm thick for freezers. All joints to be sealed with a glue approved by the manufacturer. Where liquid accumulators are specified, insulate these in the same manner. Clamp at every support, with additional clamps as required to prevent vibration or to keep lines from touching together. Clip with metal band over Armaflex to keep clamp from compressing insulation.
    - .5 Supply and install "Unistrutt" piping supports with accessories from the same manufacturer. Where there is a possibility of vibration in the suction lines and backflow near the compressor, use "Hydra-Zorb" attachments from the same manufacturer.
-



### **PART 3 EXECUTION**

#### **3.1 MATERIALS**

- .1 Stainless steel:

Specifications: ASTM-A167-99, type 304 cold rolled and sealed with #4 finish on one (1) side.

Use only stainless steels nuts, bolts, screws, washers, and all other hardware.

Metal thickness as specified on plans and specifications.

#### **3.2 WELDING**

- .1 Method: Electric, seamless, under inert gas atmosphere. Welding shall conform to the requirements of the C.S.A.
- .2 Composition: Use type 304 stainless steel rods so that deposited and original metals have the same composition.

#### **3.3 COOPERATION**

- .1 Supply any services, items or equipment that require "building-in" or overlapping coordination to all other trades in sufficient time. Also, notify other trades of exact locations of floor depressions, conduits, anchors required.

#### **3.4 PROTECTION AND REPAIR**

- .1 Properly and efficiently protect all work against damage.
- .2 Repair any damage to equipment and/or building immediately, with no extra charge.

#### **3.5 DELIVERY, STORAGE AND HANDLING EQUIPMENT**

- .1 Coordinate the delivery, storage and handling of food service equipment with the General Contractor.

#### **3.6 INSTALLATION**

- .1 Supervision: Provide a competent site supervisor experienced in food service equipment assembly and installation.
- .2 Requirements: Install equipment in accordance with all building and safety codes, and with the manufacturers recommendations.
-

### **3.7 INSPECTION AND REJECTION**

- .1 The Ministerial Representative reserves the right to inspect the fabrication at the fabricating plant; they may reject any equipment which does not comply with drawings and/or specifications. Replace all rejected materials or equipment within ten (10) days and with no extra charge.

### **3.8 TESTING**

- .1 Factory test and verify all equipment.
- .2 Calibrate and balance all refrigeration systems.

### **3.9 CLEANING**

- .1 Cooperate at all times with the General Contractor to keep the area of operation clean and free of all rubbish and debris. At the end, clean all equipment to permit immediate use without further cleaning.

### **3.10 DEMONSTRATION AND MAINTENANCE**

- .1 Convene each manufacturer's representative as soon as you receive the schedule of the demonstration and operational sessions on date as indicated on the Ministerial Representative notice. The training, demonstration and operational sessions also include all information related to the maintenance instruction.
-

---

**PART 4 DESCRIPTION OF ITEMS**

**EXISTING EQUIPMENTS**

**#1 WALK-IN FREEZER**

.1 Quantity: One (1). Existing equipment to be evacuated from site by the general contractor.

**#2 REFRIGERATION SYSTEM FOR ITEM #1**

.1 Quantity: One (1) system including: one blower coil, one condensing unit installed on top of the cold room, refrigeration lines and accessories. These equipments will be dismantled and evacuated from site by the food service equipment contractor. Dispose of the refrigerant according to the environmental requirements actually in force. To do so, use the form in annex A-1.

**#3 WALK-IN FREEZER**

.1 Quantity: One (1). Existing equipment to be evacuated from site by the general contractor.

**#4 REFRIGERATION SYSTEM FOR ITEM #3**

.1 Quantity: One (1) system including: one blower coil, one condensing unit installed on top of the cold room, refrigeration lines and accessories. These equipments will be dismantled and evacuated from site by the food service equipment contractor. Dispose of the refrigerant according to the environmental requirements actually in force. To do so, use the form in annex A-1.

**#5 REFRIGERATOR**

.1 Quantity: Three (3). Existing equipment not relocated.

**#6 TO #9 SPARE**

**NEW EQUIPMENTS**

**#10 WALK-IN FREEZER**

.1 Quantity: One (1).

.2 Dimensions: 5945 mm x 2745 mm x 2590 mm high

.3 Construction: Sandwich type 75 mm thick insulated panels for walls and ceiling and 100 mm for the floor. Exterior and interior finishes are made of white enamelled steel and are non-textured. Insulated panels and cam-type fixation devices shall meet actual standards. Refer to details on sheets I-03, I-04 and I-05. Refer to general specification, part 2 - Products, clause 2.1. Supply and install a stainless steel box from the floor to the top of cold room to hide the refrigeration lines coming from the basement.

---

- .4 Temperature: - 18 °C
- .5 Dimensions of blower coil: 3352 mm x 400 mm x 420 mm high
- .6 Description of blower coil: « Low Silhouette » model, Blower coil entirely built of non-corrosive material, exterior is white baked enamel. The motor fans are permanently lubricated with thermal overload protection and built-in heat exchanger. Blower coil specified with electric defrost complete with time clock, fan delay thermostat and defrost termination thermostat. Supply and install non-corrosive, cadmium-plated steel support rods. Install time clock on top of cold room. Supply and install all interwiring for time clock. The blower coil is complete with securable disconnect switch integrated in the unit. Four (4) fins per inch.
  - .1 The disconnect switch must have a clearance of 1 meter on front.
  - .2 Disconnect switch integrated to the unit.
  - .3 Electrical defrost.
  - .4 One (1) electrical contactor Standard Lovato.
  - .5 Liquid solenoid (13 mm) 240 V (factory installed).
  - .6 White enameled exterior finish.
  - .7 Accessory #TXV – Standard 0-9 Tons (factory installed).
- .7 Door: 865 mm wide (without window).

**#11 CONDENSING UNIT FOR ITEM #10**

- .1 Quantity: One (1).
- .2 Model: Air cooled condensing unit and horizontal air flow (installed in basement), semi-hermetic compressor model of 6 HP including R404A cooling fluid – 1L4.
- .3 Compressor: With air cooled calender including a «real» separate sub-cooling circuit. With reservoir adapted to required refrigerant charges. Factory assembled on a galvanized steel frame. Refer to general specification, part 2 - Products, clause 2.2.
  - .1 Receiver: 24 lb
  - .2 Heat rejected: 44 597 BTU/h
  - .3 Suction: 35 mm
  - .4 Suction riser: 29 mm
  - .5 Liquid: 13 mm, Armaflex isolated 13 mm on full-length
- .4 Accessories: Complete with the standard accessories plus:
  - .1 Receiver as per mentioned capacity.
  - .2 Sealed liquid line dryer accessories.
  - .3 Disconnect - fused 030A.
  - .4 Liquid line kit - sealed liquid line drier and sight glass / moisture indicator standard 13 mm (factory installed).
  - .5 Liquid line kit solenoid (supplied by the refrigeration manufacturer, but installed on site near blower coil by the refrigeration contractor).
  - .6 Replaceable filter on suction line RSF-4811T.
  - .7 Liquid accumulator on suction line HX-3706 with heat exchanger in the case of freezer.
  - .8 Oil separator « Temprite » 923.
  - .9 Adjustable discharge pressure valve.
  - .10 Switch with breaker.
  - .11 Pressure controls: adjustable dual pressure controls complete with super hoses.
  - .12 Discharge thermostat on compressor Standard RTH-0012 (required when ambient temperature is over 41 °C).
  - .13 Electrical defrost timer with contactor for fan and contactor for defrost element. Timer must be located on top of walk-in cold room and must be easily accessible.

- .14 The condenser must be cleanable.
- .15 Legs included for each corner.
- .16 Transformator - Standard 240 V.
- .17 Adjustable flooding valve.
  
- .5 Notes:
  - .1 On the suction riser, there should be a bottom hatch and a high-style «P-Trap» on exceeding risers of 4570 mm in height.
  - .2 Install a double hatch at every 4570 mm of suction riser.
  - .3 The condensing unit shall be complete and shall include all required accessories for an optimal operation.
  - .4 All required accessories for liquid lines.
  
- .6 Dimensions: 1125 mm x 870 mm x 880 mm high

## #12 WALK-IN REFRIGERATOR

- .1 Quantity: One (1).
- .2 Dimensions: 2943 mm x 7279 mm x 2590 mm high
- .3 Construction: Sandwich type 75 mm thick insulated panels for walls and ceiling and 100 mm for the floor. Exterior and interior finishes are made of white enamelled steel and are non-textured. Insulated panels and cam-type fixation devices shall meet actual standards. Refer to details on sheets I-03, I-04 and I-05. Refer to general specification, part 2 - Products, clause 2.1. Supply and install a stainless steel box from the floor to the top of cold room to hide the refrigeration lines coming from the basement.
- .4 Temperature: - 1 °C
- .5 Dimensions of blower coil: two (2) of 1321 mm x 400 mm x 420 mm high (2 fans)
- .6 Description of blower coil: « Low Silhouette » model, Blower coil entirely built of non-corrosive material, exterior is white baked enamel. The motor fans are permanently lubricated with thermal overload protection and built-in heat exchanger. Blower coil specified with electric defrost complete with time clock, fan delay thermostat and defrost termination thermostat. Supply and install non-corrosive, cadmium-plated steel support rods. Install time clock on top of cold room. Supply and install all interwiring for time clock. The blower coil is complete with securable disconnect switch integrated in the unit.
  - .1 The disconnect switch must have a clearance of 1 meter on front.
  - .2 Disconnect switch integrated to the unit.
  - .3 Electrical defrost.
  - .4 One (1) electrical contactor Standard Lovato.
  - .5 Liquid solenoid (13 mm) 240 V (factory installed).
  - .6 White enameled exterior finish.
  - .7 Accessory #TXV – Standard 0-9 Tons (factory installed).
- .7 Door: 865 mm wide (complete with window of 380 mm x 510 mm).

## #13 CONDENSING UNIT FOR ITEM #12

- .1 Quantity: One (1).

- .2 Model: Air cooled condensing unit and horizontal air flow (installed in basement), semi-hermetic compressor model of 3 HP including R404A cooling fluid - 1M4.
- .3 Compressor: With air cooled calender including a «real» separate sub-cooling circuit. With reservoir adapted to required refrigerant charges. Factory assembled on a galvanized steel frame. Refer to general specification, part 2 - Products, clause 2.2.
  - .1 Receiver: 19 lb
  - .2 Heat rejected: 34 524 BTU/h
  - .3 Suction: 29 mm
  - .4 Suction riser: 29 mm
  - .5 Liquid: 13 mm
- .4 Options and accessories: Complete with the standard accessories plus:
  - .1 Receiver as per mentioned capacity.
  - .2 Sealed liquid line dryer accessories.
  - .3 Disconnect - fused 030A.
  - .4 Liquid line kit - standard 13 mm (sealed liquid line drier and sight glass / moisture indicator factory installed).
  - .5 Liquid line kit solenoid (supplied by the refrigeration manufacturer, but installed on site near blower coil by the refrigeration contractor).
  - .6 Replaceable filter on suction line RSF-489T.
  - .7 Liquid accumulator on suction line 3700 with heat exchanger in the case of freezer.
  - .8 Oil separator « Temprite » 923.
  - .9 Adjustable discharge pressure valve.
  - .10 Switch with breaker.
  - .11 Pressure controls: adjustable dual pressure controls complete with super hoses.
  - .12 Discharge thermostat on compressor Standard RTH-0012 (required when ambient temperature is over de 41 °C).
  - .13 Electrical defrost timer with contactor for fan and contactor for defrost element. Timer must be located on top of walk-in cold room and must be easily accessible.
  - .14 The condenser must be cleanable.
  - .15 Legs included for each corner.
  - .16 Transformator - Standard 240 V.
  - .17 Adjustable flooding valve.
- .5 Notes:
  - .1 On the suction riser, there should be a bottom hatch and a high-style «P-Trap» on exceeding risers of 4570 mm in height.
  - .2 Install a double hatch at every 4570 mm of suction riser.
  - .3 The condensing unit shall be complete and shall include all required accessories for an optimal operation.
  - .4 All required accessories for liquid lines.
- .6 Dimensions: 1125 mm x 870 mm x 880 mm high

**#14 FAN AND DUCT FOR ITEM #12**

**FAN**

- .1 Quantity: Four (4)
- .2 Approximate dimensions (overall): 248 mm x 283 mm x 270 mm high

- .3 Description: Utility ventilator squirrel type housing with low noise levels. Direct connection to unit. Designed for easy installation. Works up to 650 CFM in low static systems (up to 0.75 inch of water column). Works on 120 V. Prelubricated bearings – no further lubrication required. Built in automatic reset thermal protector. Mount in horizontal or vertical position. Conduit wiring box. Duct collar inlet. Quiet operating forwardly curved zinc coated blower wheel. Base slotted for four (4) rubber blower feet. Rugged steel blower housings with baked green enamel finish. Motor side access plate for motor and wheel servicing removal.

The blower opening must be connected to the ventilation duct. All seams must be sealed between the blower and the ventilation duct.

- .4 Note: The ventilator must operate all day long and 7 days a week.

### **DUCT**

- .1 Quantity: Four (4)
- .2 Dimensions:  $\pm 60$  mm x  $\pm 210$  mm x 600 mm long.
- .3 Description: Stainless steel, 1.6 gauge. The ducts are fixed to the fan. Verify size with fan. The top and sides of the cold room must be closed and sealed adequately with stainless steel moulding, size to verify on place. Refer to detail on sheets I-03, I-04 and I-05.

### **#15 VENTILATED BUMPER FOR ITEM #12**

- .1 Quantity: Two (2)
- .2 Dimensions:  
.1 One (1) of  $\pm 1500$  mm x 75 mm x 305 mm high  
.2 One (1) of  $\pm 4600$  mm x 75 mm x 305 mm high
- .3 Construction: Stainless steel 2 mm thick installed on each side of the door. Refer to detail on sheets I-03, I-04 and I-05 for construction and for the detail under the threshold. Seal to the floor and the cold room. The ventilation duct installed in the depression and under the threshold of the door must be built to support the weight of equipment and carts and as required to avoid depression of this duct. Supply and install all protection required on the shaft to avoid catalytic reaction between the stainless steel and the filling product supplied by the general contractor.





