



# **SPECIFICATIONS**

**SOLICITATION #:** 21-58074

**BUILDING:** STJ  
Memorial University Campus, 1 Arctic Avenue  
St-John's, NL

**PROJECT:** STJ – Washroom and Kitchen Upgrade

**PROJECT #:** STJ-6056

**Date:** November 2021



# **SPECIFICATION**

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National Research Council    Conseil national de recherches  
Canada                            Canada

Finance and Procurement    Services financiers et  
Services                            d'approvisionnement

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## Construction Tender Form

**Project Identification    STJ – Washroom and Kitchen Upgrade**

**Tender No.:    21-58074**

**1.2    Business Name and Address of Tenderer**

**Name** \_\_\_\_\_

**Address** \_\_\_\_\_

\_\_\_\_\_

**Contact Person(Print Name)** \_\_\_\_\_

**Telephone** (\_\_\_\_\_) \_\_\_\_\_    **Fax:** (\_\_\_\_\_) \_\_\_\_\_

**1.3 Offer**

I/We the Tenderer, hereby offer to Her Majesty the Queen in Right of Canada (hereinafter referred to as “Her Majesty”) represented by the National Research Council Canada to perform and complete the work for the above named project in accordance with the Plans and Specifications and other Tender Documents, at the place and in the manner set out therein for the Total Tender Amount (to be expressed in numbers only) of: \$\_\_\_\_\_. \_\_\_\_\_ **in lawful money of Canada (excluding GST/HST)**

The above amount is inclusive of all applicable (\*) Federal, Provincial and Municipal taxes except that in the event of a change in any tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property, that occurs

- .1        after the date this tender was mailed or delivered, or
- .2        if this tender is revised, after the date of the last revision

the amount of this offer shall be decreased or decreased in the manner provided for in GC22 of the General Conditions of the Contract Documents.

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### **1.3.1 Offer** (continued)

(\*) For the purpose of this tender, the Goods and Services Tax (GST) is not to be considered as an applicable tax.

In the province of Quebec, the Quebec Sales Tax is not to be included in the tender amount because the Federal Government is exempt from this tax. Tenderers shall make arrangements directly with the provincial Revenue Department to recover any tax they may pay on goods and services acquired in the performance of this contract. However, tenderers should include in their tender amount Quebec Sales Tax for which an Input Tax Refund is not available.

### **1.4 Acceptance and Entry into Contract**

I/We undertake, within fourteen (14) days of notification of acceptance of my/our offer, to sign a contract for the performance of the work provided I/we are notified, by the Department, of the acceptance of my/our offer within 30 days of the tender closing date.

### **1.5 Construction Time**

I/We Agree to complete the work within the time stipulated in the specification from the date of notification of acceptance of my/our offer.

### **1.6 Bid Security**

I/We herewith enclose tender security in accordance with Article 5 of the General Instruction to Tenderers.

I/We understand that if a security deposit is furnished as tender security and if I/we refuse to enter into a contract when called upon to do so, my/our security deposit shall be forfeited but the Minister may, if it is in the public interest, waive the right of Her Majesty to forfeit the security deposit.

I/We understand that if the security furnished is not in the approved form as described in Article 5 of the General Instructions to Tenderers, my/our tender is subject to disqualification.

### **1.7 Contract Security**

Within fourteen (14) days after receipt of written notification of the acceptance of my/our offer, I/we will furnish contract security in accordance with the Contract Conditions "F" of the Contract Documents.

I/We understand that the contract security referred to herein, if provided in the form of a bill of exchange, will be deposited into the Consolidated Revenue Fund of Canada.

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Canada                              Canada

Finance and Procurement    Services financiers et  
Services                              d'approvisionnement

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**1.8    Appendices**

This Tender Form includes Appendix No. \_\_\_\_\_N/A\_\_\_\_\_.

**1.9    Addenda**

The Total Tender Amount provides for the Work described in the following Addenda:

NUMBER	DATE	NUMBER	DATE

**(Tenderers shall enter numbers and dates of addenda)**

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National Research Council Canada	Conseil national de recherches Canada
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Finance and Procurement Services	Services financiers et d'approvisionnement
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**1.10 Execution of Tender**

The Tenderer shall refer to Article 2 of the General Instructions to Tenderers.

**SIGNED, ATTESTED TO AND DELIVERED on the \_\_\_\_\_ day of  
\_\_\_\_\_ on behalf of**

\_\_\_\_\_  
(Type or print the business name of the Tenderer)

AUTHORIZED SIGNATORY (IES)

\_\_\_\_\_  
(Signature of Signatory)

\_\_\_\_\_  
(Print name & Title of Signatory)

\_\_\_\_\_  
(Signature of Signatory)

\_\_\_\_\_  
(Print name & Title of Signatory)

**SEAL**

# BUYANDSELL NOTICE

## STJ – Washroom and Kitchen Upgrade

The National Research Council Canada, Memorial University Campus, 1 Arctic Avenue, St-John's, NL has a requirement for a project that includes:

Work under this contract covers upgrades to the washroom and kitchen located in the National Research Council Canada Main Building located at 1 Arctic Avenue, St. John's NF.

### 1. GENERAL:

Questions regarding any aspect of the project are to be addressed to and answered only by the Departmental Representative (or his designate) or the Contracting Authority.

Any information received other than from the Departmental Representative (or his designate) or the Contracting Authority will be disregarded when awarding the contract and during construction.

Firms intending to submit tenders on this project should obtain tender documents through the Buyandsell.gc.ca TMA services provider. Addenda, when issued, will be available from the Buyandsell.gc.ca TMA service provider. Firms that elect to base their bids on tender documents obtained from other sources do so at their own risk and will be solely responsible to inform the tender calling authority of their intention to bid. Tender packages are not available for distribution on the actual day of tender closing.

### 2. MANDATORY SITE VISIT:

It is mandatory that the bidder attends one of the site visits at the designated date and time. At least one representative from proponents that intend to bid must attend.

The site visits will be held on December 7<sup>th</sup> and December 8<sup>th</sup>, 2021 at **10:00am** . Meet Monty Fudge at STJ Building , Memorial University Campus, 1 Arctic Avenue, St-John's, NL. Bidders who, for any reason, cannot attend at the specified date and time will not be given an alternative appointment to view the site and their tenders, therefore, will be considered as non-responsive. **NO EXCEPTIONS WILL BE MADE.**

As proof of attendance, at the site visit, the Contracting Authority will have an Attendance Form which **MUST** be signed by the bidder's representative. It is the responsibility of all bidders to ensure they have signed the Mandatory Site Visit Attendance form prior to leaving the site. Proposals submitted by bidders who have not attended the site visit or failed to sign the Attendance Form will be deemed non-responsive.

\* Due to COVID-19, we are taking additional measures to protect you and our employees at the site visits.

- To allow NRC to prepare for the site visits, all proponents are asked to pre-register preferably 48 hours ahead of the job showing and identify their preferred site visit date. Please register by emailing Monty Fudge at [Monty.Fudge@nrc-cnrc.gc.ca](mailto:Monty.Fudge@nrc-cnrc.gc.ca). Bidders shall provide contact name, email and phone number of person attending.
- At the site visit, to limit contact and risks:
  - o The proponents will sanitize their hands at the hand sanitizing station.
  - o The proponents will be asked to sign the Attendance Form. It is the responsibility of all proponents to verify information on the Attendance Form.



- The site visit will proceed with a maximum of four (4) proponents at a time. Each group will have approximately 20 minutes to review the site. The site visit will continue with the next group of four (4) proponents until each one has had a chance to review the site.
  - The site visits could take longer than usual, therefore anticipate a longer meeting duration.
  - Physical distancing: keeping a distance of at least 2 arms-length (approximately 2 metres) from others may not be possible at all times, therefore the use of NRC issued disposable face coverings to reduce the risk of transmission of COVID-19 is mandatory.
  - The proponents shall not impede safe access to and from the facility.
- Depending on the anticipated amount of pre-registration, the NRC may decide to schedule time slots for every group of four (4) proponents. The time slot for your site visit will be confirmed by the NRC Departmental Representative by email upon pre-registration. That time will supersede the site visit meeting time specified above.
  - Proposals submitted by bidders who have not attended the site visit or failed to submit their identification and contact information at the site visit will be deemed non-responsive.

### **3. TENDER CLOSING DATE:**

Tender closing date is December 21<sup>st</sup>, 2021 at 14:00.

### **4. TENDER RESULTS**

Following the Tender closing, the tender results will be sent by e-mail to all Contractors who submitted a tender.

## **5. SECURITY REQUIREMENT FOR CANADIAN CONTRACTORS**

### **5.1 MANDATORY SECURITY REQUIREMENT:**

.1 All personnel that will be involved with the project must be security screened to **RELIABILITY** status level as defined in the security policy of Canada.

## **6.0 WHSCC (WORKPLACE HEALTH SAFETY AND COMPENSATION COMMISSION)**

- .1 All Bidders must provide a valid WHSCC certificate with their Tender or prior to contract award.

## **7.0 OFFICE OF THE PROCUREMENT OMBUDSMAN**

- .1 Dispute Resolution Services  
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will, on request or consent of the parties to participate in an alternative dispute resolution process to resolve any dispute between the parties respecting the interpretation or application of a term and condition of this contract and their consent to bear the cost of such process, provide to the parties a proposal for an alternative dispute resolution

process to resolve their dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at [boa.opo@boa-opo.gc.ca](mailto:boa.opo@boa-opo.gc.ca).

- .2 **Contract Administration**  
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will review a complaint filed by [*the supplier or the contractor or the name of the entity awarded this contract*] respecting administration of this contract if the requirements of Subsection 22.2(1) of the *Department of Public Works and Government Services Act* and Sections 15 and 16 of the *Procurement Ombudsman Regulations* have been met, and the interpretation and application of the terms and conditions and the scope of the work of this contract are not in dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at [boa.opo@boa-opo.gc.ca](mailto:boa.opo@boa-opo.gc.ca).
  
- .3 The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under \$25,000 for goods and under \$100,000 for services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at [boa.opo@boa-opo.gc.ca](mailto:boa.opo@boa-opo.gc.ca). You can also obtain more information on the OPO services available to you at their website at [www.opo-boa.gc.ca](http://www.opo-boa.gc.ca).

The Departmental Representative or his designate for this project is: **Monty Fudge**  
**[Monty.Fudge@nrc-cnrc.gc.ca](mailto:Monty.Fudge@nrc-cnrc.gc.ca)**  
Telephone: **709 772-4294**

Contracting Authority for this project is: **Collin Long**  
**[Collin.Long@nrc-cnrc.gc.ca](mailto:Collin.Long@nrc-cnrc.gc.ca)**

## INSTRUCTIONS TO BIDDERS

### Article 1 – Receipt of Tender

- 1a) Tender must be received **by email only** not later than the specified tender closing time. Electronic bids received after the indicated closing time - NRC servers received time - will be irrevocably rejected. Bidders are urged to send their proposal sufficient time in advance of the closing time to prevent any technical issues. NRC will not be held responsible for bids sent before closing time but received by the NRC servers after the closing time. Tenders received after this time are invalid and shall not be considered, regardless of any reason for their late arrival.
- 1b) A letter of printed telecommunication from a bidder quoting a price shall not be considered as a valid tender unless a formal tender has been received on the prescribed Tender Form.
- 1c) Bidders may amend their tenders by **email only** provided that such amendments are received not later than the specified tender closing time.
- 1d) Any amendments to the tender which are transmitted by **email only** must be signed and must clearly identify the tenderer.

All such amendments are to be addressed to:  
National Research Council of Canada  
Collin Long, Senior Contracting Officer

[Collin.Long@nrc-cnrc.gc.ca](mailto:Collin.Long@nrc-cnrc.gc.ca)

### Article 2 – Tender Form & Qualifications

- 1) All tenders must be submitted on the Construction Tender Form and the tender must be signed in compliance with the following requirements:
  - a) Limited Company: The full names of the Company and the name(s) and status of the authorized signing officer(s) must be printed in the space provided for that purpose. The signature(s) of the authorized officer(s) and the corporate seal must be affixed.
  - b) Partnership: The firm name and the name(s) of the person(s) signing must be printed in the space provided. One or more of the partners must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.
  - c) Sole Proprietorship : The business name and the name of the sole proprietor must be printed in the space provided. The sole proprietor must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.
- 2) Any alterations in the printed part of the Construction Tender Form or failure to provide the information requested therein, may render the tender invalid.
- 3) All space in the Construction Tender Form must be completed and any handwritten or typewritten corrections to the parts so completed must be initialed immediately to the side of the corrections by the person or persons executing the tender on behalf of the the tenderer.
- 4) Tenders must be based on the plans, specifications and tender documents provided.

- 5) A proposal submitted by a bidder who's Board of Directors or proprietor (s) are in majority the same as a former vendor who has declared bankruptcy while performing work for NRC over the last 7-years from the date of issuance of this RFP may be rejected and not eligible for award at NRC's sole discretion. In such case, NRC will advise the ineligible proponent(s).
- 6) A proposal submitted by a bidder who has had a previous contracts cancelled by NRC due to lack of performance within 3 years from the issuance date of this RFP may be rejected and not eligible for award at NRC's sole discretion. In such case, NRC will advise the ineligible proponent (s).
- 7) If there is discrepancy between the English version and the French version of this document and any of the attachments and amendments, the English version will takes precedence.
- 8) Bidders must adhere to the COVID-19 Vaccination Policy for Supplier Personnel. In accordance with the COVID-19 Vaccination Policy for Supplier Personnel, all Bidders must provide with their bid, the COVID-19 Vaccination Requirement Certification attached to this bid solicitation (refer to **Appendix "H"**), to be given further consideration in this procurement process. This Certification incorporated into the bid solicitation on its closing date is incorporated into, and forms a binding part of any resulting Contract.

#### Article 3 - Contract

- 1) The Contractor will be required to sign a contract similar to the Standard Contract Form for Fixed Price Construction Contracts, a blank specimen of which is enclosed in the package for reference purposes.

#### Article 4 – Tender Destination

- 1a) Tenders are to be submitted **by email only**:  
National Research Council Canada

[Collin.Long@nrc-cnrc.gc.ca](mailto:Collin.Long@nrc-cnrc.gc.ca)

Endorsed "Tender for (insert title of work as it appears in the drawings and specifications)" and must bear the name and address of the tenderer.

- 1b) Unless otherwise specified, the only documents required to be submitted with the tender are the Tender form and the Bid Security.

#### Article 5 - Security

- 1a) Bid Security is required and must be submitted in one of the following forms:
  - i) bonds of the Government of Canada, or bonds unconditionally guaranteed as to principal and interest by the Government of Canada; **OR**
  - ii) a bid bond.
- 1b) Regardless of the Bid Security submitted, it should never be more than \$250,000 maximum, calculated at 10% of the first \$250,000 of the tendered price, plus 5% of any amount in excess of \$250,000.

- 1c) Bid Security shall accompany each tender or, if forwarded separately from the tender, shall be provided not later than the specified tender closing time. Bid bond or E-bond Security must be in the ORIGINAL form. PDF via email is acceptable. FAILURE TO PROVIDE THE REQUIRED BID SECURITY SHALL INVALIDATE THE TENDER.
- 1d) The successful tenderer is required to provide security within 14 days of receiving notice of tender acceptance. The tenderer must furnish EITHER:
- i) a Security Deposit as described in 1(b) above together with a Labour and Material Payment Bond in the amount of at least 50% of the amount payable under the contract, OR
  - ii) a Performance Bond and a Labour and Material Payment Bond – each in the amount of 50% of the amount payable under the contract.
- 1e) Bonds must be in an approved form and from the companies whose

bonds are acceptable to the Government of Canada. Samples of the approved form of Bid Bond, Performance Bond and Labour and Material Payment Bond and a list of acceptable Bonding Companies may be obtained from the Contracting Officer, National Research Council, Building M-58, Montreal Road, Ottawa, Ontario, K1A 0R6.