**PART 5**  
**EQUIPMENT LIST AND SCHEDULE OF MECHANICAL & ELECTRICAL LOADS**

SIZES & LOADS INDICATED ARE ACTUAL REQUIREMENTS AT POINT OF CONNECTION ON EQUIPMENT

ISSUED FOR BID

**LEGEND OF ABBREVIATIONS**

**LOAD**

◆ EMERGENCY POWER = To be connected on emergency power circuit by the electrical contractor

**CONNECTION**

◆ JUNCTION BOX = Supply and install by the food service equipment contractor and connected by electrical contractor.  
 ◆ ELECTRICAL OUTLET = **K:** on equipment, supplied and installed by the food service contractor and connected by electrical contractor.  
**W:** on wall, supplied and connected by the electrical contractor.  
 ◆ ON ITEM # = load included in and plugged into item no  
 ◆ C.B.P. = Circuit breaker panel number – supply and install by the food service equipment contractor and connected by the electrical contractor. The interconnection between outlets or others junction boxes of equipments and the circuit breaker is by the food service equipment contractor.

**CONDENSING UNIT**

◆ LOCATION = **I:** built-in **B:** bottom mounted  
**T:** top mounted **R:** remote  
 ◆ COOLING = **A:** air cooled **W:** water cooled

**DRAINS**

◆ OPEN = **F.D.F.:** floor drain with funnel and the open drain is extended to F.D.F. by the food service equipment contractor.  
**F.F.:** floor funnel and the open drain is extended to F.F. by the food service equipment contractor.

**GAS**

◆ BTU = Consumption (btu/hour)  
 ◆ PRESSURE = mm water gauge

**STEAM**

◆ IN = Inlet size (mm)  
 ◆ OUT = Return size (mm)  
 ◆ KG = Consumption (kilograms/hours)  
 ◆ PRE = Pressure (kilopascal)

◆ DEPRESSION = Depth of depression (mm)  
 ◆ EXISTING EQUIPMENT = Verify mechanical and electrical services

\* When encountering this symbol in the schedule, you must refer to the "REMARKS" column.

**TYPE OF EQUIPMENT**

N = New equipment  
 EX = Existing equipment to be relocated by the food service equipment contractor  
 EXN = Existing equipment not relocated  
 EXE = Existing equipment to be evacuated from site by the food service equipment contractor

IMPORTANT INFORMATIONS

- |  |   |
|--|---|
|  | <p><b>Note 1:</b> Condensing unit is supplied and installed in the basement by the food service equipment contractor.</p> <p><b>Note 2:</b> The "intelligence module" of the cold room is connected to the building central alarm system by the electrical contractor.</p> <p><b>Note 3:</b> The bottom of the floor depression must be levelled by the general contractor.</p> |
|--|---|

FOOD SERVICE  
 WALK-IN COOLERS  
 AND FREEZERS

IDENTIFICATION			ELECTRICAL FOR EACH UNIT										MECHANICAL FOR EACH UNIT										REMARKS			
Revision	Item #	Quantity	IDENTIFICATION	Type of equipment	LOAD					CONNECTION			COND. UNIT	WATER			DRAINS			GAS				STEAM	Depression (mm)	
					Emergency power	Amperes	Horse power (HP)	Kilowatts	Volts	Phase	Junction box	Electrical outlet		Included on item #	Location	Cooling	Hot water (mm)	Temperature (°C)	Cold water (mm)	Direct (mm)	Open (mm)					Floor drain
			<b>EXISTING EQUIPMENTS</b>																							
	1	1	Walk-in freezer	*																						*To be evacuated from site by general contractor
	2	1	Refrigeration system for item #1	*																						*To be evacuated from site by food service equipment contractor
	3	1	Walk-in freezer	*																						*To be evacuated from site by general contractor
	4	1	Refrigeration system for item #3	*																						*To be evacuated from site by food service equipment contractor
	5	3	Refrigerator	EXN																						
	5 to 9		Spare																							
			<b>NEW EQUIPMENTS</b>																							
	10	1	Walk-in freezer	N	X							R														Note 2
		1	Set (B)for: 3 lighting fixtures, 1 temperature alarm, 1 panic alarm, 1 heated exhaust port, 1 heating cable / door	N	X	12*		120	1	X																*Total charge
		1	Blower coil (C)	N	X		5.76	208	1	X						22										
		1	Drain heater (D)	N	X		1	120	1	X																
	11	1	Condensing unit for item #10	N	X		6	600	3	X		A														Note 1. Heat rejected: 44,597 BTU/h

FOOD SERVICE  
 WALK-IN COOLERS  
 AND FREEZERS

IDENTIFICATION			ELECTRICAL FOR EACH UNIT										MECHANICAL FOR EACH UNIT										REMARKS					
Revision	Item #	Quantity	IDENTIFICATION	Type of equipment	LOAD					CONNECTION			COND. UNIT		WATER			DRAINS			GAS			Depression (mm)				
					Emergency power	Amperes	Horse power (HP)	Kilowatts	Volts	Phase	Junction box	Electrical outlet	Included on item #	Location	Cooling	Hot water (mm)	Temperature (°C)	Cold water (mm)	Direct (mm)	Open (mm)		Floor drain			Inlet size (mm)	BTU	Pressure (mm)	STEAM
																				FD	FF							
	12	1	Walk-in refrigerator	N	X									R											165	Notes 2 and 3		
		1	Junction box (B) for: 4 lighting fixtures, 1 temperature alarm, 1 panic alarm, 1 heating cable / door	N	X	12*		120	1	X																	*Total charge	
		2	Blower coil (C)	N	X		1.92	208	1	X							22											
	13	1	Condensing unit for item #12	N	X		3	208	3	X			A													Note 1. Heat rejected: 34,524 BTU/h		
	14	4*	Fan and duct for item #12	N	X	3		120	1	X																*Four (4) fans and four (4) ducts.  Electrical connection on top of the walk-in refrigerator by the electrical contractor		
	15	2	Ventilated bumper for item #12	N																								



**DISMANTLING, DECOMMISSIONING OR DESTRUCTION  
NOTICE FOR A SYSTEM**

**AVIS DE DESTRUCTION, DE DESASSEMBLAGE OU DE MISE  
HORS SERVICE D'UN SYSTÈME**

**INFORMATION**

Name & Address of Owner - Nom et adresse du propriétaire	
Name of the operator - Nom de l'opérateur	Name of Technician - Nom du technicien
Technician's trade certificate No. N° du certificat d'accréditation professionnelle du technicien	Technician's awareness certificate No. N° du certificat de sensibilisation du technicien
Name of technician's employer or service company Nom de l'entreprise de service ou de l'employeur du technicien	

Location of System Emplacement du système	Type of System Type de système	Description of System Description du système
RC No. N° du CC	<input type="checkbox"/> Air Conditioning Climatisation  <input type="checkbox"/> Refrigeration Réfrigération  <input type="checkbox"/> Solvent Solvant  <input type="checkbox"/> Fire extinguishing Extinction d'incendie	Manufacturer Fabricant
Building No. Adresse de l'immeuble		Model No. N° du modèle
Floor or Room No. N° de l'étage ou pièce		Serial No. N° de série
Type of halocarbon Type d'halocarbure		
Capacity of System Capacité du système		((kg) or (kw) (kg) ou (kw)
Final destination of the system - Destination finale du système		
<p><b>This unit no longer contains any halocarbon. Cette unité ne contient plus d'halocarbure</b></p>		
Signature of Service Technician - Signature de technicien de service		Date recovered Date de la récupération

PWGSC-TPSGC 72 (09/2003)

- Copy 1 ► Place on System  
Copie 1 ► Apposer sur le système
- Copy 2 ► Attach to System Service Log  
Copie 2 ► Annexer au registre d'entretien



**Part 1            General**

**1.1                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3        Shop drawings:
  - .1        Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2        Drawings to show:
    - .1        Mounting arrangements.
    - .2        Operating and maintenance clearances.
  - .3        Drawings and product data accompanied by:
    - .1        Detailed drawings of bases, supports, and anchor bolts.
    - .2        Acoustical sound power data, where applicable.
    - .3        Points of operation on performance curves.
    - .4        Manufacturer to certify current model production.
    - .5        Certification of compliance to applicable codes.

**1.2                CLOSEOUT SUBMITTALS**

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

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

### **1.3 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers.



- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

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

#### **Part 2 Products**

##### **2.1 W/O**

#### **Part 3 Execution**

##### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

##### **3.2 PAINTING REPAIRS AND RESTORATION**

- .1 Do painting in accordance with Section 09 91 23 - Interior Painting.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.

##### **3.3 FIELD QUALITY CONTROL**

- .1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

### **3.4 DEMONSTRATION**

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Departmental Representative will record these demonstrations on video tape for future reference.

### **3.5 CLEANING**

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

### **3.6 PROTECTION**

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

**END OF SECTION**

**Part 1        General**

**1.1            REFERENCES**

- .1        National Fire Prevention Association (NFPA)
  - .1        NFPA 13, Standard for the Installation of Sprinkler Systems.
  - .2        NFPA 25, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.

**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 data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.
- .3        Shop Drawings:
  - .1        Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2        Indicate:
    - .1        Materials.
    - .2        Finishes.
    - .3        Method of anchorage
    - .4        Number of anchors.
    - .5        Supports.
    - .6        Reinforcement.
    - .7        Assembly details.
    - .8        Accessories.
- .4        Samples:
  - .1        Submit samples of following:
    - .1        Each type of sprinkler head.
    - .2        Signs.
- .5        Test reports:
  - .1        Submit certified test reports for wet pipe fire protection sprinkler systems from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .6        Certificates:
  - .1        Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .7        Manufacturers' Instructions:

- .1 Provide manufacturer's installation instructions.
- .8 Field Quality Control Submittals:
  - .1 Manufacturer's Field Reports: manufacturer's field reports specified.

### **1.3 CLOSEOUT SUBMITTALS**

- .1 Provide operation, maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.
- .2 Manufacturer's Catalog Data, including specific model, type, and size for:
  - .1 Pipe and fittings.
  - .2 Sprinkler heads.
  - .3 Pipe hangers and supports.
  - .4 Mechanical couplings.
- .3 Drawings:
  - .1 Sprinkler heads and piping system layout.
    - .1 Prepare detail working drawings of system layout in accordance with NFPA 13, "Working Drawings (Plans)".
    - .2 Show data essential for proper installation of each system.
    - .3 Show details, plan view, elevations, and sections of systems supply and piping.
    - .4 Show piping schematic of systems supply, devices, valves, pipe, and fittings. Show point to point electrical wiring diagrams.
  - .2 Electrical wiring diagrams.
- .4 Field Test Reports:
  - .1 Preliminary tests on piping system.
- .5 Records:
  - .1 As-built drawings of each system.
    - .1 After completion, but before final acceptance, submit complete set of as-built drawings of each system for record purposes.
    - .2 Submit drawings on reproducible support with title block similar to full size contract drawings.
- .6 Operation and Maintenance Manuals:
  - .1 Provide Contractors Material and Test Certificate for aboveground piping and other documentation for incorporation into manual in accordance with NFPA 13.

### **1.4 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installer: company or person specializing in wet sprinkler systems with documented experience.

- .2 Supply grooved joint couplings, fittings, valves, grooving tools and specialties from a single manufacturer. Use date stamped castings for coupling housings, fittings, valve bodies, for quality assurance and traceability.

## **1.5 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide spare sprinklers and tools in accordance with NFPA 13.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Storage and Protection:
  - .1 Store materials indoors.
  - .2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

## **Part 2 Products**

### **2.1 DESIGN REQUIREMENTS**

- .1 Design automatic wet pipe fire suppression sprinkler systems in accordance with required and advisory provisions of NFPA 13.
- .2 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.
- .3 Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed shop drawings.
- .4 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.
- .5 Design systems for earthquake protection for buildings in seismic zones 3 and 4, and only essential and high risk buildings in seismic zone 2.
- .6 Location of Sprinkler Heads:
  - .1 Locate heads in relation to ceiling and spacing of sprinkler heads not to exceed that permitted by NFPA 13.
  - .2 Uniformly space sprinklers on branch.

## **2.2 ABOVE GROUND PIPING SYSTEMS**

- .1 Provide fittings for changes in direction of piping and for connections.
  - .1 Make changes in piping sizes through tapered reducing pipe fittings, bushings will not be permitted.

## **2.3 PIPE, FITTINGS AND VALVES**

- .1 Pipe:
  - .1 Ferrous: to NFPA 13.
- .2 Fittings and joints to NFPA 13:
  - .1 Ferrous: screwed, welded, flanged or roll grooved.
    - .1 Grooved joints designed with two ductile iron housing segments, pressure responsive gasket, and zinc-electroplated steel bolts and nuts. Cast with offsetting angle-pattern bolt pads for rigidity and visual pad-to-pad offset contact.
  - .2 Provide threaded fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded.
  - .3 Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into pipe when pressure is applied will not be permitted.
  - .4 Rubber gasketed grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 32 mm and larger.
  - .5 Fittings: ULC approved for use in wet pipe sprinkler systems.
  - .6 Ensure fittings, mechanical couplings, and rubber gaskets are supplied by same manufacturer.
  - .7 Side outlet tees using rubber gasketed fittings are not permitted.
  - .8 Sprinkler pipe and fittings: metal.
- .3 Pipe hangers:
  - .1 ULC listed for fire protection services in accordance with NFPA.

## **2.4 SPRINKLER HEADS**

- .1 General: to NFPA 13 and ULC listed for fire services.
- .2 Sprinkler Head Type:
  - .1 Pendant, dry and institutional type.
- .3 Provide nominal 1.2 cm orifice sprinkler heads.
  - .1 Release element of each head to be of normal temperature rating or higher as suitable for specific application.
  - .2 Provide corrosion-resistant sprinkler heads and sprinkler head guards in accordance with NFPA 13.
  - .3 Ceiling cups: not permitted.

**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

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

**3.2 INSTALLATION**

- .1 Install, inspect and test to acceptance in accordance with NFPA 13 and NFPA 25.

**3.3 PIPE INSTALLATION**

- .1 Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings.
- .2 Keep interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter.
- .3 Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter.
- .4 Inspect piping before placing into position.

**3.4 FIELD PAINTING**

- .1 Clean, pretreat, prime, and paint new systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories.
- .2 Apply coatings to clean, dry surfaces, using clean brushes.
- .3 Clean surfaces to remove dust, dirt, rust, and loose mill scale.
- .4 Immediately after cleaning, provide metal surfaces with 1 coat of pretreatment primer applied to minimum dry film thickness of 0.3 ml, and one coat of zinc chromate primer applied to minimum dry film thickness of 1.0 ml.
- .5 Shield sprinkler heads with protective covering while painting is in progress.
- .6 Upon completion of painting, remove protective covering from sprinkler heads.
- .7 Remove sprinkler heads which have been painted and replace with new sprinkler heads.
- .8 Provide primed surfaces with following:
  - .1 Piping in Finished Areas:
    - .1 Provide primed surfaces with 2 coats of paint to match adjacent surfaces.
    - .2 Provide valves and operating accessories with 1 coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil.
    - .3 Provide piping with self-adhering red plastic bands 50 mm wide red enamel bands spaced at maximum of 6 m intervals throughout piping systems.

### **3.5 FIELD QUALITY CONTROL**

- .1 Site Test, Inspection:
  - .1 Perform test to determine compliance with specified requirements in presence of Departmental Representative.
  - .2 Test, inspect, and approve piping before covering or concealing.
  - .3 Preliminary Tests:
    - .1 Hydrostatically test each system at 200 psig for a 2 hour period with no leakage or reduction in pressure.
    - .2 Flush piping with potable water in accordance with NFPA 13.
    - .3 Piping above suspended ceilings: tested, inspected, and approved before installation of ceilings.
  - .4 Formal Tests and Inspections:
    - .1 Do not submit request for formal test and inspection until preliminary test and corrections are completed and approved.
    - .2 Submit written request for formal inspection at least 15 days prior to inspection date.
    - .3 Repeat required tests as directed.
    - .4 Correct defects and make additional tests until systems comply with contract requirements.
    - .5 Furnish instruments, personnel for tests.
    - .6 Authority of Jurisdiction, will witness formal tests and approve systems before they are accepted.
- .2 CLEANING
  - .1 Clean in accordance with Section 01 74 11 - Cleaning.
    - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**



**Part 1 General**

**1.1 REFERENCES**

- .1 ASTM International Inc.
  - .1 ASTM B32, Standard Specification for Solder Metal.
  - .2 ASTM B306, Standard Specification for Copper Drainage Tube (DWV).
  - .3 ASTM C564, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .2 Canadian Standards Association (CSA International).
  - .1 CSA B67, Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.
  - .2 CAN/CSA-B70, Cast Iron Soil Pipe, Fittings and Means of Joining.
  - .3 CAN/CSA-B125.3, Plumbing Fittings.
- .3 Green Seal Environmental Standards (GSES)
  - .1 Standard GS-36, Commercial Adhesives.
- .4 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1168, Adhesive and Sealant Applications.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3 DELIVERY, STORAGE AND HANDLING**

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

**Part 2 Products**

**2.1 COPPER TUBE AND FITTINGS**

- .1 Above ground sanitary and vent Type DWV to: ASTM B306.
  - .1 Fittings.
    - .1 Cast brass: to CAN/CSA-B125.3.

- .2 Wrought copper: to CAN/CSA-B125.3.
- .2 Solder: to ASTM B32.

## **2.2 CAST IRON PIPING AND FITTINGS**

- .1 Buried sanitary and vent minimum NPS 3, to: CAN/CSA-B70, with one layer of protective coating.
  - .1 Joints:
    - .1 Mechanical joints:
      - .1 Neoprene or butyl rubber compression gaskets: to CAN/CSA-B70.
      - .2 Hub and spigot:
        - .1 Caulking lead: to CSA B67.
        - .2 Cold caulking compounds.
  - .2 Above ground sanitary and vent: to CAN/CSA-B70.
    - .1 Joints:
      - .1 Hub and spigot:
        - .1 Caulking lead: to CSA B67.
      - .2 Mechanical joints:
        - .1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

## **Part 3 Execution**

### **3.1 APPLICATION**

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

### **3.2 TESTING**

- .1 Pressure test buried systems before backfilling.
- .2 Hydraulically test to verify grades and freedom from obstructions.

### **3.3 PERFORMANCE VERIFICATION**

- .1 Cleanouts:
  - .1 Ensure accessible and that access doors are correctly located.
  - .2 Open, cover with linseed oil and re-seal.
  - .3 Verify that cleanout rods can probe as far as the next cleanout, at least.
- .2 Test to ensure traps are fully and permanently primed.

- .3 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

**3.4 CLEANING**

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

**END OF SECTION**



**Part 1            General**

**1.1                REFERENCES**

- .1    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.
- .2    Reference Standards:
  - .1    CSA Group
    - .1    CSA C22.1, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
    - .2    CSA C22.2.
    - .3    CAN/CSA-C22.3 No.1, Overhead Systems.
    - .4    CAN3-C235, 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, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.
- .3    The current edition of the references shall always be used.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3    Shop drawings:
  - .1    Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
  - .2    Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
  - .3    Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .4    Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
  - .5    If changes are required, notify Departmental Representative of these changes before they are made.
- .4    Certificates:
  - .1    Provide CSA certified equipment and material.

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

### **1.3 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
  - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
  - .2 Operating instructions to include following:
    - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
    - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
    - .3 Safety precautions.
    - .4 Procedures to be followed in event of equipment failure.
    - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
  - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
  - .4 Post instructions where directed.
  - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
  - .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

### **1.4 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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect materials and equipment from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 DESIGN REQUIREMENTS**

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
  - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates for control items in French.

### **2.2 MATERIALS AND EQUIPMENT**

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

### **2.3 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS**

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.
- .2 Control wiring and conduit: in accordance with Sections 26 05 21 – Wires and Cables (0-1000 V) and 26 05 34 – Conduits, conduit fastening and conduit fittings.

### **2.4 WARNING SIGNS**

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction and Departmental Representative.

### **2.5 WIRING TERMINATIONS**

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

## 2.6 EQUIPMENT IDENTIFICATION

- .1 Unless there is already another existing method in place for the establishment, which in this case must be followed, identify electrical equipment with nameplates and labels as follows:
  - .1 Nameplates: plastic laminate 3 mm thick plastic engraving sheet, black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
  - .2 Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters
- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY NO. [\_\_\_\_\_]" as directed by Departmental Representative.
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system and voltage.
- .9 Transformers: indicate capacity, primary and secondary voltages.

## 2.7 WIRING IDENTIFICATION

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

## 2.8 CONDUIT AND CABLE IDENTIFICATION

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



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

**2.9 FINISHES**

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
  - .1 Paint outdoor electrical equipment "equipment green" finish.
  - .2 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 INSTALLATION**

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.1 except where specified otherwise.

**3.3 NAMEPLATES AND LABELS**

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

### **3.4 CONDUIT AND CABLE INSTALLATION**

- .1 Install conduit and sleeves prior to pouring of concrete.
  - .1 Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

### **3.5 LOCATION OF OUTLETS**

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

### **3.6 MOUNTING HEIGHTS**

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at heights shown on drawings unless indicated otherwise.

### **3.7 CO-ORDINATION OF PROTECTIVE DEVICES**

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

### **3.8 FIELD QUALITY CONTROL**

- .1 Load Balance:
  - .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
  - .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

- .3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests in accordance with Section 01 45 00 - Quality Control.
  - .1 Power distribution system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Lighting and its control.
  - .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
  - .5 Systems: fire alarm.
  - .6 Insulation resistance testing:
    - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
    - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
    - .3 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Departmental Representative.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
  - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

### **3.9 SYSTEM STARTUP**

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

### 3.10 CLEANING

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

### 3.11 SEISMIC PROTECTION

- .1 General
  - .1 Contractor is responsible to evaluate, furnish and install seismic protection for all technical components installed under his responsibility.
  - .2 Hire an Engineer, member in good standing of the Ordre des ingénieurs du Québec, for the evaluation of the seismic risk and calculation of seismic force resisting systems. The hired Engineering shall demonstrate recognized expertise in seismic protection. Contractor shall provide his contact details no more than two (2) weeks after contract signature.
  - .3 During an earthquake, seismic protection devices shall prevent permanent displacements and damages caused by vertical and horizontal motions and overturns.
- .2 Design criterias
  - .1 Site class of the building is F.
  - .2 Height of building
    - .1 See architectural drawing.
- .3 Evaluation and mitigation of seismic effects
  - .1 Evaluation of seismic effects shall be done as per requirements of sub-section 4.1.8 of the Code de construction du Québec 2005, Chapter 1 (CNB 2005 et modifications du Québec).
  - .2 Seismic force resisting systems shall be designed as per following standards:
    - NFPA 13 et 20;
    - SMACNA – Seismic Restraint Manual Guidelines for Mechanical System;
    - ASHRAE – Seismic and Wind Design;
    - FEMA;
    - Engineering documents from earthquake-resistant devices manufacturers.
- .4 Evaluation and mitigation of seismic effects report
  - .1 Submit to the Engineer the evaluation and mitigation of seismic effects report before beginning the installation of the technical components.
  - .2 The report shall include, at least, the following information:
    - .1 General data for the project:
      - Location of the building;
      - General description of the building including height of the building (hn);
      - Site class at the location of the building;
      - Importance category of the building;

- Value of  $S_a(0.2)$ ;
  - Value of  $F_a$ ;
  - Value of  $I_e$ ;
- .2 List of all technical components included in the contract which need to be have an evaluation of the seismic effects.
- .3 List of all technical components which may be exempted with the justifications.
- .4 For each technical component (CT) the evaluation of the seismic effect and the seismic force resisting system applied. Include following elements:
- Identification of the CT as per drawings and specifications;
  - Location of the CT including height (hx);
  - Description of CT including:
    - Type of equipment;
    - Make and model;
    - Dimensions;
    - Weight;
    - Category and values of  $C_p$ ,  $A_r$  et  $R_p$ .
  - Calculation of lateral force  $V_p$ , and forces on building structure;
  - Description of the resisting system applied, including:
    - Make and model of chosen material;
    - Installation drawing specific for this project;
    - Drawing showing the location of the seismic resisting systems.
- .5 For each CT located on the ground, on a slab or on an equipment base, the overturn force calculation and description of the resisting system. Included following elements:
- Identification of the CT as per drawings and specifications;
  - Location of the CT including height (hx);
  - Description of CT including:
    - Type of equipment;
    - Make and model;
    - Dimensions;
    - Weight;
    - Location of gravity center;
  - Calculation of the overturn force;
  - Description of the resisting system applied, including:
    - Mark and model of chosen material;
    - Installation drawing specific for this project;
    - Drawing showing the location of the seismic resisting systems.
- .5 Installation
- .1 Install seismic force resisting system as per the indications of the evaluation and mitigation of seismic effects report.
- .2 Any modification to the seismic force resisting system for any reason, shall be subject to a new calculation by the Engineer responsible for the seismic protection, and issued as an amendment to the report.

- .3 Following requirements apply to the installation of electrical and mechanical material:
  - Power-driven and drop-in anchors are not permitted for traction loads;
  - C-clamps are not allowed to support CT unless they have a retainer mechanism;
  - C-clamps are not allowed for seismic resisting systems;
  - Equipment base shall be anchored to the slab;
  - All vibration isolators shall be designed for seismic protection;
  - Oval bolt adjusting hole are prohibited.
- .6 Work approval
  - .1 The Engineer who prepared the evaluation and mitigation of seismic effects report shall inspect the work related to the seismic force resisting systems.
  - .2 Obtain from the seismic protection engineer a written and signed certification indicating that the seismic force resisting systems have been installed as per the report and the amendments to the report. Submit this certification before submitting of the work certificate of compliance.
  - .3 Include in the operation and maintenance manual all documents issued by the seismic protection engineer.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 CSA International CAN/CSA-C22.2 No.18, Outlet Boxes, Conduit Boxes and Fittings.
  - .1 CAN/CSA-C22.2 No.65, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
  - .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA)
- .4 The current edition of reference shall always be used.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3 CLOSEOUT SUBMITTALS**

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

**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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.

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

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 INSTALLATION**

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

#### **3.3 CLEANING**

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



**Part 1            General**

**1.1                PRODUCT DATA**

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

**Part 2            Products**

**2.1                BUILDING WIRES**

- .1            Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2            Copper conductors: size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE.

**2.2                TECK 90 CABLE**

- .1            Cable: in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2            Conductors:
  - .1            Grounding conductor: copper.
  - .2            Circuit conductors: copper, size as indicated.
- .3            Insulation:
  - .1            Cross-linked polyethylene XLPE.
  - .2            Rating: , 1000 V.
- .4            Inner jacket: polyvinyl chloride material.
- .5            Armour: interlocking galvanized steel.
- .6            Overall covering: thermoplastic polyvinyl chloride, compliant to applicable Building Code classification for this project.
- .7            Fastenings:
  - .1            One hole steel 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 adequate spacing.
  - .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 aluminium strip.
- .4            Type ACWU90, the same characteristics as the AC90 cable, but with PVC jacket over armour and compliant to applicable building code classification for this project wet locations.

- .5 Connectors: anti short connectors.