#### Article 6 – Sales Tax

- 1) The amount of the tender shall include all taxes as levied under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act or the Customs Tariff, in force or applicable at the time.
- 1) In Quebec, the Provincial Sales Tax should not be included in the Tender Price as the Federal Government is exempt. Tenderers should contact the Provincial Revenue Minister to recover all taxes paid for goods and services rendered under this contract.

Tenderers must include in their Tender Price the amount of Provincial Sales Tax for which the exemption does not apply.

#### Article 7 – Examination of Site

- 1) All parties tendering shall examine the sites of the proposed work before sending in their tender and make themselves thoroughly acquainted with the same and obtain for themselves any and all information that may be necessary for the proper carrying out of the Contract. No after claim will be allowed or entertained for any work or material that may be requisite and necessary for the proper execution and completion of this Contract with the exception of that provided for under GC 35 in the General Conditions of the General Specification.

#### Article 8 – Discrepancies, Omissions, Etc.

- 1a) Bidders finding discrepancies in, or omissions from, drawings, specifications or other documents, or having any doubt as to the meaning or intent of any part thereof, should at once notify the Engineer who will send written instructions or explanation to all bidders.
- 1b) Neither the Engineer nor the Council will be responsible for oral instructions.
- 1c) Addenda or corrections issued during the time of the bidding shall be covered in the proposal. However, the contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work and made prior to the date of the contract.

Article 9 – No additional Payments for Increased Costs

- 1) The only other adjustments in the contract price allowed are those specified in the General Conditions of the General Specification. The contract price will not be amended for change in freight rates, exchange rates, wage rates or cost of materials, plant or services.

Article 10 – Awards

- 1a) The Council reserves the power and right to reject tenders received from parties who cannot show a reasonable acquaintance with and preparation for the proper performance of the class of work herein specified and shown on plans. Evidence of such competence must be furnished by the tenderers if required to do so.
- 1b) A tenderer may be required to furnish to the Contracting Office, National Research Council of Canada, Building M-58, 1200 Montreal Road, Ottawa, Ontario, K1A 0R6, Canada, unsigned copies of the insurance requirements as covered by the Insurance Conditions of the General Specification.
- 1c) The Council does not bind itself to accept the lowest or any tender.

Article 11 – Harmonized Sales Tax

- 1) The Harmonized Sales Tax (HST) which is now in effect shall be considered an applicable tax for the purpose of this tender. However, the bidder shall NOT include any amount in the bid price for said HST. The successful contractor will indicate on each application for payment as a separate amount the appropriate HST the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract in addition to the amount certified for payment under the Contract and will therefore not affect the Contract Price. The Contractor agrees to remit any HST collected or due to Revenue Canada

## **Acceptable Bonding Companies**

Published September 2010

The following is a list of insurance companies whose bonds may be accepted as security by the government.

### **1. Canadian Companies**

- ACE INA Insurance
- Allstate Insurance Company of Canada
- Ascentus Insurance Ltd. (Surety only)
- Aviva Insurance Company of Canada
- AXA Insurance (Canada)
- AXA Pacific Insurance Company
- Canadian Northern Shield Insurance Company
- Certas Direct Insurance Company (Surety only)
- Chartis Insurance Company of Canada (formerly AIG Commercial Insurance Company of Canada)
- Chubb Insurance Company of Canada
- Commonwealth Insurance Company
- Co-operators General Insurance Company
- CUMIS General Insurance Company
- The Dominion of Canada General Insurance Company
- Echelon General Insurance Company (Surety only)
- Economical Mutual Insurance Company
- Elite Insurance Company
- Everest Insurance Company of Canada
- Federated Insurance Company of Canada
- Federation Insurance Company of Canada
- Gore Mutual Insurance Company
- Grain Insurance and Guarantee Company
- The Guarantee Company of North America
- Industrial Alliance Pacific General Insurance Corporation
- Intact Insurance Company
- Jevco Insurance Company (Surety only)
- Lombard General Insurance Company of Canada
- Lombard Insurance Company
- Markel Insurance Company of Canada
- The Missisquoi Insurance Company
- The Nordic Insurance Company of Canada
- The North Waterloo Farmers Mutual Insurance Company (Fidelity only)
- Novex Insurance Company (Fidelity only)
- The Personal Insurance Company
- Pilot Insurance Company
- Quebec Assurance Company
- Royal & Sun Alliance Insurance Company of Canada
- Saskatchewan Mutual Insurance Company
- Scottish & York Insurance Co. Limited
- The Sovereign General Insurance Company
- TD General Insurance Company
- Temple Insurance Company

- Traders General Insurance Company
- Travelers Guarantee Company of Canada
- Trisura Guarantee Insurance Company
- The Wawanesa Mutual Insurance Company
- Waterloo Insurance Company
- Western Assurance Company
- Western Surety Company

## 2. Provincial Companies

Surety bonds issued by the following companies may be accepted provided that the contract of suretyship was executed in a province in which the company is licensed to do business as indicated in brackets.

- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- ALPHA, Compagnie d'Assurances Inc. (Que.)
- Canada West Insurance Company (Ont., Man., Sask, Alta., B.C., N.W.T.) (Surety only)
- The Canadian Union Assurance Company (Que.)
- La Capitale General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., Que.(Surety only), Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Coachman Insurance Company (Ont.)
- Continental Casualty Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- GCAN Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- The Insurance Company of Prince Edward Island (N.S., P.E.I., N.B.)
- Kingsway General Insurance Company (N.S., N.B., Que., Ont., Man., Sask., Alta., and B.C.)
- Liberty Mutual Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Manitoba Public Insurance Corporation (Man.)
- Norgroupe Assurance Générales Inc.
- Orleans General Insurance Company (N.B., Que., Ont.)
- Saskatchewan Government Insurance Office (Sask.)
- SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alta.)
- L'Unique General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., N.B., Que.(Surety only), Ont.(Surety only), Man., Sask., Alta., B.C.(Surety only), Nun., N.W.T., Yuk.)

## 3. Foreign Companies

- Aspen Insurance UK Limited
- Compagnie Française d'Assurance pour le Commerce Extérieur (Fidelity only)
- Eagle Star Insurance Company Limited
- Ecclesiastical Insurance Office Public Limited Company (Fidelity only)
- Lloyd's Underwriters
- Mitsui Sumitomo Insurance Company, Limited
- NIPPONKOA Insurance Company, Limited
- Sompo Japan Insurance Inc.
- Tokio Marine & Nichido Fire Insurance Co., Ltd.
- XL Insurance Company Limited (Surety only)
- Zurich Insurance Company Ltd



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## Articles of Agreement

Standard Construction Contract – Articles of Agreement  
(23/01/2002)

- A1 Contract Documents
- A2 Date of Completion of Work and Description of Work
- A3 Contract Amount
- A4 Contractor's Address
- A5 Unit Price Table

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## Articles of Agreement

These Articles of Agreement made in duplicate this      day of      .

Between

**Her Majesty the Queen**, in right of Canada (referred to in the contract documents as “ Her Majesty”) represented by the National Research Council Canada (referred to in the contract documents as the “Council”)

and

(referred to in the contract documents as the “Contractor”)

Witness that in consideration for the mutual promises and obligations contained in the contract, Her Majesty and the Contractor covenant and agree as follows:

A1      Contract Documents

**(23/01/2002)**

1.1      Subject to A1.4 and A1.5, the documents forming the contract between Her Majesty and the Contractor, referred to herein as the contract documents, are

1.1.1    these Articles of Agreement,

1.1.2    the document attached hereto, marked “A” and entitled “Plans and Specifications”, referred to herein as the Plans and Specifications,

1.1.3    the document attached hereto, marked “B” and entitled “Terms of Payment”, referred to herein as the Terms of Payment,

1.1.4    the document attached hereto, marked “C” and entitled “General Conditions”, referred to herein as the General Conditions,

1.1.5    the document attached hereto, marked “D” and entitled “Labour Conditions”, referred to herein as the Labour Conditions,

1.1.6    the document attached hereto, marked “E” and entitled “Insurance Conditions”, referred to herein as the Insurance Conditions,

1.1.7    the document attached hereto, marked “F” and entitled “Contract Security Conditions”, referred to herein as the Contract Security Conditions, and

1.1.8    any amendment or variation of the contract documents that is made in accordance with the General Conditions.

1.1.9    the document entitled Fair Wage Schedules for Federal Construction Contracts referred to herein as Fair Wage Schedules

1.1.10

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## Articles of Agreement

The Council hereby designates \_\_\_\_\_ of \_\_\_\_\_ of the Government of Canada as the Engineer for the purposes of the contract, and for all purposes of or incidental to the contract, the Engineer's address shall be deemed to be:

### 1.2 In the contract

1.3.1 "Fixed Price Arrangement" means that part of the contract that prescribes a lump sum as payment for performance of the work to which it relates; and

1.3.2 "Unit Price Arrangement" means that part of the contract that prescribes the product of a price multiplied by a number of units of measurement of a class as payment for performance of the work to which it relates.

1.3 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Unit Price Arrangement are not applicable to any part of the work to which a Fixed Price Arrangement is applicable.

1.4 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Fixed Price Arrangement are not applicable to any part of the work to which a Unit Price Arrangement is applicable.

### A2 Date of Completion of Work and Description of Work

**(23/01/2002)**

2.1 The contractor shall, between the date of these Articles of Agreement and the \_\_\_\_\_, \_\_\_\_\_, in the careful and workmanlike manner, diligently perform and complete the following work:

which work is more particularly described in the Plans and Specifications.

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## Articles of Agreement

### A3 Contract Amount

**(23/01/2002)**

- 3.1 Subject to any increase, decrease, deduction, reduction or set-off that may be made under the Contract, Her Majesty shall pay the Contractor at the times and in the manner that is set out or referred to in the Terms of Payment
- 3.1.1 the sum of \_\_\_\_\_ (GST/HST extra), in consideration for the performance of the work or the part thereof that is subject to Fixed Price Arrangement, and
- 3.1.2 a sum that is equal to the aggregate of the products of the number of units of Measurement of each class of labour, plant and material that is set out in a Final Certificate of Measurement referred to in GC44.8 multiplied in each case by the appropriate unit price that is set out in the Unit Price Table in consideration for the performance of the work or the part thereof that is subject to a Unit Price Arrangement.
- 3.2 For the information and guidance of the Contractor and the persons administering the contract on behalf of Her Majesty, but not so as to constitute a warranty , representation or undertaking of any nature by either party, it is estimated that the total amount payable by Her Majesty to the Contractor for the part of the work to which a Unit Price Arrangement is applicable will be approximately \$N/A
- 3.3 A3.1.1 is applicable only to a Fixed Price Arrangement.
- 3.4 A3.1.2 and A3.2 applicable only to a Unit Price Arrangement.

### A4 Contractor's Address

**(23/01/2002)**

- 4.1 For all purposes of or incidental to the contract, the Contractor's address shall be deemed to be:

**Articles of Agreement**

A5 Unit Price Table

(23/01/2002)

5.1 Her Majesty and the Contractor agree that the following table is the Unit Price Table for the purposes of the contract.

<b>Column 1</b> Item	<b>Column 2</b> Class of Labour Plant  Or Material	<b>Column 3</b> Unit of Measurement	<b>Column 4</b> Estimated Total Quantity	<b>Column 5</b> Price per Unit	<b>Column 6</b> Estimated Total Price
		N/A			

5.2 The Unit Price Table that is set out in A5.1 designates the part of the work to which a Unit Price Arrangement is applicable.

5.3 The part of the work that is not designated in the Unit Price Table referred to in A5.2 is the part of the work to which a Fixed Price Arrangement is applicable.

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**Articles of Agreement**

Signed on behalf of Her Majesty by

\_\_\_\_\_

as Senior Contracting Officer

and \_\_\_\_\_

as \_\_\_\_\_

of the **National Research Council Canada**

on the \_\_\_\_\_

day of \_\_\_\_\_

Signed, sealed and delivered by

\_\_\_\_\_

as \_\_\_\_\_ and  
Position

by \_\_\_\_\_

as \_\_\_\_\_ and  
Position

of

on the \_\_\_\_\_

day of \_\_\_\_\_

**Seal**

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# **SPECIFICATION**

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**WASHROOM & KITCHEN UPGRADES  
NRC**

**Project # STJ-6056**

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**Prepared for:**



**National Research  
Council Canada**

**Conseil national de  
recherches Canada**

**Prepared by:**

**GIBBONS SNOW ARCHITECTS INC.**

**WASHROOM and KITCHEN UPGRADES  
NRC ST. JOHN'S FACILITY**

**Contract # 939984**

**SPECIFICATIONS**

**ISSUED FOR TENDER**

**October 5, 2021**

**CONSULTANTS:**

**Prime Consultant & Architects  
Engineering Consultants**

**Gibbons Snow Architects Inc.  
CBCL Ltd.**

**NRC Project No. STJ-6056**

**GSA Project No. 19-6201-09**



**ARCHITECTURAL:**



**MECHANICAL:**



**ELECTRICAL:**



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Appendix 1

Canadian Construction Association COVID-19 Standardized Protocols for All Canadian Construction Sites

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WASHROOM & KITCHEN UGRADES  
NRC  
PROJECT NO. STJ-6056

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## 1.1 SCOPE OF WORK

- .1 Work under this contract covers the Washroom & Kitchen Upgrades as indicated on the drawings at the National Research Council building on Arctic Avenue in St. John's, NL.

## 1.2 DRAWINGS

- .1 The following drawings illustrate the work and form part of the contract documents:

### ARCHITECTURAL

A1	DEMOLITION FLOOR PLAN
A2	NEW CONDITIONS FLOOR PLAN
A3	NEW CONDITIONS REFLECTED CEILING PLAN
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A5	DETAILS
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### MECHANICAL

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M2	MECHANICAL FLOORPLAN LAYOUTS EXISTING/DEMOLITION
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### ELECTRICAL

E1	ELECTRICAL LEGEND, SCHEDULES & GENERAL NOTES
E2	ELECTRICAL FLOORPLAN LAYOUTS EXISTING/DEMOLITION
E3	ELECTRICAL FLOORPLAN LAYOUT REVISED

## 1.3 COMPLETION

- .1 Complete all work within 16 week(s) after receipt of notification of acceptance of tender.

## 1.4 GENERAL

- .1 The word "provide" in this Specification means to supply and install.
- .2 Provide items mentioned in either the drawings or the specification.

## 1.5 SPECIFIED ACCEPTABLE & ALTERNATIVE EQUIPMENT & MATERIALS

- .1 Materials and equipment scheduled and/or specified on the drawings or in the specifications have been selected to establish a performance and quality standard. In most cases, acceptable manufacturers are stated for any material or equipment specified by manufacturer's name and model number. Contractors may base their tender price on materials and equipment supplied by any of the manufacturers' names as acceptable for the particular material or equipment.
- .2 In addition to the manufacturers specified or named as acceptable, you may propose alternative manufacturers of materials or equipment to the NRC Departmental Representative for acceptance. For a product to be considered as an alternative product substitute, make a written

application to the NRC Departmental Representative during the tender period, not later than seven (7) working days before tender closing.

- .3 Certify in writing that the alternative meets all requirements of the specified material or equipment. In addition, it shall be understood that all costs required by or as a result of acceptance or proposed alternatives, will be borne by the contractor.
- .4 Approval of alternatives will be signified by issue of an Addendum to the Tender Documents.
- .5 Any alternative manufacturers or materials submitted which are incomplete and cannot be evaluated, or are later than seven (7) working days before tender closing date or after the tender period, will not be considered.

#### 1.6 MINIMUM STANDARDS

- .1 Conform to or exceed minimum acceptable standards of the various applicable federal, provincial and municipal codes such as The National Building Code, The National Fire Code, Canadian Plumbing Code, Canadian Electrical Code, Canadian Code for Construction Safety and the Provincial Construction Safety Act.
- .2 Work to conform to referenced standards and codes as reaffirmed or revised to date of specification.

#### 1.7 WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS)

- .1 The general contractor shall comply with Federal and Provincial legislation regarding the WHMIS. The contractor's responsibilities include, but are not limited to the following:
  - .1 To ensure that any controlled product brought on site by the contractor or sub-contractor is labeled;
  - .2 To make available to the workers and the NRC Departmental Representative, Material Safety Data Sheets (MSDS) for these controlled products;
  - .3 To train own workers about WHMIS, and about the controlled products that they use on site;
  - .4 To inform other contractors, sub-contractors, the NRC Departmental Representative, authorized visitors and outside inspection agency personnel about the presence and use of such products on the site.
  - .5 The site foreman or superintendent must be able to demonstrate, to the satisfaction of the Departmental Representative, that he/she has had WHMIS training and is knowledgeable in its requirements. The Departmental Representative can require replacement of this person if this condition or implementation of WHMIS is not satisfactory.

#### 1.8 DESIGNATED SUBSTANCES

- .1 Comply with Provincial legislation if encountering specifically listed designated substances on the work site while performing the work described in these contract documents:

- .1 It is the responsibility of the general contractor to ensure that each prospective subcontractor for this project has received a copy of the listed designated substances which may be present on site.

#### 1.9 COST BREAKDOWN

- .1 Submit, for approval by the Departmental Representative, a cost breakdown of tender 72 hours after the contract is awarded.
- .2 Use the approved cost breakdown as the basis for submitting all claims.
- .3 Request NRC Departmental Representative's verbal approval to amount of claim prior to preparing and submitting the claim in its final form.

#### 1.10 SUB-TRADES

- .1 Submit no later than 72 hours after tender closing, a complete list of sub trades for the NRC Departmental Representative's review.

#### 1.11 PERSONNEL SECURITY AND IDENTIFICATION

- .1 All persons employed by the contractor, or by any subcontractor and present on the site must be security cleared in accordance with the requirements of the Section entitled Special Instructions to Tenderers.
- .2 All such persons must wear and keep visible identification badges as issued by the Security Office of NRC.

#### 1.12 WORKING HOURS AND EXCORTING REQUIREMENTS

- .1 Normal working hours on the NRC property are from 8:00 a.m. until 4:30 p.m., Monday to Friday inclusive, except statutory holidays.
- .2 At all other times, special written passes are required for access to the building site.
- .3 Before scheduling any work outside normal working hours, obtain permission from the NRC Departmental Representative to perform the specific tasks.
- .4 An escort may be required whenever working outside normal hours. Contractor to bear the associated costs.

#### 1.13 SCHEDULE

- .1 The contractor shall prepare a detailed schedule, fixing the date for commencement and completion of the various parts of the work and update the said schedule. Such schedule shall be made available to the Departmental Representative not later than two weeks after the award of the contract and prior to commencement of any work on site.
- .2 Notify Departmental Representative in writing of any changes in the schedule.



- .3 Ten (10) days before the scheduled completion date, arrange to do an interim inspection with the Departmental Representative.

#### 1.14 PROJECT MEETINGS

- .1 Hold regular project meetings at times and locations approved by the NRC Departmental Representative.
- .2 Notify all parties concerned of meetings to ensure proper coordination of work.
- .3 Departmental Representative will set times for project meetings and assume responsibility for recording and distributing minutes.

#### 1.15 SHOP DRAWINGS

- .1 Submit to Departmental Representative for review, shop drawings, product data and samples specified within 2 week(s) after contract award.
- .2 Submit to Departmental Representative for review a complete list of all shop drawings, product data and samples specified and written confirmation of corresponding delivery dates within one (1) week after shop drawings, product data and samples approval date. This list shall be updated and any changes to the list shall be immediately notified in writing to the NRC Departmental Representative.
- .3 Review shop drawings, data sheets and samples prior to submission.
- .4 Submit electronic copy of all shop drawings and product data and samples for review, unless otherwise specified.
- .5 Review of shop drawings and product data by the Departmental Representative does not relieve the contractor of the responsibility for errors and omissions and for the conformity with contract documents.

#### 1.16 SAMPLES AND MOCK-UPS

- .1 Submit samples in sizes and quantities as specified.
- .2 Where colour, pattern or texture is criterion, submit full range of samples.
- .3 Construct field samples and mock-ups at locations acceptable to NRC Departmental Representative.
- .4 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on the project.

#### 1.17 MATERIALS AND WORKMANSHIP

- .1 Install only new materials on this project unless specifically noted otherwise.

- .2 Only first class workmanship will be accepted, not only with regard to safety, efficiency, durability, but also with regard to neatness of detail and performance.

#### 1.18 WORK & MATERIALS SUPPLIED BY OWNER

- .1 Work and materials not included in this contract are described on drawings and in this specification.
- .2 Deliver to a storage place, as directed by the NRC Departmental Representative, all materials returned to the Owner.
- .3 Unless otherwise specified, accept owner-supplied materials at their storage location and provide all transportation as required.
- .4 General Contractor's duties:
  - .1 Unload at site.
  - .2 Promptly inspect products and report damaged or defective items.
  - .3 Give written notification to the NRC Departmental Representative for items accepted in good order.
  - .4 Handle at site, including uncrating and storage.
  - .5 Repair or replace items damaged on site.
  - .6 Install, connect finished products as specified.

#### 1.19 SITE ACCESS

- .1 Make prior arrangements with the Departmental Representative before starting work or moving materials and equipment on site.
- .2 Obtain approval of Departmental Representative for regular means of access during the construction period.
- .3 Obtain approval of Departmental Representative before temporarily suspending operations on site; before returning to the site and before leaving the site at the end of the job.
- .4 Provide and maintain access to site.
- .5 Build and maintain temporary roads and provide snow removal during period of work.
- .6 Make good any damage and clean up dirt, debris, etc., resulting from contractor's use of existing roads.

#### 1.20 USE OF SITE

- .1 Restrict operations on the site to the areas approved by the NRC Departmental Representative
- .2 Locate all temporary structures, equipment, storage, etc., to the designated areas.
- .3 Restrict parking to the designated areas.

#### 1.21 ACCEPTANCE OF SITE

- .1 Inspect the site before commencing work, review any unexpected conditions with the NRC Departmental Representative.
- .2 Commencement of work will imply acceptance of existing conditions.

#### 1.22 SITE OFFICE & TELEPHONE

- .1 Contractor to erect a temporary site office at his own expense.
- .2 Install and maintain a telephone, if necessary.
- .3 Use of NRC phones is not permitted unless in the case of an emergency.

#### 1.23 SANITARY FACILITIES

- .1 Obtain permission from the Departmental Representative to use the existing washroom facilities in the OR Provide sanitary facilities, and bear all associated costs.

#### 1.24 TEMPORARY SERVICES

- .1 A source of temporary power will be made available in the area. Bear all costs to make connections to the power source and perform distribution on site.
- .2 Provide all load centres, breakers, conduit, wiring, disconnects, extension cords, transformers, as required from the source of power.
- .3 Power is to be used only for power tools, lighting, controls, motors, and not for space heating.
- .4 A source of temporary water will be made available if required.
- .5 Bear all costs associated with distributing the water to the required locations.
- .6 Comply with requirements when connecting to existing systems in accordance with the articles entitled "Co-operation" and "Service Interruptions" of this section.

#### 1.25 DOCUMENTS REQUIRED AT WORK SITE

- .1 The contractor shall keep on the site, one (1) up-to-date copy of all contract documents, including specifications, drawings, addenda, shop drawings, change notices, schedule and any reports or bulletins pertaining to the work, in good order, available to the NRC Departmental Representative and to his / her representatives at all times.
- .2 At least one (1) copy of specifications and drawings shall be marked by the contractor to show all work "As Built" and shall be provided to the NRC Departmental Representative with the Application for Payment and for the Final Certificate of Completion.

### 1.26 CO-OPERATION

- .1 Co-operate with NRC staff in order to keep disruption of normal research work to an absolute minimum.
- .2 Work out in advance, a schedule for all work which might disrupt normal work in the building.
- .3 Have schedule approved by the NRC Departmental Representative.
- .4 Notify the Departmental Representative in writing, 72 hours prior to any intended interruption of facilities, areas, corridors, mechanical or electrical services and obtain requisite permission.

### 1.27 PROTECTION AND WARNING NOTICES

- .1 Provide all materials required to protect existing equipment.
- .2 Erect dust barriers to prevent dust and debris from spreading through the building.
- .3 Place dust protection in the form of cover sheets over equipment and furniture and tape these sheets to floors, to ensure no dust infiltration.
- .4 Repair or replace any and all damage to Owner's property caused during construction, at no cost to the Owner and to the satisfaction of the NRC Departmental Representative.
- .5 Protect the buildings, roads, lawns, services, etc. from damage which might occur as a result of this work.
- .6 Plan and co-ordinate the work to protect the buildings from the leakage of water, dust, etc.
- .7 Ensure that all doors, windows, etc., that could allow transfer of dust, noise, fumes, etc., to other areas of the building are kept closed.
- .8 Be responsible for security of all areas affected by the work under the Contract until acceptance by NRC. Take all necessary precautions to prevent entry to the work area by unauthorized persons and guard against theft, fire and damage by any cause. Secure working area at the end of each day's work and be responsible for same.
- .9 Provide and maintain adequate safety barricades around the work sites to protect NRC personnel and the public from injury during the construction.
- .10 Post warnings, in all instances where possible injury could occur such as Work Overhead, Hard Hat Areas, etc. or as required by the NRC Departmental Representative.
- .11 Provide temporary protective enclosures over building entrances and exits to protect pedestrians. All enclosures to be structurally sound against weather and falling debris.

### 1.28 BILINGUALISM

- .1    Ensure that all signs, notices, etc. are posted in both official languages.
- .2    Ensure that all identification of services called for by under this contract are bilingual.

### 1.29 LAYOUT OF WORK

- .1    Location of equipment, fixtures, outlets and openings indicated on drawings 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 the manufacturer's recommendations for safety, access and maintenance.
- .3    Employ competent person to lay out work in accordance with the contract documents.

### 1.30 DISCREPANCIES & INTERFERENCES

- .1    Prior to the start of the work, examine drawings and specifications. Report at once to the Departmental Representative, any defects, discrepancies, omissions or interferences affecting the work.
- .2    Contractor to immediately inform the Departmental Representative in writing, of any discrepancies between the plans and the physical conditions so the Departmental Representative may promptly verify same.
- .3    Any work done after such a discovery, until authorized, is at the contractor's risk.
- .4    Where minor interferences as determined by the NRC Departmental Representative are encountered on the job and they have not been pointed out on the original tender or on the plans and specifications, provide offsets, bends or reroute the services to suit job conditions at no extra cost.
- .5    Arrange all work so as not to interfere in any way with other work being carried out.

### 1.31 MANUFACTURER'S INSTRUCTIONS

- .1    Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .2    Notify the NRC Departmental Representative in writing of any conflict between these specifications and manufacturer's instruction. Departmental Representative will designate which document is to be followed.

### 1.32 TEMPORARY HEATING AND VENTILATING

- .1 Bear the costs of temporary heat and ventilation during construction including costs of installation, fuel, operation, maintenance, and removal of equipment.
- .2 Use of direct-fired heaters discharging waste products into the work areas will not be permitted unless prior approval is given by the Departmental Representative.
- .3 Furnish and install temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of work.
  - .2 Protect work and products against dampness and cold.
  - .3 Reduce moisture condensation on surfaces to an acceptable level.
  - .4 Provide ambient temperature and humidity levels for storage, installation and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for a safe working environment.
- .4 Maintain minimum temperature of 10 °C (50 °F) or higher where specified as soon as finishing work is commenced and maintain until acceptance by the NRC Departmental Representative. Maintain ambient temperature and humidity levels as required for comfort of NRC personnel.
- .5 Prevent hazardous or unhealthy accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction including also, storage areas and sanitary facilities.
  - .1 Dispose of exhaust materials in a manner that will not result in a harmful or unhealthy exposure to persons.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment.
  - .1 Enforce conformance with applicable codes and standards.
  - .2 Comply with instructions of the Departmental Representative including provision of full-time watchman services when directed.
  - .3 Enforce safe practices.
  - .4 Vent direct-fired combustion units to outside.
- .7 Submit tenders assuming existing or new equipment and systems will not be used for temporary heating and ventilating.
- .8 After award of contract, Departmental Representative may permit use of the permanent system providing agreement can be reached on:
  - .1 Conditions of use, special equipment, protection, maintenance, and replacement of filters.
  - .2 Methods of ensuring that heating medium will not be wasted and in the case of steam, agreement on what is to be done with the condensate.
  - .3 Saving on contract price.
  - .4 Provisions relating to guarantees on equipment.

### 1.33 CONNECTIONS TO AND INTERRUPTIONS TO EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times and in the manner agreed to by the NRC Departmental Representative and by authorities having jurisdiction, with minimum disruption to NRC Personnel and vehicular traffic and minimum service interruption. Do not operate any equipment or plant.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit a schedule to and obtain approval from the NRC Departmental Representative for any shut-down or closure of active service or facility; allow minimum 72 hours notice. Adhere to approved schedule and provide notice to the Departmental Representative.
- .4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .5 Provide detours, bridges, alternate feeds, etc., as required to minimize disruptions.
- .6 Protect existing services as required and immediately make repairs if damage occurs.
- .7 Remove any abandoned service lines as indicated on the contract documents and as approved by the Departmental Representative; cap or otherwise seal lines at cut-off points. Record and provide a copy to the Departmental Representative of locations of maintained, re-routed and abandoned service lines.

### 1.34 CUTTING AND PATCHING

- .1 Cut existing surfaces as required to accommodate new work.
- .2 Remove all items as shown or specified.
- .3 Patch and make good with identical materials, the surfaces that have been disturbed, cut or damaged, to the satisfaction of the Departmental Representative.
- .4 Where new pipes pass through existing construction, core drill an opening. Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Do not drill or cut any surface without the approval of the Departmental Representative.
- .5 Obtain written approval of the NRC Departmental Representative before cutting openings through existing or new structural members.
- .6 Seal all openings where cables, conduits or pipes pass through walls with an acoustic sealant conforming to CAN/CGSB-19.21-M87.
- .7 Where cables, conduits and pipes pass through fire rated walls and floors, pack space between with compressed glass fibres and seal with fire stop caulking in accordance with CAN/CGSB-19.13-M87 AND NBC 3.1.7.

### 1.35 FASTENING DEVICES

- .1 Do not use explosive actuated tools, without first obtaining permission from the Departmental Representative.
- .2 Comply with the requirements of CSA A-166 (Safety Code for Explosive Actuated Tools).
- .3 Do not use any kind of impact or percussion tool without first obtaining permission from the Departmental Representative.

### 1.36 OVERLOADING

- .1 Ensure that no part of the building or work is subjected to a load which will endanger safety or cause permanent deformation or structural damage.

### 1.37 DRAINAGE

- .1 Provide temporary drainage and pumping as required to keep excavations and site free of water.