### **Part 3 Execution**

#### **3.1 FIELD QUALITY CONTROL**

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

#### **3.2 GENERAL CABLE INSTALLATION**

- .1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .2 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.
- .3 Conductor length for parallel feeders to be identical.
- .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.
- .7 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 BUILDING WIRES**

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

#### **3.4 INSTALLATION OF TECK90 CABLE (0 -1000 V)**

- .1 Group cables wherever possible on channels.
- .2 Install cable exposed, securely supported by hangers.
- .3 Hide in service spaces all up and down feeder.

#### **3.5 INSTALLATION OF ARMOURED CABLES**

- .1 Group cables wherever possible on channels.
  - .1 AC90 or BX cable usage is permitted on maximum 3 m length only in the following cases :
    - .1 Connections of recessed or surface-mounted lighting fixtures, to junction box in ceiling.

- .2 Verticals runs inside wall for wiring devices connection, to junction box in ceiling.
- .3 Daisy chain connection type is prohibited.
- .2 Type ACWU90 cable usage is permitted for final connection from a junction box power points on top of the cold rooms.

**END OF SECTION**



**Part 1            General**

**1.1                REFERENCES**

- .1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE)
  - .1 ANSI/IEEE 837, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.
  - .2 The current edition of reference shall always be used.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3                CLOSEOUT SUBMITTALS**

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

**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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect grounding equipment from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**Part 2            Products**

**2.1                EQUIPMENT**

- .1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.
- .2 Grounding conductors: bare stranded copper, tinned, soft annealed, size as indicated.
- .3 Insulated grounding conductors: green, copper conductors, size as indicated.
- .4 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

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

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 INSTALLATION GENERAL**

- .1 Install complete permanent, continuous grounding system including conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to conductive water main, electrodes, using permanent mechanical connectors or inspectable wrought copper compression connectors to ANSI/IEEE 837.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.
- .8 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.
- .9 Ground secondary service pedestals.

#### **3.3 SYSTEM AND CIRCUIT GROUNDING**

- .1 Install system and circuit grounding connections.

### **3.4 EQUIPMENT GROUNDING**

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, motor control centres, starters, control panels, building steel work, generators, elevators and escalators, distribution panels, outdoor lighting, cable trays.

### **3.5 GROUNDING BUS**

- .1 Install copper grounding bus mounted on insulated supports on wall of electrical room and communication equipment room.

### **3.6 COMMUNICATION SYSTEMS**

- .1 Install grounding connections for telephone, sound, fire alarm, security systems, intercommunication systems as follows:
  - .1 Telephones: make telephone grounding system in accordance with telephone company's requirements.
  - .2 Sound, fire alarm, security systems, intercommunication systems as indicated.

### **3.7 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

### **3.8 CLEANING**

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

**END OF SECTION**





**Part 1            General**

**1.1                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Product Data:
  - .1            Submit manufacturer's instructions, printed product literature and data sheets for hangers and supports and include product characteristics, performance criteria, physical size, finish and limitations.

**1.2                DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2            Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3            Storage and Handling Requirements:
  - .1            Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2            Store and protect hangers and supports from nicks, scratches, and blemishes.
  - .3            Replace defective or damaged materials with new.

**Part 2            Products**

**2.1                SUPPORT CHANNELS**

- .1            U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted and suspended.

**Part 3            Execution**

**3.1                EXAMINATION**

- .1            Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for hangers and supports installation in accordance with manufacturer's written instructions.
  - .1            Visually inspect substrate in presence of Departmental Representative.
  - .2            Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3            Proceed with installation only after unacceptable conditions have been remedied.

**3.2                INSTALLATION**

- .1            Secure equipment to masonry, tile and plaster surfaces with lead anchors.
- .2            Secure equipment to poured concrete with expandable inserts.

- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps.
  - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
  - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
  - .3 Beam clamps to secure conduit to exposed steel work.
- .7 Suspended support systems.
  - .1 Support individual cable or conduit runs with 6 mm diameter threaded rods and spring clips.
  - .2 Support 2 or more cables or conduits on channels supported by 6 mm diameter threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use channels at appropriate intervals.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

### 3.3

#### **CLEANING**

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

**Part 1 General**

**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1, Canadian Electrical Code, Part 1, 20th Edition.
- .2 The current edition of reference shall always be used.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3 DELIVERY, STORAGE AND HANDLING**

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

**Part 2 Products**

**2.1 SPLITTERS**

- .1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
- .2 Terminations: connection blocks to match required size and number of incoming and outgoing conductors as indicated.
- .3 Spare Terminals: minimum three spare terminals or lugs on each connection or lug block sized less than 400 A.

**2.2 JUNCTION AND PULL BOXES**

- .1 Construction:welded steel enclosure.
- .2 Covers Flush Mounted: 25 mm minimum extension all around.

**2.3 CABINETS**

- .1 Construction: welded sheet steel as indicated hinged door, handle, latch lock 2 keys and catch
- .2 Type E Empty: surface return flange mounting as indicated.
- .3 Type T Terminal: surface return flange mounting as indicated containing 19 mm plywood backboard.

**Part 3 Execution**

**3.1 SPLITTER INSTALLATION**

- .1 Mount plumb, true and square to building lines.
- .2 Extend splitters full length of equipment arrangement except where indicated otherwise.

**3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION**

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

**3.3 IDENTIFICATION**

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

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CSA C22.1, Canadian Electrical Code, Part 1, 20th Edition.
- .2 The current edition of reference shall always be used.

**1.2 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit samples for floor box in accordance with Section 01 33 00 - Submittal Procedures.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

**Part 2 Products**

**2.1 OUTLET AND CONDUIT BOXES GENERAL**

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 347 V outlet boxes for 347 V switching devices.
- .6 Combination boxes with barriers where outlets for more than one system are grouped.

**2.2 GALVANIZED STEEL OUTLET BOXES**

- .1 One-piece electro-galvanized construction.
- .2 Single or multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
- .4 102 mm square or octagonal outlet boxes for lighting fixture outlets.
- .5 Extension and plaster rings for flush mounting devices in finished plaster or tile walls.

**2.3 MASONRY BOXES**

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

**2.4 CONCRETE BOXES**

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

**2.5 CONDUIT BOXES**

- .1 Cast FS boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

**2.6 FITTINGS - GENERAL**

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

**Part 3 Execution**

**3.1 INSTALLATION**

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

**END OF SECTION**

## **Part 1        General**

### **1.1            REFERENCES**

- .1 Canadian Standards Association (CSA International)
  - .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
  - .2 CSA C22.2 No. 45, Rigid Metal Conduit.
  - .3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
  - .4 CSA C22.2 No. 83, Electrical Metallic Tubing.
  - .5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.
  - .6 CAN/CSA C22.2 No. 227.3, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada.
- .2 The current edition of reference shall always be used.

### **1.2            SUBMITTALS**

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

### **1.3            WASTE MANAGEMENT AND DISPOSAL**

- .1 Place materials defined as hazardous or toxic waste in designated containers.
- .2 Ensure emptied containers are sealed and stored safely for disposal away from children.

## **Part 2        Products**

### **2.1            CABLES AND REELS**

- .1 Provide cables on reels or coils.
  - .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- .2 Each coil or reel of cable to contain only one continuous cable without splices.
- .3 Identify cables for exclusively dc applications.

## **2.2 CONDUITS**

- .1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.
- .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .3 Rigid pvc conduit: to CSA C22.2 No. 211.2.
- .4 Flexible metal conduit: to CSA C22.2 No. 56, steel liquid-tight flexible metal.

## **2.3 CONDUIT FASTENINGS**

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
  - .1 Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at appropriate spacing.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.

## **2.4 CONDUIT FITTINGS**

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.  
Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
  - .1 Set-screws are not acceptable.

## **2.5 EXPANSION FITTINGS FOR RIGID CONDUIT**

- .1 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .2 Weatherproof expansion fittings for linear expansion at entry to panel.

## **2.6 FISH CORD**

- .1 Polypropylene.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

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

### **3.2 INSTALLATION**

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical and electrical service rooms.
- .3 Use rigid galvanized steel threaded conduit outside building.
- .4 Use electrical metallic tubing (EMT) inside building except in cast concrete.



- .5 Use rigid pvc conduit underground.
- .6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment and in cold rooms/freezers.
- .7 Minimum conduit size for lighting and power circuits: 21 mm.
- .8 Bend conduit cold:
  - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 21 mm diameter.
- .10 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .11 Install fish cord in empty conduits.
- .12 Run 2-25 mm spare conduits up to ceiling space and 2-25 mm spare conduits down to ceiling space from each flush panel.
  - .1 Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in surface type box.
- .13 Remove and replace blocked conduit sections.
  - .1 Do not use liquids to clean out conduits.
- .14 Dry conduits out before installing wire.

### **3.3 SURFACE CONDUITS**

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

### **3.4 CONCEALED CONDUITS**

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

### **3.5 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**



**Part 1 General**

**1.1 REFERENCES**

- .1 CSA International
  - .1 CAN/CSA-C22.2 No.47, Air-Cooled Transformers (Dry Type).
  - .2 CSA C9, Dry-Type Transformers.
  - .3 CAN/CSA-C802.2, Minimum Efficiency Values for Dry Type Transformers.
- .2 National Electrical Manufacturers Association (NEMA)
- .3 The current edition of reference shall always be used.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for dry type transformers and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3 CLOSEOUT SUBMITTALS**

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

**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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect dry type transformers from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**Part 2 Products**

**2.1 DESIGN DESCRIPTION**

- .1 Design .
  - .1 Type: ANN.
  - .2 Single or 3 phase, power and voltage as indicated, 60 Hz.
  - .3 Voltage taps: standard.

- .4 Insulation: Class H (220), 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: CSA, removable metal front panel.
- .10 Mounting: floor or wall.
- .11 Finish: in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .12 Copper windings.
- .13 Voltage Regulation to be 4% or better.

## **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 Nameplate wording: as indicated on drawings.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for dry type transformers installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

- .1 Mount dry type transformers up to 75 kVA as indicated.
- .2 Mount dry type transformers above 75 kVA on floor.
- .3 Ensure adequate clearance around transformer for ventilation.
- .4 Install transformers in level upright position.
- .5 Remove shipping supports only after transformer is installed and just before putting into service.
- .6 Loosen isolation pad bolts until no compression is visible.
- .7 Make primary and secondary connections in accordance with wiring diagram.
- .8 Energize transformers after installation is complete.
- .9 Make conduit entry into bottom 1/3 of transformer enclosure.

**3.3 CLEANING**

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

**3.4 PROTECTION**

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

**END OF SECTION**



**Part 1 General**

**1.1 REFERENCES**

- .1 CSA International
  - .1 CSA C22.2 No.29, Panelboards and Enclosed Panelboards.
- .2 The current edition of references shall always be used.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for panelboards and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Include on drawings:
    - .1 Electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

**1.3 CLOSEOUT SUBMITTALS**

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

**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: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect panelboards from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**Part 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.
- .2 250 and 600 V panelboards: bus interrupting capacity, same as breakers.
- .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 Minimum of 2 flush locks for each panel board.
- .6 Two keys for each panelboard and key panelboards alike.
- .7 Copper bus with neutral of same ampere rating of mains.
- .8 Mains: suitable for bolt-on breakers.
- .9 Trim with concealed front bolts and hinges.
- .10 Trim and door finish: baked enamel.
- .11 Isolated ground bus.
- .12 Include one ground bus with three (3) terminals to link corresponding conductor to the breakers capacity of panelboards.

## **2.2 BREAKERS**

- .1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.
- .2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.
- .3 In 120 or 208 Volts circuits use, unless otherwise noted on the distribution diagram or on the panel description sheets, single, two or three pole circuit breakers having the ratings as shown and with a 10 kA minimum RMS, symmetrical rupturing capacity.
- .4 In 347 or 600 Volts circuits use, unless otherwise noted on the distribution diagram or on the panel description sheets, single, two or three pole circuit breakers having the ratings as shown and with a 14kA minimum RMS, symmetrical rupturing capacity.
- .5 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.
- .6 Lock-on devices for fire alarm, emergency lighting, door supervisory, intercom, stairway lighting, exit and CCTV circuits.

## **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 as indicated.
- .3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.
- .4 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.



**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for panelboards installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative. Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 INSTALLATION**

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards. 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. Refer to panelboard description at the end of present section.
- .5 Connect neutral conductors to common neutral bus.

**3.3 CLEANING**

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

**3.4 PROTECTION**

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

**END OF SECTION**



**Part 1 General**

**1.1 REFERENCES**

- .1 CSA International
  - .1 CSA C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.
  - .2 CAN/CSA C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
  - .3 CSA C22.2 No.55, Special Use Switches.
  - .4 CSA C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20).
- .2 The current edition of reference shall always be used.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wiring devices and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3 CLOSEOUT SUBMITTALS**

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

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wiring devices from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return packaging materials as specified in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 SWITCHES**

- .1 15, 20 A, 120 V, 347 V, single pole, double pole, three-way or four-way switches as indicated to: CSA C22.2 No.55 and CSA C22.2 No.111, industrial grade.
- .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.
- .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, industrial grade, 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 SPECIAL WIRING DEVICES**

- .1 Special wiring devices:
  - .1 Pilot lights as indicated, with neon type 0.04 W, 125 V lamp and red plastic flush type.

### **2.4 COVER PLATES**

- .1 Cover plates for wiring devices to: CSA C22.2 No.42.1.
- .2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .3 Stainless steel, vertically brushed, 1 mm thick cover plates.
- .4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

- .5 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.
- .6 Weatherproof spring-loaded cover plates complete with gaskets for single receptacles or switches.

## **2.5 SOURCE QUALITY CONTROL**

- .1 Cover plates from one manufacturer throughout project.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative. Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

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

### **3.3 CLEANING**

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

**3.4 PROTECTION**

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

**END OF SECTION**

**Part 1        General**

**1.1            ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide fuse performance data characteristics for each fuse type and size above 60 A. Performance data to include: average melting time-current characteristics.
- .3 Shop Drawings:
  - .1 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

**1.2            DELIVERY, STORAGE AND HANDLING**

- .1 Ship fuses in original containers.
- .2 Do not ship fuses installed in switchboard.
- .3 Store fuses in original containers in moisture free location.