### 1.38 ENCLOSURE OF STRUCTURES

- .1 Construct and maintain all temporary enclosures as required to protect foundations, sub-soil, concrete, masonry, etc., from frost penetration or damage.
- .2 Maintain in place until all chances of damage are over and proper curing has taken place.
- .3 Provide temporary weather tight enclosures for exterior openings until permanent sash and glazing and exterior doors are installed.
- .4 Provide lockable enclosures as required to maintain the security of NRC facilities and be responsible for the same.
- .5 Provide keys to NRC security personnel when required.
- .6 Lay out the work carefully and accurately and verify all dimensions and be responsible for them. Locate and preserve general reference points.
- .7 Throughout the course of construction, keep continuously acquainted with field conditions, and the work being developed by all trades involved in the project. Maintain an awareness of responsibility to avoid space conflict with other trades.
- .8 Conceal all services, piping, wiring, ductwork, etc., in floors, walls or ceilings except where indicated otherwise.



#### 1.39 STORAGE

- .1 Provide storage as required to protect all tools, materials, etc., from damage or theft and be responsible for the same.
- .2 Do not store flammable or explosive materials on site without the authorization of the Departmental Representative.

#### 1.40 GENERAL REVIEW

- .1 Periodic review of the contractor's work by the Departmental Representative does not relieve the contractor of the responsibility of making the work in accordance with contract documents. Contractor shall carry out his own quality control to ensure that the construction work is in accordance with contract documents.
- .2 Inform the Departmental Representative of any impediments to the installation and obtain his / her approval for actual location.

#### 1.41 INSPECTION OF BURIED OR CONCEALED SERVICES

- .1 Prior to concealing any services that are installed, ensure that all inspection bodies concerned, including NRC, have inspected the work and have witnessed all tests. Failure to do so may result in exposing the services again at the contractor's expense.

#### 1.42 TESTING

- .1 On completion, or as required by local authority inspectors and/or Departmental Representative during progress of work and before any services are covered up and flushing is complete, test all installations in the presence of the Departmental Representative.
- .2 Obtain and hand to the Departmental Representative all acceptance certificates or test reports from authority having jurisdiction. The project will be considered incomplete without the same.

#### 1.43 PARTIAL OCCUPANCY

- .1 NRC may request partial occupancy of the facility if the contract extends beyond the expected completion date.
- .2 Do not restrict access to the building, routes, and services.
- .3 Do not encumber the site with materials or equipment.

#### 1.44 DISPOSAL OF WASTES

- .1 Dispose of waste materials including volatiles, safely off NRC property. Refer to the section entitled "General and Fire Safety Requirements" included as part of this specification.

1.45 CLEAN-UP DURING CONSTRUCTION

- .1    On a daily basis, maintain project site and adjacent area of campus including roofs, free from debris and waste materials.
- .2    Provide on-site dump containers for collection of waste materials and rubbish.

1.46 FINAL CLEAN-UP

- .1    Upon completion do a final clean-up to the satisfaction of the Departmental Representative.
- .2    Clean all new surfaces, lights, existing surfaces affected by this work, replace filters, etc.
- .3    Clean all resilient flooring and prepare to receive protective finish. Protective finish applied by NRC.

1.47 WARRANTY AND RECTIFICATION OF DEFECTS IN WORK

- .1    Refer to General Conditions "C", section GC32.
- .2    Ensure that all manufacturers' guarantees and warranties are issued in the name of the General Contractor and the National Research Council.

1.48 MAINTENANCE MANUALS

- .1    Provide three (3) bilingual copies of maintenance manuals or two English and two French maintenance manuals immediately upon completion of the work and prior to release of holdbacks.
- .2    Manuals to be neatly bound in hard cover loose leaf binders.
- .3    Manuals to include operating and maintenance instructions, all guarantees and warranties, shop drawings, technical data, etc., for the material and apparatus supplied under this contract.

END OF SECTION

### 1.01 GENERAL CONSTRUCTION SAFETY REQUIREMENTS

- .1 The Contractor shall take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.
- .2 The Contractor shall be solely responsible for the construction safety of both its employees and those of its sub-contractors at the work site, and for initiating, maintaining and supervising safety precautions, programs and procedures in connection with the performance of the work.
- .3 The Contractor shall comply with all Federal, Provincial and Municipal safety codes and regulations and the Occupational Health and Safety Act and the Workplace Safety and Insurance Board. In the event of any conflict between any provisions in legislation or codes, the most stringent provisions shall apply.
- .4 Periodic review of the contractor's work by the Departmental Representative, using the criteria of the contract documents, does not relieve the contractor of his safety responsibilities in carrying out the work in accordance with the contract documents. The contractor shall consult with the Departmental Representative to ensure that this responsibility is carried out.
- .5 The Contractor shall ensure that only competent personnel are permitted to work on site. Throughout the term of the contract, any person will be removed from the site who is not observing or complying with the safety requirements.
- .6 All equipment shall be in safe operating condition and appropriate to the task.
- .7 Following a project and site hazard assessment, the Contractor shall develop a Site Specific Safety Plan based on the following minimum requirements. Site Specific Safety Plans must also be robust enough to address any abnormal occurrences, such as, but not limited to: pandemics (COVID-19 or similar), fire, flooding, inclement weather or other environmental anomalies.
  - .1 Provide a safety board mounted in a visible location on the project site, with the following information included thereon:
    - .1 Notice of Project
    - .2 Site specific Safety Policy
    - .3 Copy of Ontario Health and Safety Act
    - .4 Building Schematic showing emergency exits
    - .5 Building emergency procedures
    - .6 Contact list for NRC, Contractor and all involved sub-contractors
    - .7 Any related MSDS sheets
    - .8 NRC Emergency phone number
- .8 The Contractor shall provide competent personnel to implement its safety program and those of any Health and Safety Act legislation applicable at this project location, and to ensure they are being complied with.

- .9 The Contractor shall provide safety orientation to all its employees as well as those of any subcontractors under its jurisdiction.
- .10 The Departmental Representative will monitor to ensure that safety requirements are met and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the contract to be cancelled and the Contractor or sub-contractors removed from the site.
- .11 The Contractor will report to the Departmental Representative and jurisdictional authorities, any accident or incident involving Contractor or NRC personnel or the public and/or property arising from the Contractor's execution of the work.
- .12 If entry to a laboratory is required as part of the work of the Contractor, a safety orientation shall be provided to all his employees as well as those of any subcontractors regarding lab safety requirements and procedures, as provided by the Researcher or the Departmental Representative.

## 1.2 FIRE SAFETY REQUIREMENTS

- .1 Authorities
  - 1. The Fire Commissioner of Canada (FC) is the authority for fire safety at NRC.
  - 2. For the purpose of this document, "Departmental Representative" will be deemed as the NRC person in charge of the project and who will enforce these Fire Safety Requirements.
  - 3. Comply with the following standards as published by the Office of the Fire Commissioner of Canada:
    - a. Standard No. 301 - June 1982 "Standard for Construction Operations";
    - b. Standard No. 302 - June 1982 "Standard for Welding and Cutting".
- .2 Smoking
  - .1 Smoking is prohibited inside all NRC buildings, as well as roof areas.
  - .2 Obey all "NO SMOKING" signs on NRC premises.
- .3 Hot Work
  - .1 Prior to commencement of any "Hot Work" involving welding, soldering, burning, heating, use of torches or salamanders or any open flame, obtain a Hot Work Permit from the NRC Departmental Representative.
  - .2 Prior to commencement of "Hot Work", review the area of hot work with the Departmental Representative to determine the level of fire safety precautions to be taken.
- .4 Reporting Fires
  - .1 Know the exact location of the nearest Fire Alarm Pull Station and telephone, including the emergency phone number.
  - .2 REPORT immediately, all fire incidents as follows:

- .1 Activate nearest fire alarm pull station and;
  - .2 Telephone the following emergency phone number as appropriate:
    - FROM AN NRC PHONE 333
    - FROM ANY OTHER PHONE (613) 993-2411
  - .3 When reporting a fire by phone, give the location of fire, building number and be prepared to verify location.
  - .4 The person activating fire alarm pull station must remain at a safe distance from the scene of the fire but readily available to provide information and direction to the Fire Department personnel.
- .5 Interior and Exterior Fire protection & Alarm Systems
- .1 DO NOT OBSTRUCT OR SHUT OFF FIRE PROTECTION EQUIPMENT OR SYSTEMS, INCLUDING BUT NOT LIMITED TO FIRE ALARM SYSTEMS, SMOKE/HEAT DETECTORS, SPRINKLER SYSTEM, PULL STATIONS, EMERGENCY CALL BUTTONS AND PA SYSTEMS, WITHOUT AUTHORIZATION FROM THE NRC Departmental Representative.
  - .2 WHEN ANY FIRE PROTECTION EQUIPMENT IS TEMPORARILY SHUT DOWN, ALTERNATIVE MEASURES AS PRESCRIBED BY THE Departmental Representative SHALL BE TAKEN TO ENSURE THAT FIRE PROTECTION IS MAINTAINED.
  - .3 DO NOT LEAVE FIRE PROTECTION OR ALARM SYSTEMS INACTIVE AT THE END OF A WORKING DAY WITHOUT NOTIFICATION AND AUTHORISATION FROM THE NRC Departmental Representative. THE DEPARTMENTAL REPRESENTATIVE WILL ADVISE THE (FPO) OF THE DETAILS OF ANY SUCH EVENT.
  - .4 DO NOT USE FIRE HYDRANTS, STANDPIPES AND HOSE SYSTEMS FOR OTHER THAN FIRE FIGHTING PURPOSES UNLESS AUTHORISED BY Departmental Representative.
- .6 Fire Extinguishers
- .1 Provide a minimum of 1-20 lb. ABC Dry Chemical Fire Extinguisher at each hot work or open flame location.
  - .2 Provide fire extinguishers for hot asphalt and roofing operations as follows:
    - a. Kettle area - 1-20 lb. ABC Dry Chemical;
    - b. Roof - 1-20 lb. ABC Dry Chemical at each open flame location.
  - .3 Provide fire extinguishers equipped as below:
    - c. Pinned and sealed;
    - d. With a pressure gauge;
    - e. With an extinguisher tag signed by a fire extinguisher servicing company.
  - .4 Carbon Dioxide (CO<sub>2</sub>) extinguishers will not be considered as substitutes for the above.

- .7 Roofing Operations
  - .1 Kettles:
    - .1 Arrange for the location of asphalt kettles and material storage with the Departmental Representative before moving on site. Do not locate kettles on any roof or structure and keep them at least 10m (30 feet) away from a building.
    - .2 Equip kettles with 2 thermometers or gauges in good working order; a hand held and a kettle-mounted model.
    - .3 Do not operate kettles at temperatures in excess of 232°C (450 °F).
    - .4 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire. Provide fire extinguishers as required in article 2.6.
    - .5 Demonstrate container capacities to Departmental Representative prior to start of work.
    - .6 Store materials a minimum of 6m (20 feet) from the kettle.
  - .2 Mops:
    - .1 Use only glass fibre roofing mops.
    - .2 Remove used mops from the roof site at the end of each working day.
    - .3 Torch Applied Systems:
      - .1 DO NOT USE TORCHES NEXT TO WALLS.
      - .2 DO NOT TORCH MEMBRANES TO EXPOSED WOOD OR CAVITY
      - .3 Provide a Fire Watch as required by article 2.9 of this section.
    - .4 Store all combustible roofing materials at least 3m (10 feet) away from any structure.
    - .5 Keep compressed gas cylinders a minimum of 6m (20 feet) away from the kettle, protected from mechanical damage and secured in an upright position.
- .8 Welding / Grinding Operations
  - .1 Contractor to provide fire blankets, portable fume extraction devices, screens or similar equipment to prevent exposure to welding flash, or sparks from grinding.
- .9 Fire Watch
  - .1 Provide a fire watch for a minimum of one hour after the termination of any hot work operation.
  - .2 For temporary heating, refer to General Instructions Section 01 10 10.
  - .3 Equip fire watch personnel with fire extinguishers as required by article 2.6.
- .10 Obstruction of access/egress routes-roadways, halls, doors, or elevators
  - .1 Advise the Departmental Representative in advance of any work that would impede the response of Fire Department personnel and their

apparatus. This includes violation of minimum overhead clearance, erection of barricades and the digging of trenches.

- .2 Building exit routes must not be obstructed in any way without special permission from the Departmental Representative, who will ensure that adequate alternative routes are maintained.
- .3 The Departmental Representative will advise the FPO of any obstruction that may warrant advanced planning and communication to ensure the safety of building occupants and the effectiveness of the Fire Department.

.11 Rubbish and Waste Materials

- .1 Keep rubbish and waste materials to a minimum and a minimum distance of 6m (20 feet) from any kettle or torches.
- .2 Do not burn rubbish on site.
- .3 Rubbish Containers
  - .1 Consult with the Departmental Representative to determine an acceptable safe location for any containers and the arrangement of chutes etc. prior to bringing the containers on site.
  - .2 Do not overfill the containers and keep area around the perimeter free and clear of any debris.
- .4 Storage
  - .1 Exercise extreme care when storing combustible waste materials in work areas. Ensure maximum possible cleanliness, ventilation and that all safety standards are adhered to when storing any combustible materials.
  - .2 Deposit greasy or oily rags or materials subject to spontaneous combustion in CSA or ULC approved receptacles and remove at the end of the work day or shift, or as directed.

.12 Flammable Liquids

- .1 The handling, storage and use of flammable liquids is governed by the current National Fire Code of Canada.
- .2 Flammable Liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres (10 imp gal), provided they are stored in approved safety cans bearing the ULC seal of approval and kept away from buildings, stockpiled combustible materials etc. Storage of quantities of flammable liquids exceeding 45 litres (10 imp gal) for work purposes, require the permission of the Departmental Representative.
- .3 Flammable liquids are not to be left on any roof areas after normal working hours.
- .4 Transfer of flammable liquids is prohibited within buildings.

- .5 Do not transfer flammable liquids in the vicinity of open flames or any type of heat producing device.
- .6 Do not use flammable liquids having a flash point below 38 °C (100 °F) such as naphtha or gasoline as solvents or cleaning agents.
- .7 Store flammable waste liquids for disposal in approved container located in a safe, ventilated area. Waste flammable liquids are to be removed from the site on a regular basis.
- .8 Where flammable liquids, such as lacquers or urethane are used, ensure proper ventilation and eliminate all sources of ignition. Inform the Departmental Representative prior to, and at the cessation of such work.

### 3.01 QUESTIONS AND/OR CLARIFICATIONS

- .1 Direct any questions or clarification on Fire or General Safety, in addition to the above requirements, to the Departmental Representative.

END OF SECTION



## 1 GENERAL

### 1.01 SUMMARY

- .1 This Section includes the following:
  - .1 Demolition and removal of selected portions of interior building components and finishes.
  - .2 Repair procedures for selective demolition operations.
- .2 This section does not include the following:
  - .1 Removal of hazardous materials or asbestos abatement.
  - .2 Demolition of exterior building components or structural elements.
  - .3 Mechanical or electrical equipment, except as required to make minor modifications to allow the work to be completed.
- .3 Drawings contain details that suggest directions for solving some of the major demolition and removal requirements for this project; Contractor is required to develop these details further by submitting a demolition plan prepared by a professional engineer employed by the Contractor.

### 1.02 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 02 81 00 - Hazardous Materials
- .3 Section 09 21 16 - Gypsum Board Assemblies

### 1.03 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A10.8 2011, Safety Requirements for Scaffolding
- .2 ASTM International (ASTM)
  - .1 ASTM C 475/C 475M-15, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
- .3 Canadian Green Building Council (CaGBC)
  - .1 LEED Reference Guide for Building Design and Construction, Version 4
- .4 CSA Group (CSA)
  - .1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures
- .5 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Assessment Act (CEAA), 2012
  - .2 Canadian Environmental Protection Act (CEPA), 2012
    - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations
    - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations
    - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34
    - .4 Motor Vehicle Safety Act (MVSA), 1995

- .5 Hazardous Materials Information Review Act, 1985
- .6 National Fire Protection Association (NFPA)
  - .1 NFPA 241 13, Standard for Safeguarding Construction, Alteration, and Demolition Operations

#### 1.04 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Remove and Salvage: Detach items from existing construction and deliver them to Departmental Representative ready for reuse.
- .3 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .4 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled.
- .5 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .6 Draft Construction Waste Management Plan (Draft CWM Plan): Detailed inventory of materials in building indicating estimated quantities of reuse, recycling and landfill, prepared in accordance with Section 01 74 19 - Waste Management and Disposal and as follows:
  - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
- .7 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 10 00 - General Instructions.
- .8 Construction Waste Management Report (CWM Report): Written report identifying actual materials that formed CWM Plan for reduction, reuse, or recycling of materials prepared in accordance with Section 01 10 00 - General Instructions.
- .9 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

#### 1.05 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate with Departmental Representative Consultant and Owner for the material ownership as follows:
  - .1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Departmental

- Representative property, demolished materials shall become Contractor's property and shall be removed from Project site.
- .2 Coordinate selective demolition work so that work of this Section adheres to aesthetic criteria established by the Drawings and specified dimensions with all elements in planes as drawn, maintaining their relationships with all other building elements.
  - .2 Pre-Demolition Meeting: Convene pre-installation meeting 1 week prior to beginning work of this Section and on-site installation, with Departmental Representative in accordance with Section 01 10 00 - General Instructions to:
    - .1 Confirm extent of salvaged and demolished materials
    - .2 Review Contractor's demolition plan
      - .1 Verify existing site conditions adjacent to demolition work
      - .2 Coordination with other construction sub trades
  - .3 Hold project meetings every month.
  - .4 Ensure key personnel, site supervisor, project manager, subcontractor representatives attend.

#### 1.06 ACTION AND INFORMATION SUBMITTALS

- .1 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Schedule of Selective Demolition Activities: Coordinate with Section 01 10 00 - General Instructions, and indicate the following:
    - .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
    - .2 Coordinate with Departmental Representative ongoing site operations, and limit the number of interruptions during regular business hours.
    - .3 Interruption of utility services.
    - .4 Coordination for shutoff, capping, and continuation of utility services.
    - .6 Locations of temporary partitions and means of egress, including for others affected by selective demolition operations.
  - .2 Demolition Plan: Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared by a professional engineer in accordance with requirements of Authority Having Jurisdiction, and as follows:
    - .1 Inventory: Submit a list of items that have been removed and salvaged after selective demolition is complete.
    - .2 Landfill Records: Indicate receipt and acceptance of [hazardous wastes by a landfill facility licensed to accept hazardous wastes.
    - .3 Pre-demolition Photographs or Videotape: Submit photographs or videotape indicating existing conditions of adjoining construction and site improvements prior to starting Work. Include finish surfaces that may be misconstrued as damage caused by selective demolition operations.
- .2 Informational Submittals: Provide the following submittals when requested by the Departmental Representative:

- .1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of architects and owners, for work of similar complexity and extent.

#### 1.07 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work as follows; use most restrictive requirements where differences occur between the municipal, provincial and federal jurisdictions:
  - .1 Provincial and Federal Requirements: Perform work in accordance with governing environmental notification requirements and regulations of the Authority Having Jurisdiction.
  - .2 Municipal Requirements: Perform hauling and disposal operations in accordance with regulations of Authority Having Jurisdiction.
- .2 Qualifications: Provide proof of qualifications when requested by Departmental Representative:
  - .1 Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project:
    - .1 Conform to the provincial Occupational Health and Safety Act and Regulation.
    - .2 Conform to Workers' Compensation Board Regulations.
    - .3 Conform to City of local municipal bylaws and regulations governing this type of work.

#### 1.08 SITE CONDITIONS

- .1 Maintain access to existing means of egress, walkways, corridors, exits, and other adjacent occupied or used facilities:
  - .1 Do not close or obstruct means of egress, walkways, corridors, exits, or other occupied or used facilities without written acceptance from authorities having jurisdiction.
- .2 Departmental Representative assumes no responsibility for condition of areas to be selectively demolished:
  - .1 Conditions existing at time of Pre-Bid Site Review will be maintained by Departmental Representative as far as practical.
  - .2 Departmental Representative will remove the following items prior to selective demolition:
    - .1 Insert items to be removed by Departmental Representative.
- .4 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in the Work; immediately notify Departmental Representative if materials suspected of containing hazardous substances are encountered and perform the following activities:
  - .1 Hazardous materials will be as defined in the Hazardous Materials Act.
  - .2 Hazardous materials will be removed by Departmental Representative before start of the Work.
  - .3 If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Departmental Representative. Hazardous materials will be removed by Departmental

Representative under a separate contract or as a change to the Work.

- .5 Hazardous Substances: Hazardous Substances are present in building to be selectively demolished. A report on the presence of Hazardous Substances is available at the Departmental Representative office for review and use:
  - .1 Examine report to become aware of locations where hazardous materials are present.
  - .2 Coordinate with Section 02 81 00 - Hazardous Materials.
  - .3 Do not disturb Hazardous Substances or items suspected of containing Hazardous Substances.

## 2 PRODUCTS

### 2.01 DESCRIPTION

- .1 This section of the Work includes, but is not necessarily limited to, the following:
  - .1 Demolition, removal completely from site, and disposal of all identified components, materials, equipment and debris
  - .2 Selective demolition to allow new walls, bulkheads, ceilings and other materials to meet existing construction as indicated
  - .3 All material from demolition shall be removed from site immediately with no salvage, selling, sorting or burning permitted on site
  - .4 Retain items indicated on drawings for re use in new construction

### 2.02 DEBRIS

- .1 Make all arrangements for transport and disposal of all demolished materials from the site.

### 2.03 EQUIPMENT

- .1 Provide all equipment required for safe and proper demolition of the building interiors indicated.

### 2.04 REPAIR MATERIALS

- .1 Use repair materials identical to existing materials:
  - .1 If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
  - .2 Use a material whose installed performance equals or surpasses that of existing material.
  - .3 Comply with material and installation requirements specified in individual Specification Sections.
- .2 Floor Patching and Levelling Compounds: Cement based, trowelable, self levelling compounds compatible with specified floor finishes; gypsum based products are not acceptable for work of this Section.
- .3 Concrete Unit Masonry: Lightweight concrete masonry units, and mortar, cut and trimmed to fit existing opening to be filled. Provide standard hollow core units, square end units and bond beam units as indicated on drawings.

- .4 Gypsum Board Patching Compounds: Joint compound to ASTM C 475/C 475M, bedding and finishing types thinned to provide skim coat consistency to patch and prepare existing gypsum board walls ready for new finishes in accordance with Section 09 21 16 - Gypsum Board Assemblies.
- .5 Hoarding and Dust Screens: Refer to Section 01 10 00 - General Instructions for stud framing and gypsum board sheathing materials.

### 3 EXECUTION

#### 3.01 EXAMINATION

- .1 Verify that utilities have been disconnected and capped.
- .2 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- .4 Notify the Departmental Representative where existing mechanical, electrical, or structural elements conflict with intended function or design:
  - .1 Investigate and measure the nature and extent of conflict and submit a written report to Departmental Representative.
  - .2 Departmental Representative will issue additional instructions or revise drawings as required to correct conflict.
- .5 Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.

#### 3.02 UTILITY SERVICES

- .1 Coordinate existing services indicated to remain and protect them against damage during selective demolition operations.
- .2 Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
  - .1 Arrange to shut off affected utilities with utility companies.
  - .2 If utility services are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary utilities that bypass area of selective demolition and that maintain continuity of service to other parts of building.
- .3 Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- .4 Cut off pipe or conduit to a minimum of 25 mm below slab and remove concrete mound. Patch concrete using cementitious grout.
- .3 Coordinate with Mechanical and Electrical Divisions for shutting off, disconnecting, removing, and sealing or capping utilities.
- .4 Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

### 3.03 PREPARATION

- .1 Identify and mark all equipment and materials identified to be retained by Departmental Representative or to be re used in subsequent construction. Separate and store items to be retained in an area away from area of demolition and protect from accidental disposal.
- .2 Post warning signs on electrical lines and equipment that must remain energized to serve other areas during period of demolition.
- .3 Confirm that all electrical and telephone service lines entering buildings are not disconnected.
- .4 Do not disrupt active or energized utilities crossing the demolition site.
- .5 Provide and maintain barricades, warning signs, protection for workers and the public during the full extent of the Work. Read drawings carefully to ascertain extent of protection required.
- .6 Mark all materials required to be re used, store in a safe place until ready for re installation.
- .7 Adjust all junction boxes, receptacles and switch boxes flush with new wall construction where additional layers to existing construction are indicated.
- .8 Remove permanent marker lines used or found on exposed surfaces and at surfaces indicated for subsequent finish materials. Mechanically remove permanent marker lines and associated substrates where permanent marker lines occur and patch surface. Sealing or priming over permanent marker lines is not acceptable.

### 3.04 CONCRETE SLAB REINFORCING

- .1 Locate location of reinforcing steel in concrete slabs prior to cutting or coring using nondestructive, non-ionizing radio frequency locators.
- .2 Core concrete slabs to avoid reinforcing steel, electrical conduit or water pipes; adjust core location and coordinate with Engineer where slab features interfere with core drilling.
- .3 Notify the Engineer immediately for further instructions where coring or cutting will damage existing slab features.

### 3.05 SELECTIVE DEMOLITION

- .1 Demolish and dismantle work in a neat and orderly manner and in strict accordance with all regulations.
- .2 At end of each day's work, leave Work in safe condition so that no part is in danger of toppling or falling.
- .3 Demolish in a manner to minimize dusting and to prevent migration of dust.
- .4 Selling or burning of materials on the site is not permitted.

- .5 Remove concrete bases by cutting and chipping, take precautions against slab cracking and degradation. Grind edges smooth, fill and make level with self levelling grout.
- .6 Fill all openings in concrete block walls with concrete masonry units, coursing to match existing, prepare ready to receive new finishes to match existing.
  - .1 Provide bond beams in new openings cut into existing concrete masonry unit walls.
  - .2 Provide finished end masonry units to patch and repair for new jamb sections in existing concrete masonry unit walls.
- .7 Fill all openings in gypsum board walls with gypsum board and steel framing to match existing, skim coat to make wall smooth and even.
- .8 Demolish existing resilient flooring and adhesive remnants as follows:
  - .1 Vacuum existing carpet thoroughly, prior to removal, using vacuum equipped with power head/sweeper.
  - .2 Apply fine mist water spray to carpet as required to minimize dust generation during removal. Avoid spraying near electrical outlets.
  - .3 Demolish existing carpet and resilient floor finishes, remove and dispose of offsite.
  - .4 Remove adhesive to the greatest extent possible using scrapping tools and as follows:
    - .1 Do not use solvent based cleaners to remove adhesive remnants.
    - .2 Lightly shot blast or grind floor using machine designed for purpose to remove adhesive remnants.
    - .3 Vacuum floor ready for application of skim coating.
    - .4 Repair all slab depressions and damage with cementitious patching compound.
    - .5 Skim coat floor with minimum 1 mm thick cementitious floor underlayment compatible with new flooring materials.
  - .5 Floor substrate shall be smooth, free from ridges and depressions, and adhesive remnants that could telegraph through resilient flooring materials and carpets.
  - .6 Recycle materials in accordance with Section 01 10 00 - General Instructions.
- .9 Demolish existing ceramic tile finishes. Remove setting bed or adhesive to the greatest extent possible using mechanical scrapping tools and as follows:
  - .1 Saw cut edge of tile for clean and even transition joint between existing tile to remain and new flooring materials
  - .2 Lightly shot blast or grind floor to remove remnants of setting materials
  - .3 Vacuum floor ready for application of skim coating
  - .4 Repair all slab depressions and damage with cementitious patching compound. Skim coat floor with minimum 1 mm thick cementitious floor underlayment compatible with new flooring materials
- .10 Demolish completely all ceiling panels and grid as indicated.
- .11 Patch and repair all walls, floor and ceilings damaged during demolition with material matching adjacent walls, prepare ready for new finishes.
- .13 Patch and repair all mechanical equipment and electrical fixtures damaged or exposed during demolition to match adjacent finished surfaces.



### 3.06 PATCHING AND REPAIRING

- .1 Floors and Walls:
  - .1 Where walls or partitions that are demolished extend from one finished area into another, patch and repair floor and wall surfaces in the new space.
  - .2 Provide a level and smooth surface having uniform finish colour, texture, and appearance.
  - .3 Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.
  - .4 Patch with durable seams that are as invisible as possible.
  - .5 Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - .6 Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
  - .7 Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- .2 Ceilings: patch, repair, or re hang existing ceilings as necessary to provide an even plane surface of uniform appearance.

### 3.07 PROTECTION

- .1 Prevent debris from blocking drainage inlets and systems and ground draining and protect material and electrical systems and services that must remain in operation.
- .2 Arrange demolition and shoring work so that interference with the use of adjoining areas by the Departmental Representative is minimized.
- .4 Provide and maintain fire prevention equipment and alarms accessible during demolition.

### 3.08 CLEANING

- .1 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 10 00 - General Instructions.
- .2 Waste Management: Separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions, and as follows:
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .3 Divert excess materials from landfill to site approved Departmental Representative.
- .4 Promptly as the Work progresses, and on completion, clean up and remove from the site all rubbish and surplus material. Remove rubbish resulting from demolition work daily.
- .5 Maintain access to exits clean and free of obstruction during removal of debris.

- .6 Keep surrounding and adjoining roads, lanes, sidewalks, municipal rights of way clean and free of dirt, soil or debris that may be a hazard to vehicles or persons.
- .7 Transport material designated for alternate disposal using approved haulers, facilities, receiving organizations listed in CWM Plan and in accordance with applicable regulations.
  - .1 Written authorization from Departmental Representative is required to deviate from haulers, facilities, receiving organizations listed in CWM Plan.
- .8 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
  - .1 Disposal facilities must be those approved of and listed in CWM Plan.
  - .2 Written authorization from Departmental Representative is required to deviate from disposal facilities listed in CWM Plan.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 07 92 00 - Joint Sealants
- .3 Section 09 01 90.63 Interior Repainting
- .4 Section 09 91 23 Interior Painting

1.01 REFERENCE STANDARDS

- .2 Canadian Environmental Protection Act, 1999 (CEPA 1999)
  - .1 Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (SOR/2005-149).
- .3 Department of Justice Canada (Jus)
  - .1 Transportation of Dangerous Goods Act, 1992 (TDG Act) 1992, (c. 34).
  - .2 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2001-286).
- .4 Green Seal Environmental Standards (GS)
  - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
  - .2 GS-36-00, Commercial Adhesives.
- .5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 WHMIS Safety Data Sheets (SDS).
- .6 National Research Council Canada (NRC)
  - .1 National Fire Code of Canada 2015 (NFC).
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.03 DEFINITIONS

- .1 Dangerous Goods: product, substance, or organism specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.
- .2 Hazardous Material: product, substance, or organism used for its original purpose; and is either dangerous goods or material that will cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into environment.
- .3 Hazardous Waste: hazardous material no longer used for its original purpose and that is intended for recycling, treatment or disposal.