**1.3            EXTRA MATERIALS**

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Three spare fuses of each type and size installed above 100 A.
- .3 Six spare fuses of each type and size installed up to and including 100 A.

**Part 2        Products**

**2.1            FUSES - GENERAL**

- .1 Fuse type references J1 and J2, etc. have been adopted for use in this specification.
- .2 Fuses: product of one manufacturer.

**2.2            FUSE TYPES**

- .1 Class J fuses.
  - .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.
  - .2 Type J2, fast acting.

**Part 3        Execution**

**3.1            INSTALLATION**

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Ensure correct fuses fitted to physically matched mounting devices.

- .3 Ensure correct fuses fitted to assigned electrical circuit.
- .4 Fusible type
  - .1 Motors and transformers circuits
    - Class J, form 1, time delayed.
  - .2 Other circuits
    - 0 to 600 A: Class J, form 1, quick action.
    - 601 to 2000 A: Class L, form 1, quick action.

**END OF SECTION**



**Part 1        General**

**1.1            REFERENCES**

- .1        CSA International
  - .1        CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE).
- .2        The current edition of references shall always be used.

**1.2            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.
- .3        Include time-current characteristic curves for breakers with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage.
- .4        Certificates:
  - .1        Prior to installation of circuit breakers in either new or existing installation, Contractor must submit 3 copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet standards and regulations.
    - .1        Production certificate of origin must be submitted to Departmental Representative for approval.
  - .2        Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.
  - .3        Any work of manufacturing, assembly or installation to begin only after acceptance of production certificate of origin by Departmental Representative. Unless complying with this requirement, Departmental Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.
  - .4        Production certificate of origin must contain:
    - .1        Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate.
    - .2        Licensed dealer's name and address and person of distributor responsible for Contractor's account.
    - .3        Contractor's name and address and person responsible for project.
    - .4        Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate.

- .5 Name and address of building where circuit breakers will be installed:
  - .1 Project title;
  - .2 End user's reference number, and
  - .3 List of circuit breakers.

### **1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store circuit breakers and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect circuit breakers from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 BREAKERS GENERAL**

- .1 Moulded-case circuit breakers: to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
- .5 Circuit breakers to have minimum symmetrical rms interrupting capacity rating as following :
  - .1 In 120 or 208 Volts circuits use, unless otherwise noted on the distribution diagram or on the panel description sheets, single, two or three pole circuit breakers having the ratings as shown and with a 10 kA minimum RMS, symmetrical rupturing capacity.
  - .2 In 347 or 600 Volts circuits use, unless otherwise noted on the distribution diagram or on the panel description sheets, single, two or three pole circuit breakers having the ratings as shown and with a 14kA minimum RMS, symmetrical rupturing capacity.

### **2.2 THERMAL MAGNETIC BREAKERS**

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

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied .

**3.2 INSTALLATION**

- .1 Install circuit breakers as indicated.

**3.3 CLEANING**

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

**END OF SECTION**



**Part 1 General**

**1.1 REFERENCES**

- .1 CSA Group
  - .1 CAN/CSA-C22.2 No.4, Enclosed and Dead-Front Switches (Tri-National Standard, with ANCE NMX-J-162-2004 and UL 98).
  - .2 CSA C22.2 No.39, Fuseholder Assemblies.
- .2 The current edition of references shall always be used.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for disconnect switches - fused and non-fused and include product characteristics, performance criteria, physical size, finish and limitations.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect disconnect switches - fused and non-fused from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**Part 2 Products**

**2.1 DISCONNECT SWITCHES**

- .1 Fusible and non-fusible, as indicated, disconnect switch in CSA enclosure 1, to CAN/CSA-C22.2 No.4 size as indicated.
- .2 Provision for padlocking in on-off switch position by 3 locks.
- .3 Mechanically interlocked door to prevent opening when handle in ON position.
- .4 Fuses: size as indicated, in accordance with Section 26 28 13.01 - Fuses - Low Voltage.
- .5 Fuseholders: to CSA C22.2 No.39, suitable without adaptors, for type and size of fuse indicated.

- .6 Quick-make, quick-break action.
- .7 ON-OFF switch position indication on switch enclosure cover.

## **2.2 EQUIPMENT IDENTIFICATION**

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Indicate name of load controlled on size 4 nameplate.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for disconnect switches - fused and non-fused installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

- .1 Install disconnect switches complete with fuses if applicable.

### **3.3 CLEANING**

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

**END OF SECTION**

## **PART 1 - GENERAL**

### **1.1 GENERAL CLAUSES**

- .1 General Clauses and Complementary General Clauses apply to works described in this section.

### **1.2 DEFINITIONS**

- .1 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation including dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and excavated with heavy construction equipment.
- .2 Rock excavation: excavation of material from solid masses of igneous, sedimentary or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 cubic meter. If the individual volume exceeds 1 cubic meter, immediately notify the Departmental representative and follow his instructions.
- .3 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

### **1.4 SAMPLES**

- .1 Contractor shall submit to soil laboratory chosen by the Departmental representative the source of backfill materials and for testing and approval, a sample of all granular material to be used as fill at least 10 days before beginning backfilling operations.

### **1.5 PROTECTION OF EXISTING FEATURES**

- .1 Protect existing buildings and surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.

### **1.7 WORK SURVEILLANCE**

- .1 The Departmental representative may delegate laboratory to represent the Departmental representative on site for all matters concerning soil quality, examination of bottom of excavation and execution of compacted backfill; laboratory is entitled to issue directives to contractor who must conform to them.
  - .2 Contractor to cooperate with laboratory personnel and to lend equipment on site so that work can be executed rapidly and efficiently.
  - .3 Laboratory is authorized to stop backfilling operations in order to verify the compaction of backfill material already in place.
  - .4 Contractor may not ask for an extra caused by interruptions of his work because of laboratory operations.
  - .5 Compaction tests to be performed for every 100 m<sup>3</sup> of backfill.
-

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Type 1 fill: clean, hard, durable crushed gravel or stone, free from shale, clay, friable materials, organic matter and other deleterious substances and graded within the following limits when tested to Ministère des Transports du Québec standards and giving a smooth curve without sharp breaks when plotted on a semi-log chart. Material to be DB certified.

<u>Sieve designation</u>	<u>% passing</u>
31.5 mm	100
20 mm	90 - 100
14 mm	68 - 93
5 mm	35 - 60
1.25 mm	19 - 38
0.315 mm	9 - 17
0.080 mm	2 - 7

## PART 3 - EXECUTION

### 3.1 SOILS REPORT

- .1 Follow recommendations contained in soils investigation report. No L-15-1827 issued by « Journeaux Assoc. » on the 29th of october 2015

### 3.2 STOCKPILING

- .1 Stockpile fill materials in areas designated by Architect. Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.

### 3.3 DEWATERING

- .1 Keep excavations free of water while work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.
- .3 Dispose of water in a manner not detrimental to public and private property, or any portion of work completed or under construction.

### 3.4 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions indicated for the installation, the construction and inspection of the prescribed work.
  - .2 Dispose of surplus and unsuitable excavated material off site.
  - .3 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
-



- .4 Notify the Departmental representative when soil at bottom of excavation appears unsuitable and proceed as directed by Engineer.
- .5 Obtain the Departmental representative's approval of completed excavation.
- .6 Remove unsuitable material from trench bottom to extent and depth directed by the Departmental representative.
- .7 Where required due to unauthorized over-excavation, correct as follows:
  - .1 Fill under bearing surfaces and footings with concrete specified for footings.
  - .2 Fill under other areas with Type 2 fill compacted to a minimum of 95% modified Proctor.
- .8 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil, subjected to soils laboratory's approval.

### **3.5 FILL TYPES AND COMPACTION**

- .1 Use fill of types as indicated or specified below. Unless otherwise specified, compact to following densities:
  - .1 Type 1: 95% modified Proctor.
- .2 Under concrete slabs on grade: fill type 1, 150mm depth minimum or as per instructions contained in the soils investigation report, compacted at 90% modified Proctor, unless otherwise noted on the Departmental representative's plans.  
The use of shale or other deleterious material for compacted fill under slabs on grade or footings is strictly forbidden.

### **3.6 BACKFILLING**

- .1 Do not proceed with backfilling operations until the Departmental representative has inspected and approved installations.
  - .2 Areas to be backfilled to be free from debris, snow, ice, water or frozen ground.
  - .3 Do not use backfill material which is frozen or contains ice, snow or debris.
  - .4 Backfilling around installations.
    - .1 Place bedding and surround material as specified elsewhere.
    - .2 Place layers simultaneously on both sides of installed work to equalize loading. Difference not to exceed 150 mm.
    - .3 Place material by hand under, around and over installations until 600 mm of cover is provided. Dumping material directly on installations will not be permitted.
  - .5 Place backfill material in uniform layers not exceeding 200 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
  - .6 If specified on drawings, install drainage as per the Departmental representative's instructions.
  - .7 Owner will pay costs of tests.
-

**3.7 INSPECTION AND TESTING**

- .1 Compaction and material testing to be performed by laboratory chosen by owner. Rate of testing to be determined by the Departmental representative.

**FIN DE SECTION**

---

**ANNEX**



To:

**BISSON FORTIN ARCHITECTURE**

2555 Le Corbusier Boulevard, Suite 200

Laval, Quebec H7S 1Z4

Tel.: : 450 682-6360

Fax: : 450 682-1751

Represented by:

Ms. Danielle Bisson

Associate Architect, LEED AP, BD+C

---

**LEVEL III MOULD REMEDIATION  
SECTION 02 85 00.03**

**CSC-Finishing Kitchen Refit**

By:

**LE GROUPE GESFOR POIRIER, PINCHIN INC.**

6705 Jean-Talon Street East, Suite 211

Montreal, Quebec H1S 1N2

Tel.: : 514-251-1313, ext. 2261

Fax: : 514 251-1818

Represented by:

Olivier Mailloux, Jr. Eng.

Project Manager

Asbestos and Hazardous Materials

Project No.: M04-26749

Montreal, May 20, 2016

© Copyright Le Groupe Gesfor Poirier, Pinchin inc.

This document cannot be reproduced without the written permission from Le Groupe Gesfor Poirier, Pinchin inc.  
Any use of this document by a third party becomes automatically the responsibility of this third party.

## COPYRIGHT

- This specification section was written by Le Groupe Gesfor Poirier, Pinchin inc. for the related project and is the property of Le Groupe Gesfor Poirier, Pinchin inc.
- This specification section cannot be reproduced without the written consent of Le Groupe Gesfor Poirier, Pinchin inc.
- Any use of this specification section by a third party automatically becomes the responsibility of this third party.
- The content of this section of specifications is based on the professional judgement of Le Groupe Gesfor Poirier, Pinchin inc., which is based on the legislation in effect, guidelines, best practice and the requirements of the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST).
- Certain articles of this specification section cite or paraphrase legislation or guidelines.

---

## LEVEL III MOULD REMEDIATION SECTION 02 85 00.03

### CSC-Finishing Kitchen Refit

---

## SIGNATURES



---

Reviewed by:

Olivier Mailloux, Jr. Eng.  
Project Manager  
Asbestos and Hazardous Materials



---

Approved by:

Frédéric Foley-Boisvert, Eng., PMP  
Assistant Director  
Asbestos and Hazardous Materials

# TABLE OF CONTENTS

PART 1	GENERAL .....	1
1.1	Scope of Work.....	1
1.2	Work Area .....	2
1.3	Condition of the Worksite to be Decontaminated .....	2
1.4	General Requirements .....	2
1.5	Worksite Conditions.....	4
1.6	Outline of Work .....	6
1.7	Work Schedule .....	7
1.8	Worker Supervision.....	7
1.9	Quality Assurance .....	8
1.10	Definitions .....	9
1.11	Reference Regulations and Standards .....	10
1.12	Notification.....	11
1.13	Submittals.....	11
1.14	Worker Protection .....	12
1.15	Visitor Protection .....	15
1.16	Air Testing.....	15
1.17	Negative Pressure Monitoring.....	16
1.18	Work Monitoring.....	16
PART 2	PRODUCTS AND FACILITIES .....	17
2.1	Equipment and Materials .....	17
2.2	Hoarding Walls .....	19
2.3	Workers' Decontamination Facility .....	19
2.4	Waste and Equipment Decontamination Facility .....	20
2.5	Construction of Decontamination Facilities.....	21
PART 3	EXECUTION .....	22
3.1	Worksite Preparation.....	22
3.2	Mould Remediation.....	25
3.3	Cleaning of the Mould Remediation Work Area .....	28
3.4	Dismantling the Mould Remediation Work Area .....	28
3.5	End of Work .....	29





## PART 1 GENERAL

### 1.1 SCOPE OF WORK

- 1.1.1 The purpose of the work is to remove the mould-contaminated materials located in the kitchen on the ground floor and storage room in the basement of the building situated at 400 Fordyce Road, in Cowansville, Quebec.
- 1.1.2 Refer to the plans and specifications from the Professionals for the exact scope of work.
- 1.1.3 In general, the following preparations must be conducted according to Level I Mould procedure:
- 1° The removal of the prefabricated panels that make up the two freezers in the kitchen on the ground floor. The terracotta tiles that make up the floor inside the freezers are also to be removed;
  - 2° All other work related to the preparation of the demolition of the first concrete slab in the kitchen, according to the plans and specifications of the Professionals.
- 1.1.4 In general, the following work will be performed according to Level III Mould procedure:
- 1° Demolition of the first concrete slab of the floor in the kitchen on the ground floor. The work includes decontamination using a biocide and cleaning of the empty space between the two concrete slabs;
    - a) Provide dehumidifiers to the concrete slab that remains in place.
  - 2° Removal, using hand tools, of the mould-contaminated paint on the ceiling and on the central column of the storage room in the basement. The work includes cleaning the piping, light fixtures and any other equipment fixed to the concrete slab ceiling;
    - a) Provide dehumidifiers to dry the concrete slab that remains in place.
    - b) The paint is considered to be lead-containing, therefore all contaminated waste should be treated as hazardous materials waste;

- c) The Owner is responsible for the relocation of all the furniture in place in order to vacate the premises for the Contractor;
- d) The mould contamination affects about 200 square feet (ft<sup>2</sup>). The removal of the paint must be performed mainly within the contaminated area (including the central column) and around it. Take into consideration that the removal of all paint in the room is not required;
- e) The works also includes the specific cleaning of the concrete block walls in the storage room.