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#### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for hazardous materials and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies of WHMIS Safety Data Sheets (SDS) in accordance with Section 01 10 00 - General Instructions to Departmental Representative for each hazardous material required prior to bringing hazardous material on site.
  - .3 Submit hazardous materials management plan to Departmental Representative that identifies hazardous materials, usage, location, personal protective equipment requirements, and disposal arrangements.
  - .4 Hazardous waste classification: identify waste codes applicable to each hazardous waste material based on applicable federal and provincial acts, regulations, and guidelines. Waste profiles, analyses, and classification submitted to contract offices for review and approval.
- .3 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 % of construction wastes were recycled or salvaged
  - .2 Low-Emitting Materials: submit listing of adhesives and sealants and paints and coatings used in building, comply with VOC and chemical component limits or restrictions requirements.
  - .3 Spill response: establish spill response procedures. Comply with applicable requirements according to classification of waste material. Designate an emergency coordinator and emergency contacts for comprehensive emergency response and incident mitigation.
  - .5 Record keeping: contractor is responsible for maintaining adequate records of handling, storing, and shipping of hazardous materials.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions 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 Transport hazardous materials and wastes in accordance with Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.
  - .1 When exporting hazardous waste to another country, ensure compliance with Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations.
- .4 Storage and Handling Requirements:
  - .1 Co-ordinate storage of hazardous materials with Departmental

- Representative and abide by internal requirements for labelling and storage of materials and wastes.
- .2 Store and handle hazardous materials and wastes in accordance with applicable federal and provincial laws, regulations, codes, and guidelines.
  - .3 Store and handle flammable and combustible materials in accordance with National Fire Code of Canada (NFC) requirements.
  - .4 Keep no more than 45 litres of flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use.
    - .1 Store flammable and combustible liquids in approved safety cans bearing the Underwriters' Laboratory of Canada or Factory Mutual seal of approval.
    - .2 Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires the written approval of the Departmental Representative.
  - .5 Transfer of flammable and combustible liquids is prohibited within buildings.
  - .6 Transfer flammable and combustible liquids away from open flames or heat-producing devices.
  - .7 Solvents or cleaning agents: non-flammable or have flash point above 38 degrees C.
  - .8 Store flammable and combustible waste liquids for disposal in approved containers located in safe, ventilated area. Keep quantities to minimum.
  - .9 Observe smoking regulations, smoking is prohibited in areas where hazardous materials are stored, used, or handled.
  - .10 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:
    - .1 Store hazardous materials and wastes in closed and sealed containers.
    - .2 Label containers of hazardous materials and wastes in accordance with WHMIS.
    - .3 Store hazardous materials and wastes in containers compatible with that material or waste.
    - .4 Segregate incompatible materials and wastes.
    - .5 Ensure that different hazardous materials or hazardous wastes are stored in separate containers.
    - .6 Store hazardous materials and wastes in secure storage area with controlled access.
    - .7 Maintain clear egress from storage area.
    - .8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.
    - .9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.
    - .10 Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.
    - .11 When hazardous waste is generated on site:
      - .1 Co-ordinate transportation and disposal with Departmental Representative.
      - .2 Comply with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.
      - .3 Use licensed carrier authorized by provincial authorities to accept subject material.
      - .4 Before shipping material obtain written notice from intended hazardous waste treatment or disposal facility it will accept material and it is licensed to accept this

- material.
- .5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.
  - .6 Only trained personnel handle offer for transport, or transport dangerous goods.
  - .7 Provide photocopy of shipping documents and waste manifests to Departmental Representative.
  - .8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide photocopy of completed manifest to Departmental Representative.
  - .9 Report discharge, emission, or escape of hazardous materials immediately to Departmental Representative and appropriate provincial authority. Take reasonable measures to control release.
  - .12 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.
  - .13 Report spills or accidents immediately to Departmental Representative. Submit a written spill report to Departmental Representative within 2 hours of incident.
- .5 Develop Construction Waste Management Plan, Waste Reduction Workplan.
- .6 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 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Description:
  - .1 Bring on site only quantities hazardous material required to perform Work.
  - .2 Maintain WHMIS Safety Data Sheets (SDS) in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.
  - .3 Sustainability Characteristics:
    - .1 Adhesives and Sealants in accordance with Section 07 92 00 - Joint Sealants.
      - .1 Adhesives and Sealants: maximum VOC limit 250 g/L to SCAQMD Rule 1168.
    - .2 Primers, Paints and Coatings in accordance with manufacturer's recommendations for surface conditions and Section 09 91 23 - Interior Painting, and 09 01 90.63 - Interior Re-Painting.
      - .1 Primer: maximum VOC limit 250 g/L to GS-11 to SCAQMD Rule 1113.
      - .2 Paints: maximum VOC limit 50 g/L to GS-11to SCAQMD Rule 1113.
      - .3 Coatings: maximum VOC limit 50 g/L to SCAQMD Rule 1113.
  - .4 Spill Response Materials: provide spill response materials which can be used for absorbing/shoveling and containing hazardous materials.
  - .5 Provide personal protective equipment.

### 3 EXECUTION

#### 3.01 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines.
  - .2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.
  - .3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.
  - .4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.
  - .5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.
  - .6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.
  - .7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
  - .8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
    - .1 Hazardous wastes recycled in manner constituting disposal.
    - .2 Hazardous waste burned for energy recovery.
    - .3 Lead-acid battery recycling.
    - .4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions.

1.02 REFERENCE STANDARDS

- .1 CSA Group (CSA)
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .2 CSA O121-08, Douglas Fir Plywood.
  - .3 CSA O141-05(R2009), Softwood Lumber.
  - .4 CSA O151-09, Canadian Softwood Plywood.
  - .5 CAN/CSA-O325.0-07, Construction Sheathing.
  - .6 CAN/CSA-Z809-08, Sustainable Forest Management.
- .2 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).
- .3 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .4 Green Seal Environmental Standards (GS)
  - .1 GS-11-11, Paints and Coatings.
- .5 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2010.
- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-[A2011], Architectural Coatings.
- .7 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2010-2014 Standard.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for rough carpentry work and include product characteristics, performance criteria, physical size, finish and limitations.

1.04 SUSTAINABLE DESIGN SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions and to confirm that products and procedures conform to specified sustainability requirements.
- .2 Submit evidence that work of this Section incorporates required percentage of regional materials and products, showing their cost, distance from



project to furthest site of extraction or manufacture, and total cost of materials for project.

- .3 Submit evidence that:
  - .1 Engineered wood products contain specified percentage of recycled content.
  - .2 Wood products are derived from salvaged recovered lumber sources.
- .4 Submit vendor's manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
- .5 Low-Emitting Materials:
  - .1 Submit listing of adhesives and sealants used in building, showing compliance with VOC and chemical component limits or restriction requirements.
  - .2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, and laminating adhesives used in building, stating that they contain no urea-formaldehyde.
  - .3 Include SDS sheets indicating resin type for structural composite lumber and agrifibre materials.

#### 1.05 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials:
  - .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19 mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 305 mm intermediate

#### 1.06 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grade mark in accordance with applicable CSA standards.
- .4 Sustainable Standards Certification:
  - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

#### 1.07 DELIVERY, STORAGE AND HANDLING

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

- .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan Waste Reduction Workplan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan, Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
  - .1 CAN/CSA-0141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
  - .1 Board sizes: "Standard" or better grade.
  - .2 Dimension sizes: "Standard" light framing or better grade.
  - .3 Post and timbers sizes: "Standard" or better grade.
- .3 Primers, Paints and Coatings: in accordance with manufacturer's recommendations for surface conditions:
  - .1 Primer: VOC limit 100 g/L maximum to SCAQMD Rule 1113.
  - .2 Paint: VOC limit 150 g/L maximum to SCAQMD Rule 1113.
  - .3 Coating: VOC limit 650 g/L maximum to SCAQMD Rule 1113.

### 2.02 ACCESSORIES

- .1 Fasteners: to CAN/CSA-G164, for exterior work, interior highly humid areas, pressure- preservative, fire-retardant treated lumber.
- .2 Nails, spikes and staples: to CSA B111.
- .3 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

## 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 INSTALLATION

- .1 Comply with requirements of National Building Code of Canada (NBC), supplemented by the following paragraphs.
- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.
- .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .7 Use caution when working with particle board. Use dust collectors and high-quality respirator masks.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .10 Countersink bolts where necessary to provide clearance for other work.

### 3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions

1.02 REFERENCE STANDARDS

- .1 American National Standards Institute/National Particleboard Association (ANSI/NPA)
- .1 ANSI/NPA A208.1-2009 Particleboard.
- .2 ASTM International (ASTM)
- .1 ASTM A 123/A 123M-15, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A 153/A 153M-09 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .3 ASTM A 307-14 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
- .4 ASTM A 653/A 653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .5 ASTM D 5055-13e1, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
- .6 ASTM D 5456-14b, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .7 ASTM F 1667-13 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-11.3-M87, Hardboard.
- .2 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .4 Canadian Wood Council
- .1 Wood Design Manual 2010 (R2014) Edition
- .2 Engineering Guide for Wood Frame Construction 2014
- .5 CSA Group (CSA)
- .1 CAN/CSA-A123.2-03(R2013), Asphalt Coated Roofing Sheets.
- .2 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
- .3 CSA O86-14 Engineered Design in Wood
- .4 CSA O112.9-10, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
- .5 CSA O121-08(R2013), Douglas Fir Plywood.
- .6 CSA O141-05(R2014), Softwood Lumber.
- .7 CSA O151-09(R2014), Canadian Softwood Plywood.
- .8 CSA O153-13, Poplar Plywood.
- .9 CSA O325-07(R2012), Construction Sheathing.
- .10 CAN/CSA-S406-92(R2008), Construction of Preserved Wood Foundations.
- .11 CAN/CSA-Z809-08, Sustainable Forest Management.
- .6 Forest Stewardship Council (FSC)

- .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .7 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2010.
- .8 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).
- .9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
  - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .10 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2015-2019 Standard.
- .11 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

### 1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Include manufacturer's pre-engineered floor, ceiling and roof joist span charts, and manufacturer's pre-engineered installation details.
  - .3 Submit certified test reports for prefabricated structural members from approved independent laboratory indicating compliance with specifications for specified performance characteristics and physical properties.
  - .4 Submit CCMC Product Evaluation Report for engineered wood products.
  - .5 Submit manufacturer's installation instructions.
- .3 Shop Drawings:
  - .1 For structural applications or conditions beyond the scope of the manufacturer's pre-engineered design information, submit drawings stamped and signed by professional engineer registered or licensed in Province of, Canada.
  - .2 Include on drawings:
    - .1 Design data in accordance with CAN/CSA-O86 and CWC Engineering Guide for Wood Frame Construction.
    - .2 Indicate configuration and spacing of joists, hanger and connector types, fasteners, locations and design values; bearing details.
    - .3 Submit stress diagrams or print out of computer design indicating design loads for members. Indicate allowable load and stress increase.
    - .4 Indicate arrangement of webs or other members to accommodate ducts and other specialties.

#### 1.04 SUSTAINABLE DESIGN SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions and to confirm that products and procedures conform to specified sustainability requirements.
- .2 Submit evidence that work of this Section incorporates required percentage of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
- .3 Submit evidence that:
  - .1 Engineered wood products contain specified percentage of recycled content.
  - .2 Wood products are derived from salvaged recovered lumber sources.
- .4 Submit vendor's, manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
- .5 Low-Emitting Materials:
  - .1 Submit listing of adhesives and sealants used in building, showing compliance with VOC and chemical component limits or restriction requirements.
  - .2 Submit listing of composite wood products used in building, stating that they contain no added urea-formaldehyde resins, and laminating adhesives used in building, stating that they contain no urea-formaldehyde.
  - .3 Include SDS sheets indicating resin type for structural composite lumber and agrifibre materials.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions 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 materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.
  - .3 Store wood I-beams and I-joists on edge.
  - .4 Stack, lift, brace, cut and notch engineered lumber products in strict accordance with manufacturer's instructions and recommendations.
  - .5 Store and protect architecturally exposed lumber from nicks, scratches, and blemishes.
  - .6 Replace defective or damaged materials with new.
  - .7 Store separated reusable wood waste convenient to cutting station and work areas.

## 2 PRODUCTS

### 2.01 SUSTAINABILITY CHARACTERISTICS

- .1 Provide wood framing products as specified and with the following sustainability characteristics.
- .2 Lumber, Finger Jointed Lumber, I-Joists, structural composite lumber (SCL): to be CAN/CSA-Z809 or FSC or SFI certified.
- .3 Plywood, Particleboard, OSB: urea-formaldehyde free and certified to, CAN/CSA-Z809 or FSC or SFI.
- .4 Lumber: derived from salvaged, recovered lumber sources.
- .5 Adhesives: limit 120 g/L maximum to SCAQMD Rule 1168 GS-36.
- .6 Provide engineered wood products [certified as meeting requirements of respective ANSI standard for formaldehyde emissions][with no added formaldehyde and low VOC emissions when tested in accordance with ASTM D 6330].
- .7 Provide fiberboard with minimum 80% recycled content.

### 2.02 FURRING AND BLOCKING

- .1 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
  - .1 Board sizes: "Standard" or better grade.
  - .2 Dimension sizes: "Standard" light framing or better grade.
  - .3 Post and timbers sizes: "Standard" or better grade.
- .2 Where indicated, provide pressure treated materials for furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers in accordance with Section 06 05 73 - Wood Treatment.

### 2.03 ACCESSORIES

- .1 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.
- .2 General purpose adhesive: to CSA O112.9.
- .3 Nails, spikes and staples: to ASTM F 1667.
- .4 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .5 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, [explosive actuated fastening devices, recommended for purpose by manufacturer.
- .6 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, fibre, formed to prevent dishing. Bell or cup shapes not acceptable.
- .7 Fastener Finishes:

- .1 Plated finish: use cadmium plated fasteners for interior work.

### 3 EXECUTION

#### 3.01 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.

#### 3.02 SYSTEMS INTEGRATION

- .1 Install insulation in exterior wall framing cavities that will not be accessible after completion of framing.

#### 3.03 FRAMING INSTALLATION

- .1 Install members true to line, levels and elevations, square and plumb.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install spanning members with "crown-edge" up.
- .4 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .5 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .6 Countersink bolts where necessary to provide clearance for other work.

#### 3.04 FURRING AND BLOCKING

- .1 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .2 Install furring to support siding applied vertically [where there is no blocking and] where sheathing is not suitable for direct nailing.
  - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .3 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .4 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.



### 3.06 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.

### 3.07 WASTE MANAGEMENT

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
- .2 Re-use scrap lumber to the greatest extent possible. Separate scrap lumber for use on site as accessory components, including shims, bracing, and blocking.
- .3 Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill. Prevent saw dust and wood shavings from entering the storm drainage system.
- .4 Do not burn scrap lumber that has been pressure treated.
- .5 Do not send lumber treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.

### 3.08 PROTECTION

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENT

- .1 Section 01 10 00 - General Instructions
- .2 Section 09 91 23 Interior Painting

1.02 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A208.1-09, Particleboard.
  - .2 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.
  - .3 ANSI/HPVA HP-1-10, American National Standard for Hardwood and Decorative Plywood.
  - .4 ANSI/BHMA A156.16 Auxiliary Hardware.
  - .5 ANSI/ASME 18.6.1 1981 (R2012) Wood Screws (Inch Series).
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Quality Standards, 2nd edition, 2014.
- .3 ASTM International
  - .1 ASTM A 153/A 153M-16, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - .2 ASTM E 1333-14 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.
  - .3 ASTM F 1667-13 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-11.3-M87, Hardboard.
- .5 CSA Group (CSA)
  - .1 CSA O121-08 (R2013), Douglas Fir Plywood.
  - .2 CSA O151-09 (R2014), Canadian Softwood Plywood.
  - .3 CSA O153-M13, Poplar Plywood.
  - .4 CAN/CSA-Z809-08 (R2013), Sustainable Forest Management.
- .6 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .9 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2015-2019 Standard.

- .10 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
  - .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames.

### 1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, data sheets and catalogue pages for specified products. Include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
  - .2 Submit two copies of WHMIS SDS in accordance with Section 01 10 00 - General Instructions.
- .3 Shop Drawings:
  - .1 Prepare and submit shop drawings in general accordance with AWMAC AWS manual.
  - .2 Indicate profiles and dimensions, assembly techniques, jointing, methods of fastening, terminations and other related details.
  - .3 Indicate materials, thicknesses, finishes and hardware.
  - .4 Include schedule or key plan.
  - .5 Show profiles, elevations and details at scales recommended by AWMAC AWS.
  - .6 Where necessary, show location and type of blocking and backing required within supporting assemblies.
- .4 Samples:
  - .1 Submit triplicate 300 mm long representative samples of each typical item of finish carpentry.
    - .1 Standing and running trim: 300 mm long.
    - .2 Panel materials: 300 mm x 300 mm.
  - .2 Shop applied coating samples:
    - .1 For transparent finish, submit triplicate samples of each species and cut of wood veneer to be used, finished to match project sample as specified.
    - .2 For opaque finish, submit triplicate samples for each colour selection, finished to match project sample as specified.
  - .3 Decorative overlaid composite panels, complete with applied edge treatment and corner treatment, minimum 300 mm x 300 mm.
  - .4 Samples for site applied finish:
    - .1 Furnish four samples of each finish carpentry item and composite panel material to Contractor for preparation of field applied finish samples.
  - .5 Submit duplicate samples of each hardware item to be left exposed in final construction. Samples will not be returned for incorporation into the work.
- .5 Certifications: submit certificates signed by manufacturer certifying materials comply with specified performance characteristics, physical properties and requirements of referenced standards.
- .6 Test and Evaluation Reports: submit certified test reports for composite wood] from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical

properties.

#### 1.04 SUSTAINABLE DESIGN SUBMITTALS

- .1 Submit in accordance with following characteristics:
  - .1 Recycled Content.
  - .2 Regional Materials.
  - .3 Low-Emitting Materials.
  - .4 Salvaged or recovered lumber.
- .2 Submit vendor's, manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
  - .1 Submit vendor's, manufacturer's FSC Chain-of-Custody Certificate number.
- .3 Submit ASTM E 1333 test report for formaldehyde emissions from composite wood products showing compliance with specified limits.
- .4 Submit product data indicating compliance with other specified sustainable design characteristics.

#### 1.05 QUALITY ASSURANCE

- .1 Perform Work of this Section by finish carpentry contractor with minimum 5 years of current experience and having completed minimum one project in the past 5 years with value within 20% of the cost of the work of this Section.
- .2 Independent inspection/testing agency will be engaged by Departmental Representative for purpose of inspecting and/or testing Work of this Section.
  - .1 Cost of inspection and testing services will be borne by Departmental Representative.
- .3 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 10 00 - General Instructions.
  - .2 Shop prepare one typical example of each specified item of standing and running trim, wall paneling, stair, complete with shop applied finishes], and install where directed by Departmental Representative.
  - .3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with Work.
  - .4 When accepted, mock-up will demonstrate minimum standard for Work.
  - .5 Do not proceed with work prior to receipt of written acceptance of mock-up by Departmental Representative.
  - .6 Accepted mock-up may not remain as part of finished work.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions and with AWS recommendations and as follows.
- .2 Deliver finish carpentry materials only when area of work is enclosed, plaster and concrete work is dry, area is broom clean and site environmental conditions are acceptable for installation.
- .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 Maintain indoor temperature and humidity within range recommended by AWS for location of the Work.
  - .3 Store products on site as specified for minimum 72 hours prior to installation.
  - .4 Store and protect finish carpentry products from moisture, nicks, scratches, and blemishes.
  - .5 Replace defective or damaged materials with new.
- .4 Waste Management: for packaging and materials, in accordance with Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 REGULATORY REQUIREMENTS

- .1 Wood fire rated frames and panels: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
- .2 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, or NFPA 252 and listed by nationally recognized agency having factory inspection services.

### 2.02 SUSTAINABILITY CHARACTERISTICS

- .1 Solid lumber and composite wood products: in accordance with CAN/CSA-Z809 or FSC or SFI.
- .2 Composite wood products: formaldehyde free, formaldehyde emissions within the following limits when tested in accordance with ASTM E 1333.
  - .1 Hardwood plywood with veneer core (HWPW-VC): 0.05 ppm.
  - .2 Hardwood plywood with composite core (HWPW-CC): 0.05 ppm.
  - .3 Particleboard (PB): 0.09 ppm.
  - .4 Medium density fibreboard (MDF): 0.11 ppm.
  - .5 Thin (less than 8 mm) medium density fibreboard (tMDF): 0.13 ppm.
- .3 Recycled content:
  - .1 Composite wood products: in accordance with Section.
- .4 Coatings
  - .1 Clear Wood Finishes: VOC limit 550 g/L maximum to SCAQMD Rule 1113
  - .2 Paints: VOC limit 100 g/L maximum to SCAQMD Rule 1113.

### 2.03 QUALITY GRADE

- .1 Provide all materials and perform all work of this Section in accordance with AWMAC AWS Custom Grade, except as follows:
  - .1 Economy Grade: mechanical rooms and utility areas storage areas and janitor's closets.
  - .2 Premium Grade.

- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.

## 2.04 MATERIALS

- .1 Softwood lumber: Unless otherwise specified, S4S moisture content 19% or less in accordance with following standards:
  - .1 CAN/CSA 0141.
  - .2 NLGA Standard grading Rules for Canadian Lumber.
  - .3 AWMAC custom grade, moisture content as specified, pine species.
- .2 Manufacturing process must adhere to Lifecycle Assessment (LCA) Standards as per CSA Z760-94 LCA Standards.
- .3 Panel Material: MCP - Melamine Coated Particle Board:
  - .1 Melamine coated 46 lb. minimum density particleboard, finished two sides, and fine textured finish, to NEMA LD3-1991 GP-20 Minimum Performance standard by Flakeboard or equal.
- .4 Douglas fir plywood (DFP): to CSA 0121, standard construction.
- .5 Canadian softwood plywood (CSP): to CSA 0151, standard construction.
- .6 Birch plywood: to CSA 0115.

## 2.05 FASTENINGS

- .1 Provide screws, bolts, expansion shields and other fastening devices required for satisfactory installation.
- .2 Exposed fasteners to match finish of hardware.
- .3 Nails and staples: to ASTM F 1677, galvanized to ASTM A 153/A 153M stainless steel for exterior work, interior humid areas; plain finish elsewhere.
- .4 Wood screws: to ANSI/ASME 18.6.1, countersunk flush type unless indicated otherwise, in sizes to suit application, galvanized to ASTM A 153/A 153M for exterior work, interior humid areas, plain stainless steel for other locations.
- .5 Splines: wood.
- .6 Panel adhesive: Type to suit application.
  - .1 VOC limit 200 g/L maximum to SCAQMD Rule 1168.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with AWS tolerances and requirements of Contract Documents.
  - .1 Visually inspect substrate in presence of Departmental Representative.

- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### 3.02 PREPARATION

- .1 Back prime woodwork before installation, to AWS.

### 3.03 INSTALLATION

- .1 Install items of finish carpentry in accordance with AWMAC AWS grade specified for respective items.
- .2 In case of conflict between Contract Documents and AWS grade requirements, Contract Documents govern.
- .3 Install items of finish carpentry at locations shown on drawings.
  - .1 Position accurately, level, plumb straight.
  - .2 Fasten and anchor securely.
- .4 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .5 Form joints to conceal shrinkage.

### 3.04 CONSTRUCTION

- .1 Fastening:
  - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
  - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
  - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
  - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .7 Shelving:
  - .1 Install shelving on ledgers, shelf brackets as indicated.
- .8 Hardware:
  - .1 Install as detailed and as required.

### 3.05 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.

### 3.06 TOUCHUP AND PROTECTION

- .1 Fill and retouch all nicks, chips and scratches in factory finishes and substrate materials to AWS standards. Replace damaged items that cannot be repaired to AWS standards.
- .2 Protect installed products and components from damage during construction.
- .3 Repair damage to adjacent materials caused by finish carpentry installation.
- .4 Leave work to be site finished ready for finishing by Section 09 91 23 - Interior Painting.

END OF SECTION



1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 07 92 00 - Joint Sealants
- .3 Section 09 91 23 - Interior Painting

1.02 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)
  - .1 ANSI/ASME 18.6.1 1981 (R2012) Wood Screws (Inch Series).
  - .2 ANSI/BHMA A156.9-2010, Cabinet Hardware.
  - .3 ANSI/BHMA A156.11-2014, Cabinet Locks.
  - .4 ANSI/BHMA A156.16-2013, Auxiliary Hardware.
  - .5 ANSI/BHMA A156.18-2012, Materials and Finishes.
  - .6 ANSI/BHMA A156.20-2006, Strap and Tee Hinges and Hasps.
  - .7 ANSI A208.1-09, Particleboard.
  - .8 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
  - .9 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  - .1 Architectural Woodwork Standards (AWMAC AWS), 2014.
- .3 ASTM International
  - .1 ASTM A 153/A 153M-16, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - .2 ASTM E 1333-14, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
  - .3 ASTM F 1667-13 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-11.3-M87, Hardboard.
  - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
  - .3 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
- .5 CSA Group (CSA)
  - .1 CSA O112-M Series 1977 (R2006) Standards for Wood Adhesives.
  - .2 CSA O121-08 (R2013), Douglas Fir Plywood.
  - .3 CSA O141-05 (R2014), Softwood Lumber.
  - .4 CSA O151-14, Canadian Softwood Plywood.
  - .5 CSA O153-[M1980 (R2014)], Poplar Plywood.
  - .6 CAN/CSA-Z809-08 (R2013), Sustainable Forest Management.
- .6 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .7 Green Seal Environmental Standards (GS)

- .1 GS-11-2015, Paints, Coatings, Stains and Sealers.
- .2 GS-36-2013, Adhesives for Commercial Use.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .9 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates (HPDL).
- .10 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .11 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2015-2019 Standard and Rules.

### 1.03 PRE-INSTALLATION MEETING

- .1 Prior to enclosing framing, convene a meeting of contractor, casework fabricator, casework installer, framing subcontractor and Consultant.
  - .1 Review locations of backing required for casework installation as shown on shop drawings and as necessary for installation.
  - .2 Review method of attachment for backing to wall system.
  - .3 Review coordination with other affected sections.

### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Prepare and submit material list in accordance with AWMAC AWS, cross-referenced to specifications.
  - .2 Include manufacturer's instructions, printed product literature, data sheets and catalogue pages for all materials and products to be incorporated into architectural wood casework and include product characteristics, performance criteria, dimensions and profiles, finish and limitations on use.
  - .3 Submit two copies of WHMIS SDS in accordance with Section 01 10 00 - General Instructions.
- .3 Hardware List:
  - .1 Submit hardware list cross-referenced to specifications.
  - .2 Include manufacturer's specification sheets indicating name, model, material, function, finish, BHMA designations and other pertinent information.
- .4 Shop Drawings:
  - .1 Prepare and submit shop drawings in accordance with AWMAC AWS and as follows.
  - .2 Submit two sets of shop drawings for initial review in accordance with requirements of Division 01. Revise as directed, submit six copies for final acceptance and distribution.
  - .3 Indicate details of construction, profiles, jointing, fastening and other related details.
    - .1 Scales: profiles full size, details half full size.

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

#### 1.05 SUSTAINABLE DESIGN SUBMITTALS

- .1 Submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
  - .1 Submit vendor's, manufacturer's FSC Chain-of-Custody Certificate number.
- .2 Submit ASTM E 1333 test report for formaldehyde emissions from composite wood products showing compliance with specified limits.
- .3 Submit product data indicating compliance with other specified sustainable design characteristics.

#### 1.06 QUALITY ASSURANCE

- .1 Perform Work of this Section by single architectural wood casework

fabricator with minimum 5 years of current architectural casework production experience and having completed minimum one project in the past 5 years with value within 20% of the cost of the work of this Section.

- .2 Independent inspection/testing agency may engage Departmental Representative for purpose of inspecting and/or testing Work of this Section.
  - .1 Cost of inspection and testing services will be borne by Departmental Representative.
- .3 Mock-ups:
  - .1 Construct mock-ups in accordance with Section 01 10 00 - General Instructions.
  - .2 Shop prepare one base cabinet unit, wall cabinet, counter top, shelving unit, convactor cabinet, complete with hardware and shop applied finishes, and install where directed by Departmental Representative.
  - .3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with Work.
  - .4 When accepted, mock-up will demonstrate minimum standard for Work.
  - .5 Do not proceed with work prior to receipt of written acceptance of mock-up by Departmental Representative.
  - .6 Accepted mock-up may remain as part of finished work.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Deliver wood casework only when area of work is enclosed, plaster and concrete work is dry, and area is broom clean and site environmental conditions are acceptable for installation.
- .3 Protect millwork against dampness and damage during and after delivery.
- .4 Store millwork in ventilated areas, protected from extreme changes of temperature and humidity, and within range recommended by AWMAC AWS for location of project.
- .5 Store materials indoors, in dry location in clean, dry, well-ventilated area.
- .6 Protect architectural woodwork and hardware from nicks, scratches, and blemishes.
- .7 Replace defective or damaged materials with new.
- .8 Waste Management: for packaging and materials, in accordance with Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 SUSTAINABILITY CHARACTERISTICS

- .1 Lumber, plywood and composite wood products to be CAN/CSA-Z809 or FSC or

SFI certified.

- .2 Composite wood products: contain no added formaldehyde, formaldehyde emissions within the following limits when tested in accordance with ASTM E 1333.
  - .1 Hardwood plywood with veneer core (HWPW-VC): .05 ppm].
  - .2 Hardwood plywood with composite core (HWPW-CC): 0.05 ppm.
  - .3 Particleboard (PB): 0.09 ppm.
  - .4 Medium density fibreboard (MDF): 0.11 ppm.
  - .5 Thin (less than 8 mm) medium density fibreboard (tMDF): 0.13 ppm.
- .3 Recycled content:
  - .1 Fibreboard must contain less than 10% roundwood by weight, using weighted average over three month period at manufacturing locations.
  - .2 Lumber: salvaged, recovered lumber: in accordance with Section 01 35 21 - LEED Requirements.
- .4 Adhesives: VOC limit 120 g/L maximum to SCAQMD Rule 1168 GS-36.
- .5 Coatings
  - .1 Clear Wood Finishes: VOC limit 550 g/L maximum to GS-11 CAQMD Rule 1113.
  - .2 Paints: VOC limit 100 g/L maximum to GS-11 SCAQMD Rule 1113.

## 2.02 QUALITY GRADE

- .1 Provide all materials and perform all fabrication in accordance with AWMAC AWS Custom Grade and as follows, except where specified otherwise:
  - .1 Economy Grade: mechanical rooms and utility areas, storage areas, janitor's closets.
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.

## 2.03 LUMBER

- .1 Softwood and Hardwood Lumber: Sound lumber to specified AWMAC AWS quality grade requirements, kiln-dried to moisture content recommended by AWMAC AWS for location of the Work.
- .2 Machine stress-rated lumber is acceptable for all purposes.
- .3 Face framing, pulls, trims, molding, edge-banding, stiles and rails: species, in profiles indicated.