1.1.5 The mould remediation work must be performed in compliance with the requirements of Level I and III procedures - determined by the scope of work specified for the area — as indicated in the document *Mould Guidelines for the Canadian Construction Industry* (CCA-82 2004) from the Canadian Construction Association.

## 1.2 WORK AREA

1.2.1 The kitchen on the ground floor and the storage room in the basement of the building located at 400 Fordyce Road, Cowansville, Quebec, all according to the Professionals' plans.

## 1.3 CONDITION OF THE WORKSITE TO BE DECONTAMINATED

1.3.1 The Contractor must carry out the mould remediation of the worksite in the condition that it was in on the date the contract was awarded.

## 1.4 GENERAL REQUIREMENTS

1.4.1 The purpose of this specification section is to remove and dispose of all materials that are or will be affected by mould, before or during removal, and that are impossible to clean.

1.4.2 The Contractor must read this section of specifications in conjunction with the other sections drawn up by the Professionals.

1.4.3 The general conditions and complementary general conditions are applicable to this specification section.

- 1.4.4 Before submitting a proposal, each bidder must visit the site in order to become familiar with any of the conditions that may in any way affect the work. No claims due to ignorance of conditions will be considered.
- 1.4.5 The Contractor must indicate any discrepancies with the bidding documents within the bidding period, in writing. No claims due to said discrepancies will be considered during execution of the work.
- 1.4.6 The Contractor must provide all labour, equipment and materials required for the removal and disposal or decontamination of all materials affected by mould. This also includes improving the ambient air quality in order to reduce the concentration of airborne particulate that contribute to the formation of mould, to the satisfaction of the Mould Remediation Professional.
- 1.4.7 The Contractor must carry out the work according to the phase indicated in the general complementary conditions.
- 1.4.8 Section 1.5 “WORKSITE CONDITIONS” of this identifies the location and condition of mould-contaminated materials.
- 1.4.9 During the work, the Contractor must provide all equipment necessary to perform the work properly.
- 1.4.10 The Contractor is responsible for providing adequate respiratory protection for workers.
- 1.4.11 All workers who have access to the Mould Remediation Work Area must have received the necessary training on mould remediation work.
- 1.4.12 The Contractor is responsible for ensuring that the workers on their worksite are medically able to work in mould conditions.
- 1.4.13 The Contractor must coordinate, with the Owner, the shutdown, if possible (until the end of the work outlined in this specification section), and re-establishment of the heating, ventilation and air conditioning (HVAC) systems, as required for this type of work.
- 1.4.14 On the worksite, the Contractor must provide the services of a General Foreman authorized to supervise all aspects of the work, notably the estimation

and negotiation of changes to the contract, updating of bids and requirements, planning of the work as well as the manpower and equipment needs, managing communications, and coordination with the Professionals and Owner or their representative.

- 1.4.15 The Contractor must also provide a Team Foreman who will be responsible for all aspects of manpower, equipment and production.
- 1.4.16 The Contractor must conduct the work in a manner to ensure that, at all times, no airborne mould spores, contaminated waste or water leaks contaminate the areas adjacent to the Mould Remediation Work Area under the Contractor's responsibility.
- 1.4.17 The Contractor must ensure that the work procedure, when it is applied, complies with all federal, provincial and local requirements in effect.
- 1.4.18 At the end of the work, before being dismantled and accessed without constraints, the work enclosure must undergo a final inspection by the Mould Remediation Professional. Additionally, it will be subject to air testing for fungal particulate. The cost of the air testing shall be covered by the Owner. All air tests resulting from deficiencies in the performance of work by the Contractor will be at the expense of the latter.

## 1.5 WORKSITE CONDITIONS

- 1.5.1 All the building materials and dust deposited inside the Mould Remediation Work Area are considered to be contaminated by mould.
- 1.5.2 Mould growth is present or likely to be present on the following materials or in the following areas:
- 1° All of the prefabricated panels that make up the freezers in the kitchen on the ground floor.
    - a) The prefabricated panels are made of a rigid urethane-type insulation;
      - i. The urethane-type insulation is damp and water-damaged.
  - 2° In the kitchen on the ground floor, mould growth was identified on about 2 ft<sup>2</sup> of prefabricated panels on the top of the freezer, near the cooling system;

- 3° The vinyl and metal baseboards of the freezers are detached and corroded;
- 4° Infiltration of stagnant water is occurring between the two concrete slabs of the floor in the kitchen on the ground floor;
  - a) Severe mould growth is highly suspected in this space.
- 5° In the storage room in the basement, mould growth is present on the ceiling and on the central concrete column;
  - a) The contaminated area is about 200 ft<sup>2</sup>;
  - b) The paint on the ceiling and central concrete column is considered to be lead-containing;
  - c) The paint on the concrete wall adjacent to the service space is damp and the paint, considered to be lead-containing, is chipped over an approximate total surface area of 80 ft<sup>2</sup>.
- 1.5.3 Fire alarms, smoke detectors, electrical wiring, electrical or control boxes, plumbing and ventilation outside of the Mould Remediation Work Area should remain in function for the entire period of work. Make sure to protect them adequately.
- 1.5.4 The following equipment present in the Mould Remediation Work Area must be protected:
  - 1° Lighting devices;
  - 2° Emergency lighting devices;
  - 3° Exit signs;
  - 4° Speakers;
  - 5° Breakers;
  - 6° Ceiling and wall receptacle plates;
  - 7° All other equipment fixed to the ceiling and walls.
- 1.5.5 During the work, the remainder of the building will be occupied and the kitchen must remain operational.

- 1.5.6 The Contractor is responsible for checking the worksite conditions as well as the presence and quantity of mould-contaminated materials, before submitting their bid.

## 1.6 OUTLINE OF WORK

- 1.6.1 The Contractor must erect and isolate the work enclosure, as described in Part 3 “EXECUTION” of this specification section.
- 1.6.2 Erect type B hoarding walls along the perimeter of the Mould Remediation Work Area, as described in Section 2.2 “HOARDING WALLS” in order to isolate the work area from the Occupied Areas.
- 1.6.3 Erect the Workers’ Decontamination Facility as described in Part 2 “PRODUCTS AND FACILITIES.”
- 1.6.4 The Contractor must create negative pressure inside the Mould Remediation Work Area. If possible, discharge air from air exhaust units outside of the building; otherwise discharge it indoors after performing a PAO test on all devices in the Mould Remediation Work Area. PAO testing must be carried out on site before the work is started.
- 1° If necessary, the Contractor must install an exhaust pipe at height in one of the decontamination facilities by passing through the door or HVAC system exhaust duct.
- 1.6.5 The Contractor must clean all electrical, mechanical or other components, without exception, that must remain within the Mould Remediation Work Area, and protect them with polyethylene sheets.
- 1.6.6 The Contractor must remove and clean any equipment fixed to mould-contaminated materials that are to be kept, if doing so facilitates the work or at the request of the Owner or their representative. Coordinate storage of this equipment with the Owner or their representative. Re-install equipment at the end of the work, if necessary.
- 1.6.7 The Contractor must keep a functional emergency lighting system permanently in place.

- 1.6.8 The Contractor must perform the mould remediation work according to the requirements of Part 3 “EXECUTION” of this section of specifications.

## 1.7 WORK SCHEDULE

- 1.7.1 The Contractor must perform the mould remediation work according to the work schedule provided in the bidding documents.
- 1.7.2 The Contractor must submit any schedule changes to the Owner or their representative for approval.
- 1.7.3 The Contractor must submit a work schedule for each phase of work, indicating:
- 1° The duration of the removal work;
  - 2° The average daily work force required.
- 1.7.4 For clearance air tests, the Contractor must foresee a rest period (16 hours) after the acceptance of the Mould Remediation Work Area by the Mould Remediation Professional. Additionally, a 48-hour delay must be foreseen for the analysis of air samples by an accredited laboratory. This is applicable for each phase of Level III work.

## 1.8 WORKER SUPERVISION

- 1.8.1 All members of the supervisory staff must hold a recognized certificate proving that they have attended training on mould remediation (a minimum of four (4) hours) approved by the Mould Remediation Professional. They must also demonstrate that they have supervised a minimum of five (5) other mould remediation projects.
- 1.8.2 The General Foreman or Team Foreman must be on the worksite at any time that there is a risk of disturbing mould-contaminated materials. Failure to comply with this requirement will result in immediate stoppage of the work, at no additional costs to the Owner.

- 1.8.3 The Contractor must replace the members of his supervisory team by approved persons no later than one (1) day following receipt of a written request from the Owner. The Owner reserves the right to request the replacement of personnel without explanation.
- 1.8.4 The Contractor cannot replace supervisory personnel without approval from the Owner.

## 1.9 QUALITY ASSURANCE

- 1.9.1 The removal and handling of mould-contaminated materials must be performed by trained and experienced workers, according to the methods, procedures and industry practices for mould remediation.
- 1.9.2 The Contractor must ensure that the work is carried out according to schedule and meets all the requirements of this specification section.
- 1.9.3 The Mould Remediation Professional is authorized by the Owner to stop work when a sealing failure is found or is likely to occur. If additional workers or equipment are required to rectify unsatisfactory conditions, the Owner will not be responsible for any additional fees. All additional costs shall be charged to the Contractor.
- 1.9.4 All work in this section of specifications, including electrical, mechanical, plumbing, carpentry and glazing work, must be performed by licensed, experienced and qualified tradespeople.
- 1.9.5 The Mould Remediation Professional will not be responsible for and will not have control or be in charge of ensuring compliance of the means, construction methods or techniques, phases, procedures, practices or precautions and programs related to safety required for the work in accordance with the applicable construction health and safety on worksites regulations or any other legislation on general construction practices. The Mould Remediation Professional will not be responsible for or have control over the acts or omissions of the Contractor, their Subcontractors or agents, employees or other persons performing the work.



## 1.10 DEFINITIONS

- 1.10.1 Authorized Visitor: the Owner or their designated representative, the Mould Remediation Professional and individuals representing any regulatory body.
- 1.10.2 Curtained Doorway: door consisting of two (2) overlapping flaps of rip-proof polyethylene.
- 1.10.3 Filtre N95: filter capable of capturing and retaining all particles of 0.3 µm at an efficiency rate of at least 95%.
- 1.10.4 HEPA Filter: High Efficiency Particulate Arrestance filter capable of filtering particles of 0.3 µm in size at an efficiency rate of at least 99.97%.
- 1.10.5 Milestone Inspection: inspection at defined steps during the work.
- 1.10.6 Mould-Contaminated Material: material identified under the Worksite Conditions, as well as overspray, debris and settled dust.
- 1.10.7 Mould Remediation Professional: an expert, consultant, engineer, and/or their representative for the management of mould remediation work and air sampling during said work.
- 1.10.8 Mould Remediation Work Area: Area in which mould remediation work is performed.
- 1.10.9 Negative Pressure: a reduced pressure within the Mould Remediation Work Area established by extracting air directly from the work area and discharging it outside of the Mould Remediation Work Area or outside of the building.
- 1.10.10 Occupied Area: area of the building located outside of the Mould Remediation Work Area.
- 1.10.11 Polyalphaolefin (PAO) Test: testing method used as a HEPA filter leak test to determine the integrity of the air exhaust units.

- 1.10.12 Polyethylene Sheeting: impermeable or rip-proof plastic material used to provide a continuous membrane to protect underlying surfaces from water damage or to prevent airborne mould spores from contaminating the Occupied Area.
- 1.10.13 Professional: an expert, consultant, engineer, architect and/or their representative for the management of the work.

## 1.11 REFERENCE REGULATIONS AND STANDARDS

- 1.11.1 The Contractor must comply with federal, provincial, and local requirements, and in the case of conflict between these requirements and this section of specifications, the more stringent requirements shall apply. Work procedures must be carried out according to the regulations in effect at the time that the work is being performed.
- 1.11.2 References:
- 1° American National Standard Institute; Institute of Electrical and Electronics Engineers. *Guide for Cleaning Insulators* (ANSI/IEEE 957-1987);
  - 2° Canadian Construction Association. *Mould Guidelines for the Canadian Construction Industry* (CCA 82);
  - 3° Canadian Standards Association. *Selection, Use and Care of Respirators* (CSA Z94.4-93);
  - 4° Safety Code for the construction industry, CQLR, c. S-2.1, r.4;
  - 5° Goyer, Nicole et al. *Les bioaérosols en milieu de travail : Guide d'évaluation, de contrôle et de prévention, Documents T-23. Montreal, IRSST, 2001;*
  - 6° Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST). *Guide des appareils de protection respiratoire utilisés au Québec;*
  - 7° Lara, Jaime and Vennes, Mireille. *Guide pratique de protection respiratoire, Guide technique R-319. Montreal, IRSST/CSST, 2002;*

- 8° An Act Respecting Occupational Health and Safety (AOHS), CQLR, c. S-2.1;
- 9° Transportation of Dangerous Goods Act, 1992 (S.C. 1992, c. 34) and regulations made under this Act;
- 10° Regulation respecting solid waste, CQLR, c. Q-2, r 13;
- 11° Regulation respecting hazardous materials, CQLR, c. Q-2, r 32;
- 12° Regulation respecting occupational health and safety (ROHS), CQLR, c. S-2.1, r 13;

## 1.12 NOTIFICATION

- 1.12.1 The Contractor must notify the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) at least 10 days prior to the start of any worksite, as per the Safety Code for the construction industry. Submit a copy of the job opening form to the Architects.
- 1.12.2 The Contractor must inform all tradespeople of the presence of mould-contaminated materials as defined in Section 1.5 "WORKSITE CONDITIONS" of this section of specifications.
- 1.12.3 The Contractor must submit copies of all notifications provided before the start of work to the Architects.

## 1.13 SUBMITTALS

- 1.13.1 Prior to starting work, the Contractor must submit:

- 1° The names and proof of identity of the:
  - a) General Foreman;
  - b) Team Foremen;
  - c) Workers participating in the work.

The Owner may request personal information for security purposes.

- 2° Proof in the form of a certificate that the foremen and workers have attended a training course on hazards, personal protective equipment and work practices on mould remediation worksites;
- 3° Provide an original attestation issued by a licensed Quebec insurer indicating that they hold third-party insurance for the minimum sum of \$2,000,000, with no exclusions or restrictions regarding mould remediation work, five (5) days before the start of the mould remediation work. Without this attestation, the work will be postponed;
- 4° Drawings detailing the decontamination facilities for the workers and waste;
- 5° Any deviation from the descriptions prescribed in this specification section;
- 6° The results of any PAO tests performed on the air exhaust units must be submitted to the Mould Remediation Professional before the start of work. PAO testing must be conducted on site:
  - a) When an air exhaust unit is replaced with a device that has not been subjected to PAO testing, the Contractor must perform the test on the device and provide the results to the Mould Remediation Professional before it is used for the project.
- 7° Documentation, including test results, flammability and fire resistance data, and the MSDS sheets for chemicals or other materials used during work;
- 8° The MSDS sheet as well as a sample of polyethylene sheeting and any other components needing approval for installation.

## 1.14 WORKER PROTECTION

### 1.14.1 General Information:

- 1° The Contractor must give instructions to staff before allowing access to the Mould Remediation Work Area. These instructions must include training on the use of respiratory protection, dress, entry to and exit from the worksite, work procedures and protective measures; These instructions must be provided by the Contractor according to the laws and regulations in effect;

- 2° It is strictly forbidden for workers to eat, drink, smoke or chew gum on the worksite, except in clearly indicated locations outside the Mould Remediation Work Area;
- 3° The Contractor must ensure that workers are fully protected when there is a possibility of disturbing mould-contaminated materials;
- 4° The Contractor must post the procedure regarding worker protection in a visible area of the Clean Change Room.

#### 1.14.2 Respirators:

- 1° The Contractor must provide anyone required to enter the Mould Remediation Work Area with an appropriate respirator:
  - a) Use a powered, full-face respirator equipped with a HEPA filter in the area where Level III mould remediation work is being conducted.
- 2° All respirators must be approved by the National Institute of Occupational Safety and Health (NIOSH) and appear in the *Guide des appareils de protection respiratoire utilisés au Québec*, published by the IRSST;
- 3° The training and information provided on the respirators must, at a minimum, respect CSA Standard Z94.4-02, *Selection, Use and Care of Respirators*;
- 4° The Contractor must verify the filters used according to manufacturer's standards and replace them as needed;
- 5° The Contractor must change the filters after each shift;
- 6° Anyone with a beard or mustache that may affect the seal between the respirator and face will be prohibited from entering the Mould Remediation Work Area.

#### 1.14.3 Other protective equipment:

- 1° The Contractor must provide the workers in the Mould Remediation Work Area with protective coveralls. Once used, treat them as contaminated waste;

- 2° The Contractor must provide appropriate single-use (nitrile) work gloves for the workers. Once used, treat them as contaminated waste;
- 3° The Contractor must provide each worker with a safety hat, safety shoes and any other equipment required by applicable legal texts, such as An Act Respecting Occupational Health and Safety and the Safety Code for the construction industry.

#### 1.14.4 Mould Remediation Work Area entry procedure:

Before entering the Mould Remediation Work Area, each worker must:

- 1° Remove street clothes in the Clean Change Room;
- 2° Store all street clothes, clean footwear, towels, etc. in the Clean Change Room;
- 3° Don the protective coveralls;
- 4° Put on the respirator and check its adjustment by testing negative and positive pressure;
- 5° Pull the hood of the coveralls over the respirator straps;
- 6° Extend the elastics at the ankles of the coverall legs over the safety shoes. Use duct tape as needed;
- 7° Don the work gloves, ensuring that the sleeves of the coveralls cover the cuffs of the gloves. Use duct tape as needed;
- 8° Put on the safety hat; and
- 9° If necessary, retrieve the reusable protective equipment stored in the Contaminated Change Room.

#### 1.14.5 Mould Remediation Work Area exit procedure:

Before leaving the Mould Remediation Work Area, each worker must:

- 1° Remove the bulk of the debris and dust from the protective equipment using a HEPA vacuum or damp cloth;

- 2° Enter the Contaminated Change Room and remove all contaminated personal protective equipment, except the respirator. Place the protective coveralls in the sealed bins for contaminated waste disposal;
- 3° Enter the Clean Change room and clean the outside of the respirator with a cleaner before removing it. Remove the filters and place them in an appropriate waste bin, then wash and rinse the inside of the mask;
- 4° Throw out the filters at the end of every work shift.

1.14.6 Post the instructions in the Workers' Decontamination Facility.

## 1.15 VISITOR PROTECTION

- 1.15.1 The Contractor must provide Authorized Visitors in the Mould Remediation Work Area with protective coveralls. Once used, treat them as contaminated waste. The Contractor must also supply approved respirators and all other required personal protective equipment.
- 1.15.2 The Contractor must inform Authorized Visitors on the use of protective coveralls and respirators, as well as on the procedures for entry into and exit from the Mould Remediation Work Area.

## 1.16 AIR TESTING

- 1.16.1 During Level III mould remediation work, the Mould Remediation Professional must perform air sampling for total fungal particulate using spore traps, and have the samples analyzed by an independent laboratory.
  - 1° Approval of the Mould Remediation Work Area is given following the comparison between the outdoor reference, indoor reference and work area results;
  - 2° The collection of air samples in the Mould Remediation Work Area must always be preceded by a visual inspection by the Mould Remediation Professional and a representative of the Contractor.
- 1.16.2 The Contractor must collaborate with the Mould Remediation Professional in the collection of air samples.

## 1.17 NEGATIVE PRESSURE MONITORING

- 1.17.1 The Contractor must provide a pressure differential gauge and install it at a place approved by the Mould Remediation Professional. Replace any damaged or defective equipment at the request of the Mould Remediation Professional.
- 1.17.2 The Contractor must collaborate with the Mould Remediation Professional in the collection of negative pressure monitoring data.
- 1.17.3 The Contractor must maintain the minimum pressure differential required by regulations at every pressure differential gauge installed on the worksite. Note the readings in a journal twice (2) a day during the entirety of the work.
- 1.17.4 The Contractor must stop the work and take corrective action when the pressure differential is below the prescribed 5 Pa threshold.

## 1.18 WORK MONITORING

- 1.18.1 The Mould Remediation Professional will be present on the worksite periodically, both inside and outside the Mould Remediation Work Area, from the beginning of work until the completion of clean-up operations.
- 1.18.2 The Mould Remediation Professional is authorized by the Owner to stop work if dispersion of airborne mould spores outside of the Mould Remediation Work Area is detected or is likely to occur. These conditions notably include the ineffectiveness of air exhaust units and deficient sealing of the Mould Remediation Work Area. If additional workers or equipment are necessary to rectify these conditions, it will be at no additional cost to the Owner.
- 1.18.3 Costs incurred by inspections and additional air sampling required in the Mould Remediation Work Area as a result of deficiencies in regard to quality, safety or schedule will be charged to the Contractor.
- 1.18.4 The following Milestone Inspections will take place at the cost of the Owner:
  - 1° Milestone Inspection A – Acceptance of Clean Worksite Preparation: Inspection of preparations and provisions prior to the mould remediation work;



- 2° Milestone Inspection B – Visual Acceptance of the Removal of Materials: Inspection of the Mould Remediation Work Area upon completion of mould remediation, but before the final cleaning;
  - 3° Milestone Inspection C – Visual Acceptance of the Cleaning Work: Inspection of the Mould Remediation Work Area after the final cleaning, but before the removal of the polyethylene sheets;
  - 4° Milestone Inspection D – Acceptance of Air Testing: Air sampling in the Mould Remediation Work Area after it has been cleaned, and after a scheduled rest period of 16 hours, but before the removal of polyethylene sheets, in order to determine if the mould remediation was effective.
- 1.18.5 All the above-mentioned inspections must be performed by the Mould Remediation Professional while accompanied by the Contractor's representative.
- 1.18.6 In addition to the Milestone Inspections, inspections of each Mould Remediation Work Area will be performed to ensure that the Contractor respects the requirements of the specification section and regulations. Any deviation not approved in writing may result in work stoppage, at no cost to the Owner. If the Mould Remediation Work Area is unacceptable according to the standards stipulated in the specification section or required by regulations, additional work, workers or equipment required by the Mould Remediation Professional will be implemented in order to achieve these standards, at no additional cost to the Owner.

## **PART 2 PRODUCTS AND FACILITIES**

### **2.1 EQUIPMENT AND MATERIALS**

- 2.1.1 The equipment and materials brought onto the worksite must be clean and in good condition. It must be free of debris, dust and fibrous materials. The single-use (disposable) equipment and materials must be new.
- 2.1.2 HEPA Vacuum: vacuum equipped with a HEPA filter and all the necessary fittings, tools and attachments.

- 2.1.3 Protective Coveralls: single-use, full body clothing made of polyolefin – a material that does not permit penetration of mould spores – with a hood to protect hair.
- 2.1.4 Waste Bin: impermeable container for disposing of worksite waste. Asbestos waste bins must be labelled according to the Safety Code for the construction industry and be comprised of one of the following:
- 1° Two (2) 0.15 mm (6 mil) sealable polyethylene bags, inserted one inside the other;
- OR
- 2° One (1) 0.15 mm (6 mil) sealable polyethylene bag, placed inside a rigid sealable container of sufficient strength (e.g., fibre or metal barrel) to prevent perforation of the container during filling, transportation and disposal.
- 2.1.5 Cleaner: chemical used to clean surfaces (anhydrous tribasic sodium phosphate solution (t.s.p.), mild soap). Using a special cleaner for mould remediation is permitted. Provide the product MSDS sheet for approval by the Mould Remediation Professional.
- 2.1.6 Air Exhaust Unit: portable air handling system that extracts air directly from the Mould Remediation Work Area and discharges it outside the building. It must be equipped with:
- 1° a prefilter and HEPA filter through which air must pass before being exhausted;
  - 2° a pressure differential gauge to monitor filter loading;
  - 3° an auto shut off and warning system in case of filter failure; and
  - 4° separate clamps to retain the HEPA filter in place while changing the prefilter.
- 2.1.7 Impermeable Polyethylene Sheeting: must have a minimum thickness of 0.15 mm (6 mil) and a standard width (sheet) to minimize joints. Use new materials only.

- 2.1.8 Rip-Proof Polyethylene Sheet: polyethylene made with a 0.13 mm (5 mil) thick fabric closely woven between two (2) layers of poly laminate with a minimum thickness of 0.04 mm (1.5 mil) each, in sheets large enough to minimize the number of joints on the worksite.
- 2.1.9 Work Gloves: single-use nitrile gloves.
- 2.1.10 Ground Fault Panel: electrical panel installed by a licensed electrician and equipped as follows:
- 1° the ground fault circuit interrupter must be of sufficient capacity to power all electrical equipment and lights in the Mould Remediation Work Area;
  - 2° the circuit interrupters must have a minimum ground fault protection of 5 mA;
  - 3° the panel must be equipped with the necessary accessories, notably a main switch disconnect, a ground fault interrupter light, a test switch to ensure the unit is working and a reset switch; and
  - 4° all openings in the panel must be sealed to avoid any penetration by humidity or dust.

## 2.2 HOARDING WALLS

- 2.2.1 To separate the Mould Remediation Work Area from the Occupied Areas or from another work area, hoarding walls must be erected in the designated locations as follows:
- 1° Type B – Walls of 38 mm x 89 mm (1.5 in. x 3.5 in.) wood studs every 600 mm (24 in.) with continuous sill and top plates, covered with one (1) layer of polyethylene on each side of the walls, itself covered in 13 mm (½ in.) thick plywood on the Occupied Area side.

## 2.3 WORKERS' DECONTAMINATION FACILITY

- 2.3.1 The Contractor must install the Workers' Decontamination Facility at the location approved by the Owner or their representative.

- 2.3.2 The Workers' Decontamination Facility is comprised of two (2) linked rooms: a Contaminated Change Room and a Clean Change Room. The rooms, Occupied Areas and Mould Remediation Work Area must be separated by curtained doors.
- 1° Contaminated Change Room: the room between the Mould Remediation Work Area and the Clean Change Room used to store protective equipment that will be reused in the Mould Remediation Work Area. The main purposes of this room are to:
    - a) Provide a waste bin for contaminated waste, mainly for protective coveralls and disposable equipment;
    - b) Provide a storage area for any reusable protective equipment, but not for respirators.
  - 2° Clean Change Room: the room located between the Contaminated Change Room and the Occupied Areas:
    - a) Provide a source of water for the workers to wash themselves and clean reusable equipment;
    - b) Provide lockers, hangers or other apparatus in sufficient number for workers' street clothes and personal effects and for respirators;
    - c) Provide a storage area for respirators.

## 2.4 WASTE AND EQUIPMENT DECONTAMINATION FACILITY

- 2.4.1 The Contractor must install a Waste and Equipment Decontamination Facility comprised of two (2) linked rooms: a Cleaning Room and a Transfer Room. The purpose of this installation is to allow for the decontamination of waste bins and equipment required in the Mould Remediation Work Area. The rooms, Occupied Areas and Mould Remediation Work Area must be separated by curtained doors.
- 1° Cleaning Room: the room located between the Mould Remediation Work Area and Transfer Room. It must be of sufficient size to allow for proper cleaning of equipment and bins as well as double-bagging of waste.
  - 2° Transfer Room: the room located between the Cleaning Room and Occupied Areas, used as an airlock in order to stop circulation of air during the transfer of waste outside of the Mould Remediation Work Area.

## 2.5 CONSTRUCTION OF DECONTAMINATION FACILITIES

2.5.1 The Contractor must protect the floors as follows:

- 1° Prior to erecting the wall frame, lay one (1) sheet of rip-proof polyethylene over the floor areas that will be covered by the decontamination facilities;
- 2° Once the wall structure is constructed, roll up 600 mm (24 in.) of rip-proof polyethylene over the outside of the perimeter walls;
- 3° Cover the floors of all the rooms with a second layer of rip-proof polyethylene sheeting overlapped and sealed by the polyethylene sheeting on the walls.

2.5.2 The Contractor must build all the walls of the facilities as follows:

- 1° Wood frame made of 38 mm x 89 mm (1.5 in. x 3.5 in.) wood studs every 400 mm (16 in.) with continuous top and sill plates on the upper part;
- 2° Cover the inside of the walls with one (1) layer of impermeable polyethylene;
- 3° Cover the outside of the walls with one (1) layer of rip-proof polyethylene.

2.5.3 The Contractor must construct the ceilings as follows:

- 1° The size of the joists is to be determined by the span. For spans up to 3.3 m (11 ft), use joists of at least 38 mm x 150 mm (1.5 in. x 6 in.) every 400 mm (16 in.) with a continuous header beam of 38 mm x 150 mm (1.5 in. x 6 in.);
- 2° Cover the joists with one layer of 19 mm (¾ in.) plywood sheeting and then caulk and tape the joints. Cover the plywood with two (2) layers of rip-proof polyethylene, one of which overlaps the rip-proof polyethylene on the perimeter walls;
- 3° Put one (1) layer of polyethylene under the joists so as to cover the sides;
- 4° The net height inside the enclosures must be at least 2.0 m (6.5 ft) from the floor to the underside of the joists.

- 2.5.4 The Contractor must construct the curtained doorways as follows:
- 1° For each door between the rooms or between the facilities and the Mould Remediation Work Area, install two (2) overlapping flaps over the full width and height of the opening;
  - 2° Each flap door must be constructed of two (2) layers of polyethylene sheeting with all edges tape-reinforced. Use wood strapping to securely fasten the flaps to the alternate studs and joists;
  - 3° Attach weights to the bottom edge of each flap to ensure spontaneous closure;
  - 4° Provide arrows on the flaps to indicate the direction in which the doors open.

## **PART 3 EXECUTION**

### **3.1 WORKSITE PREPARATION**

- 3.1.1 The Contractor must conduct a survey of existing damage before starting the mould remediation work and submit it to the Owner or their representative.
- 1° The survey must identify the damage observed in the area where the work will be performed as well as the areas that will be entered when transporting waste.
- 3.1.2 All furniture, shelving and other stored materials must be removed by the Owner.
- 1° Clean the furniture of any dust accumulations.
- 3.1.3 Coordinate with the Owner the shutdown of all the HVAC, electrical, sprinkler, telecommunication, and alarm systems inside the Mould Remediation Work Area. Correctly identify all the systems that cannot be deactivated by the Owner and protect them properly.
- 3.1.4 Coordinate with the Owner the location of the Workers' and Waste Decontamination Facilities. Proceed to their construction, as specified in

Section 2.5 “CONSTRUCTION OF DECONTAMINATION FACILITIES” in this section of specifications.

- 3.1.5 Coordinate the construction of Type B hoarding walls between the Mould Remediation Work Area and the Occupied Areas at the necessary locations, as indicated in Sections 2.2 “HOARDING WALLS” in this section of specifications.
- 3.1.6 Protect all uncontaminated porous materials, such as wool insulation, rigid insulation, acoustic ceiling tiles and wallpaper, that will be exposed to the mould remediation work, using impermeable polyethylene sheets.
- 3.1.7 Seal all the openings to the Mould Remediation Work Area located below the ceiling, notably outlets, air diffusers and return air grilles, using polyethylene sheeting and duct tape.
- 3.1.8 Seal all cabinets, shelves, furniture, equipment that must remain in the Mould Remediation Work Area, using sheets of impermeable polyethylene and duct tape.
- 3.1.9 Keep the work area emergency exits accessible or establish alternate exits, as required by fire department officials or local authorities. Set up, as needed, extra exits for the Occupied Areas. Post emergency exit signs that clearly indicate the directions to follow for emergency evacuation. Seal the emergency exit doors so as not to prevent their use during evacuation.
- 3.1.10 Provide temporary lighting throughout the entire Mould Remediation Work Area. This temporary lighting must be safe and effective, with a strength of 550 lux.
- 3.1.11 The Contractor must provide battery-powered emergency lighting to:
- 1° light exit routes through the Mould Remediation Work Area;
  - 2° light all worker emergency exits from Mould Remediation Work Area;
  - 3° provide lighting throughout the Mould Remediation Work Area during loss of power to the ground fault panel.

- 3.1.12 Provide one (1) fire extinguisher at each emergency exit and in the decontamination facilities. Protect the extinguishers with polyethylene sheeting so as not to prevent emergency use.
- 3.1.13 The Contractor must establish negative pressure in the Mould Remediation Work Area as follows:
- 1° Provide a sufficient number of air exhaust units to maintain, at all times, a rate of four (4) air changes per hour in the Mould Remediation Work Area and a pressure differential of 5 Pa;
  - 2° Place the air exhaust units as far as possible from the decontamination facilities;
  - 3° Operate the air exhaust units continuously, from the completion of preparations until the end of dismantling;
  - 4° Replace the prefilters frequently to maintain the device's flow rate;
  - 5° Replace the HEPA filter as needed to maintain the required pressure differential and the integrity of the device;
  - 6° Install and check the airtightness of the air exhaust ducts;
  - 7° Evacuate the air exhaust units directly to the outside of the building;
  - 8° Install panels for fixing the air exhaust ducts to window frames or doors. Remove them at the end of work;
  - 9° Install venting panels for the air exhaust units as follows:
    - a) Place a sheet of plywood 19 mm (¾ inch) thick in the window or door frame;
    - b) Install the panel firmly inside the opening and seal it around its perimeter with caulking;
    - c) For each exhaust unit, provide a 300 mm (12 in.) diameter opening, fitted with mesh;
    - d) Submit shop drawings to show the conditions at exhaust locations.
  - 10° Ensure that the power supply to the Mould Remediation Work Area is isolated at the panel, cut or grounded where necessary. The power supply



of Occupied Areas must continue to operate during the work described in this section.

- 3.1.14 Post warning signs at all curtained doors leading directly into the Mould Remediation Work Area. They must read as follows:

DANGER

MOULD REMEDIATION WORK AREA

RESPIRATORY PROTECTION COMPULSORY

NO ADMITTANCE

- 3.1.15 The Contractor must notify the Mould Remediation Professional at least 24 hours prior to Milestone Inspection A (Clean Perimeter Preparation). Obtain written approval for this step before continuing.

## 3.2 MOULD REMEDIATION

- 3.2.1 The workers must put on their personal protective equipment, i.e., protective coveralls, work gloves and appropriate respirators, as well as comply with all aspects of protection defined in section 1.14 "PROTECTION OF WORKERS".

- 3.2.2 As the removal of the contaminated materials progresses, seal the openings created or exposed, in order to prevent contaminating the rest of the building.

- 3.2.3 The Contractor must remove all the contaminated materials identified on the Professionals' drawings and in the following locations, and treat them as contaminated waste:

1° Ground floor kitchen:

- a) Remove all the prefabricated panels that make up the two freezers. After removing the panels, wrap them entirely with polyethylene sheeting for transportation and disposal;
- b) Remove the floor tiles inside the freezers;
- c) Demolish the first concrete slab of the floor in the kitchen and pick up the debris.

- 2° Basement storage room:
- a) Remove the paint on the ceiling and central column that is mould-contaminated considered lead-containing;
    - i. The paint is considered to be lead-containing, therefore all contaminated waste should be treated as hazardous materials waste.
- 3.2.4 Decontamination of non-porous surfaces:
- 1° Decontaminate non-porous materials, such as concrete or concrete blocks, using a brush with steel bristles to remove any stains.
- 3.2.5 All porous materials, such as rigid insulation, wool insulation and blown insulation exposed after decontamination must be removed and treated as contaminated waste.
- 3.2.6 Maintain the Mould Remediation Work Area:
- 1° The Contractor must keep the enclosures clean and tidy;
  - 2° The Contractor must ensure that the polyethylene sheets are adequately sealed. Repair damaged polyethylene sheets and correct defects as soon as they are discovered;
  - 3° The Contractor must visually inspect the enclosures at the beginning and end of each shift and perform any necessary repairs;
  - 4° The Contractor must inspect and verify the air exhaust units, including air exhaust ducts at the beginning and end of each shift. Replace filters when the air flow rate falls to 70% of maximum rate. Immediately replace defective devices.
- 3.2.7 Handling of waste and materials:
- 1° The Contractor must pack into sealed waste bins, transport and dispose of as contaminated waste:
    - a) all the materials identified in section 1.5 “WORKSITE CONDITIONS” and Part 3 “EXECUTION” and that were contaminated during the work;
    - b) the clutter and debris removed during contaminated work.

- 2° Place all debris that can tear 0.15 mm (6 mil) polyethylene bags into rigid containers and seal them before disposal;
- 3° The Contractor must remove waste bins as well as equipment or other materials from the Mould Remediation Work Area by passing through the Waste and Equipment Decontamination Facility as follows:
  - a) Before entering the Cleaning Room, one worker removes all traces of visible contamination on the surface of the element;
  - b) The worker transfers the item into the Cleaning Room, where a second worker cleans it with a wet sponge before sealing it with a second bag (double bagging) or wrapping it and then passes it to a third worker, who is in the Transfer Room.
    - i. The worker present in the Cleaning Room must also wear all personal protective equipment and cannot leave the Waste and Equipment Decontamination Facility without passing through the Mould Remediation Work Area to get to the Workers' Decontamination Facility;
  - c) The third worker, situated in the Transfer Room, passes the waste bin behind the last of the curtain doors and places it outside the Decontamination Facility to be transported to the appropriate container.
- 4° Transport of all the materials and waste:
  - a) According to the predetermined routes and exits;
  - b) Through uncontaminated areas, using covered and closed carts;
  - c) The Contractor must equip workers beforehand with all the necessary personal protective equipment and tools to properly pick up contaminated debris that might fall from the waste bin if torn.
- 5° The waste containers must:
  - a) be picked up and dropped off at preapproved times;
  - b) be dropped off in the areas identified in the bidding documents;
  - c) remain covered and closed as long as they are situated near the building. The Contractor must keep these areas clean at all times.
- 6° After each load of waste, clean the routes taken and loading areas;

- 7° At the end of the removal work, the Contractor must obtain approval from the Mould Remediation Professional (Milestone Inspection B), before the cleaning.

### 3.3 CLEANING OF THE MOULD REMEDIATION WORK AREA

- 3.3.1 Carry out cleaning of all surfaces (walls, ceiling, structure, ventilation, piping, electrical wiring) located in the Mould Remediation Work Area using cleaner and water or a HEPA vacuum:
  - 1° Wash surfaces with an approved cleaner; avoid bleach. Allow the solution to work according to the manufacturer's recommendations. If a solution of a diluted t.s.p is used, let it work for about 15 minutes. Use hard bristle brushes like the ones used for removing stains;
  - 2° Upon completion of the cleaning, dry the Mould Remediation Work Area using a wet vacuum (Shop-Vac), rubber-edged scraper (squeegee) and fans;
  - 3° Advise the Mould Remediation Professional at least 24 hours prior to the Milestone Inspection C (Visual Acceptance of the Cleaning Work). Obtain written approval for this step before continuing;
  - 4° Following the acceptance of Milestone Inspection C (Visual Acceptance of the Cleaning Work), coordinate the air sampling required for Milestone Inspection D with the Mould Remediation Professional and obtain written approval for this step before continuing. This sampling must be done at least 16 hours after Milestone Inspection C is accepted.

### 3.4 DISMANTLING THE MOULD REMEDIATION WORK AREA

- 3.4.1 Remove all temporary lighting and electrical panels with ground fault circuit interrupters.
- 3.4.2 Perform the dismantling of the Mould Remediation Work Area while wearing a half mask respirator equipped with N95 filters and protective coveralls.
- 3.4.3 Remove all the sheets of polyethylene, duct tape and caulking that, among other things, make up the enclosures. Carefully remove the polythene sheets by rolling them towards the middle of the worksite.

- 3.4.4 Clean the walls and floors as they become exposed when the polyethylene sheets are removed. Wash surfaces with an approved cleaner; avoid bleach. Allow the solution to work for about 15 minutes or according to the manufacturer's recommendations or clean the surfaces using a HEPA vacuum.
- 3.4.5 Place the polyethylene sheets, duct tape, cleaning equipment, protective coveralls and other contaminated waste into waste bins and dispose of them properly.
- 3.4.6 Leave the air exhaust units on during removal of the polyethylene sheets.
- 3.4.7 Seal the air intake and exhaust openings of the air exhaust units using polyethylene sheeting before transport.

### **3.5 END OF WORK**

- 3.5.1 The Contractor must repair all the damage that was not identified during the survey preceding the mould remediation.
- 3.5.2 Re-install the equipment removed at the start of work.
- 3.5.3 The Contractor must coordinate the start-up of systems that were shut down before starting the work.

END OF SECTION







# BISSONFORTIN

et associés ARCHITECTES

2555, boul. Le Corbusier , bureau 200 | Laval | Québec | H7S 1Z4  
T 450.682.6360 F 450.682.1751 [www.bissonfortin.ca](http://www.bissonfortin.ca)