## 2.04 PANEL MATERIALS

- .1 Interior mat-formed wood particleboard: to ANSI/NPA A208.1, industrial grade M-2 or M-3, medium density (640-800 kg/m<sup>3</sup>), thickness 19 mm unless indicated otherwise.
  - .1 Use moisture resistant grade 2-M-2 or 2-M-3 for countertops and splash-backs to receive plumbing fixtures.
- .2 MDF (medium density fibreboard) core: to ANSI A208.2, density 769 kg/m<sup>3</sup>, Grade, 19 mm thick unless indicated otherwise
  - .1 Use moisture resistant MR grade for countertops and splash-backs to

receive plumbing fixtures.

- .3 Douglas fir plywood (DFP): to CSA 0121, standard construction.
- .4 Hardwood plywood: to CHPA grading rules ANSI/HPVA HP-1.
- .5 Canadian softwood plywood (CSP): to CSA 0151, standard construction.
- .6 Poplar plywood (PP): to CSA 0153, standard construction.
- .7 Hardboard: To CAN/CGSB-11.3.

## 2.05 DECORATIVE OVERLAID COMPOSITE PANELS

- .1 Thermally Fused Laminate (TFL): to NEMA LD3 Grade VGL, High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
  - .1 Laminate: Decorated paper with melamine or polyester resin on printed pattern with matt finish selected by Departmental Representative from manufacturer's full range.
  - .2 Core: Particleboard (PD) Medium density fibreboard (MDF).
- .2 Rigid thermoformable foil (RTF): Decorative overlay, heat and pressure laminated with suitable resin to thickness indicated.
  - .1 Thermoplastic film overlay: two-dimensional laminate to suit application, based on solid colour.
  - .2 Core: Particleboard (PD) Medium density fibreboard (MDF), thickness as indicated.
- .3 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.

## 2.06 LAMINATED PLASTIC MATERIALS

- .1 Laminated plastic for flatwork: to NEMA LD3.
  - .1 High pressure decorative laminated (HPDL) plastic.
    - .1 Type: GP (general purpose).
    - .2 Horizontal Surfaces: HGS, HGL to suit application, 1.0, 1.2 mm thick.
    - .3 Vertical Surfaces: VDS, VGL to suit application, 0.5, 0.71 mm thick.
    - .4 Colour: integral colour throughout, multilayered.
    - .5 Pattern: solid woodgrain.
    - .6 Finish: satin.
  - .2 Laminated plastic for postforming work: to NEMA LD3.
    - .1 Type: postforming.
    - .2 Grade: HGP.
    - .3 Size: 1.0 mm thick.
    - .4 Colour: multilayered.
    - .5 Pattern: solid and woodgrain
    - .6 Finish: satin.
  - .3 Laminated plastic for backing sheet:
    - .1 Type: backer.
    - .2 Grade: BKH.
    - .3 Thickness: not less than 0.5 mm thick or same thickness as face

- lamine.
- .4 Colour: [same colour as face laminate].
- .4 Laminated plastic liner sheet: CLS grade, white colour.
- .5 Thermofused Melamine: to NEMA LD3 Grade LPDL.
  - .1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
- .7 Edge finishing for doors, drawer fronts, shelves and false fronts:
  - .1 HPDL to match face.
  - .2 Matching melamine and polyester overlay edge strip with thermoplastic adhesive.
  - .3 Edges dadoed or saw kerfed to take plastic "T" moulding in width and colour to match face.
- .8 Laminated plastic adhesive:
  - .1 Adhesive: urea resin adhesive to CSA 0112 contact adhesive to CAN/CGSB-71.20 resorcinol resin adhesive to CSA 0112.10 polyvinyl adhesive to CSA 0112-M.

## 2.07 CASEWORK FABRICATION - GENERAL

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

## 2.08 LAMINATED PLASTIC CASEWORK FABRICATION

- .1 Do laminated plastic fabrication in compliance with NEMA LD3, Annex A and specified AWMAC AWS quality grade.
- .2 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .3 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.
- .4 Form shaped profiles and bends as indicated, using post-forming grade laminate to laminate manufacturer's instructions.

- .5 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .6 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .7 Apply laminated plastic liner sheet to interior of cabinetry where indicated.
- .8 Drawer Construction:
  - .1 Sides:
    - .1 Custom grade: LPDL (melamine) or HPDL on particleboard, thickness 12 mm.
    - .2 Premium grade: 7-ply veneer core with HPDL faces.
  - .2 Bottoms: Tempered hardboard MDF with melamine surfaces, Hardwood plywood of same species as drawer sides, thickness 6 mm.
  - .3 Joinery: Meeting requirements of AWMAC for Grade specified.
  - .4 Drawer bottoms held in place with drawer hardware to sides and mechanically fastened to back and sub front fully housed into sides and sub front and mechanically fastened to back or plowed into back.

## 2.09 WOOD CASEWORK FABRICATION

- .1 Fabricate casework bodies of specified veneered plywood panel materials of specified veneers laid up as specified in accordance with AWMAC AWS requirements for grade specified and as follows.
  - .1 Exposed interior surfaces: Veneer of same species and cut and grade as exposed exterior surfaces.
  - .2 Semi-exposed surfaces: Veneer of same species as exposed exterior surfaces low pressure melamine overlay in solid and woodgrain.
- .2 Fabricate door, drawer and panel surfaces of specified veneered plywood panel materials of specified veneers laid up as specified.
- .3 Drawer construction:
  - .1 Sides:
    - .1 AWMAC AWS Custom grade: solid wood of manufacturer's species option LPDL melamine surface.
    - .2 AWMAC AWS custom grade: prefinished seven or nine ply hardwood veneer core with no internal voids prefinished solid hardwood 12mm thickness.
  - .2 Bottoms: Tempered hardboard MDF with melamine surfaces, Hardwood plywood of same species as drawer sides, 6 mm thick.
  - .3 Joinery: Meeting requirements of AWMAC AWS for Grade specified.

## 2.10 SHOP APPLIED FINISH COATINGS

- .1 Finish system: AWMAC AWS system Custom grade.
  - .1 Include filler, wash coat, stain.
- .2 Apply finish system component materials in accordance with manufacturer's instructions.
- .3 For raw wood (pulls, trims, molding and edgbanding) on HPDL casework, provide AWMAC AWS finish system Custom grade.



## 2.11 CABINET HARDWARE

- .1 Conform to ANSI/BHMA Standards (latest edition), Grade 2 requirements.
- .2 Door/Drawer Pulls: Contemporary Metal Pull, 192mm centre to centre of installation holes. 272mm wide overall dimension. Finish to be selected by Architect from manufacturer's standard range.

## 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 INSTALLATION

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

- .10 Fit hardware accurately and securely in accordance with manufacturer's written instructions.
- .11 Make cutouts for inset equipment and fixtures using templates provided.

### 3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
  - .1 Clean millwork and cabinet work inside cupboards and drawers and outside surfaces.
  - .2 Remove excess glue, pencil and ink marks from surfaces.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.

### 3.04 PROTECTION

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 07 92 00 - Joint Sealants

1.02 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)
  - .1 ANSI 208.1-09, Particleboard.
  - .2 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
- .2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  - .1 Architectural Woodwork Standards (AWS), 2nd edition, 2014.
- .3 ASTM International (ASTM)
  - .1 ASTM E 1333-14, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
  - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .5 CSA Group (CSA)
  - .1 CSA O112-M Series 1977 (R2006) Standards for Wood Adhesives.
  - .2 CSA O121-08, Douglas Fir Plywood.
  - .3 CSA O151-09, Canadian Softwood Plywood.
  - .4 CSA O153-M1980 (R2008), Poplar Plywood.
  - .5 CAN/CSA-Z809-08, Sustainable Forest Management.
- .6 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .7 Green Seal Environmental Standards (GS)
  - .1 GS-36-13, Commercial Adhesives.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .9 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High Pressure Decorative Laminates (HPDL).
- .10 Scientific Equipment and Furniture Association (SEFA)
  - .1 SEFA 8-99, Laboratory Furniture.
- .11 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards



### 1.06 QUALITY ASSURANCE

- .1 Perform Work of this Section by plastic laminate fabricator with minimum 5 years of current experience and having completed minimum one project in the past 5 years with value within 20% of the cost of the work of this Section.
- .2 Independent inspection/testing agency may be engaged by Departmental Representative, for purpose of inspecting and/or testing Work of this Section.
  - .1 Cost of inspection and testing services will be borne by Departmental Representative.
- .3 Mock-ups:
  - .1 Construct mock-ups in accordance with Section Section 01 10 00 - General Instructions.
  - .2 Prepare one typical plastic laminate finish installation where directed by Departmental Representative.
  - .3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with Work.
  - .4 When accepted, mock-up will demonstrate minimum standard for Work.
  - .5 Do not proceed with work prior to receipt of written acceptance of mock-up by Departmental Representative.
  - .6 Accepted mock-up may remain as part of finished work.

### 1.07 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Maintain indoor temperature and humidity within range recommended by the AWMAC Quality Standards for location of the project.
  - .3 Store and protect laminate, adhesive, and core materials from nicks, scratches, and blemishes.
  - .4 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: sort for reuse, return, recycling or disposal as specified in Construction Waste Management Plan, Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 SUSTAINABILITY CHARACTERISTICS

- .1 Lumber, plywood and composite wood products to be CAN/CSA-Z809 or FSC or SFI certified.

- .2 Composite wood products: contain no added formaldehyde, formaldehyde emissions within the following limits when tested in accordance with ASTM E 1333.
  - .1 Hardwood plywood with veneer core (HWPW-VC): 0.05 ppm.
  - .2 Hardwood plywood with composite core (HWPW-CC): 0.05 ppm.
  - .3 Particleboard (PB): 0.09 ppm.
  - .4 Medium density fibreboard (MDF): 0.11 ppm.
  - .5 Thin (less than 8 mm) medium density fibreboard (tMDF): 0.13 ppm.
- .3 Fibreboard must contain less than 10% roundwood by weight, using weighted average over three month period at manufacturing locations.
- .4 Adhesives: VOC limit 200 g/L maximum to SCAQMD Rule 1168, GS-36.
- .5 Sealant: in accordance with Section 07 92 00 - Joint Sealants.

## 2.02 QUALITY GRADE

- .1 Provide all materials and perform all fabrication in accordance with AWMAC AWS Custom Grade except where specified otherwise, excepting the following:
  - .1 Economy Grade: mechanical rooms and utility areas storage areas janitor's closets.
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.

## 2.03 LAMINATED PLASTIC MATERIALS

- .1 Laminated plastic for flatwork: to NEMA LD3.
  - .1 Type: general purpose.
  - .2 Grade: HGS
  - .3 Thickness: 1.6 mm thick.
  - .4 Colour: integral colour throughout.
  - .5 Pattern: solid.
  - .6 Finish: gloss.
- .2 Laminated plastic for postforming work: to NEMA LD3.
  - .1 Type: postforming.
  - .2 Grade: HGP
  - .3 Thickness: 1.2 mm thick.
  - .4 Colour: selected by Consultant.
  - .5 Pattern: selected by Consultant.
  - .6 Finish: selected by Consultant.
- .3 Laminated plastic for backing sheet: to NEMA LD3.
  - .1 Type: backer.
  - .2 Thickness: same thickness as face laminate.
  - .3 Colour: same colour as face laminate.
- .11 Laminated plastic for liner: to NEMA LD3.
  - .1 Type: cabinet liner.
  - .2 Grade: CLS.

- .3 Thickness: 0.5 mm thick
- .4 Colour: white.

#### 2.04 CORE MATERIALS

- .1 Interior mat-formed wood particleboard: to ANSI/NPA A208.1, industrial grade M-2 or M-3, medium density (640-800 kg/m<sup>3</sup>), thickness 19 mm unless indicated otherwise.
  - .1 Use moisture resistant grade 2-M-2 or 2-M-3 for countertops and splash-backs to receive plumbing fixtures.
- .2 Douglas fir plywood (DFP): to CSA 0121, standard construction.
- .4 Hardwood plywood: to CHPA grading rules ANSI/HPVA HP-1.
- .5 Canadian softwood plywood (CSP): to CSA 0151, standard construction.
- .6 Poplar plywood (PP): to CSA 0153, standard construction.

#### 2.05 ADHESIVES, SEALERS AND ACCESSORIES

- .1 Laminated plastic adhesive: [urea resin adhesive to CSA 0112.10 contact adhesive to CAN/CGSB-71.20, resorcinol resin adhesive to CSA 0112.10, polyvinyl adhesive to CSA 0112.10 two component epoxy thermosetting adhesive.
  - .1 VOC limit 250g/L5% by weight maximum to SCAQMD Rule 1168.
- .2 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.
  - .1 VOC limit:200 g/L.maximum to SCAQMD Rule 1113.
  - .2 Chemical restrictions to SCAQMD Rule 1113.
- .3 Sealants: water resistant sealer or glue acceptable to laminate manufacturer.
- .4 Draw bolts and splines: as recommended by fabricator.
- .5 Edge finishing:
  - .1 HPDL to match face.
  - .2 Matching melamine and polyester overlay edge strip with thermoplastic adhesive.
  - .3 PVC ABS: solid colour to match face.
  - .4 Edges dadoed or saw kerfed to take plastic "T" moulding in width and colour to match face.

#### 2.06 FABRICATION

- .1 Fabricate plastic laminate finished items in accordance with NEMA LD3, Annex A and specified AWMAC AWS quality grade requirements.
- .2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .3 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .4 Veneer laminated plastic to core material in accordance with adhesive

manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400mm. Keep joints 600 mm from sink cutouts.

- .5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .6 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .7 Apply laminated plastic liner sheet to interior of cabinetry where indicated.
- .8 Edge treatment:
  - .1 For HPDL edge treatment use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
  - .2 Apply melamine and polyester overlay edge strip in accordance with manufacturer's instructions.
  - .3 Apply plastic edge mouldings in accordance with manufacturer's instructions.

### 3 EXECUTION

#### 3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for laminate, adhesive, and core materials 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.

#### 3.02 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

#### 3.03 INSTALLATION

- .1 Install laminated plastic work in accordance with AWMAC AWS Custom Grade, except as follows:
  - .1 Economy Grade: mechanical rooms and utility areas.
- .2 In case of conflict between Contract Documents and AWMAC AWS grade requirements, Contract Documents govern.



- .3 Install work plumb, true and square, neatly scribed to adjoining surfaces.
- .4 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- .5 Use draw bolts and splines in counter top joints. Maximum spacing 450 mm on centre, 75 mm from edge. Make flush hairline joints.
- .6 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
- .7 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant in accordance with Section 07 92 00 - Joint Sealants.

### 3.04 SITE APPLIED PLASTIC LAMINATE

- .1 Site apply laminated plastic to units as indicated.
- .2 Adhere laminated plastic over entire surface.
- .3 Make corners with hairline joints.
- .4 Use full sized laminate sheets.
- .5 Make joints only where indicated approved by Departmental Representative.
- .6 Slightly bevel arises.
- .7 Offset joints in plastic laminate facing from joints in core.

### 3.05 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
  - .1 Clean to NEMA LD3, Annex B.
  - .2 Remove traces of primer, caulking, epoxy and filler materials and clean doors and frames.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.

### 3.06 PROTECTION

- .1 Cover finished laminated plastic veneered surfaces with heavy kraft paper or put in cartons during shipment.
- .2 Protect installed laminated surfaces in accordance with manufacturer's written recommendations.
  - .1 Remove protection only immediately before final inspection.

- .3 Protect installed products and components from damage during construction.
- .4 Repair damage to adjacent materials caused by laminate, adhesive, and core materials installation.

END OF SECTION

## 1 GENERAL

### 1.01 SYSTEMS DESCRIPTION

- .1 This Section specifies fire stop systems and/or fire stop materials intended to fill gaps between fire separations, between fire separations and other construction assemblies, or used in or around items which fully or partially penetrate a fire separation, to restrict the spread of fire and smoke thus maintaining the integrity of a fire separation.
- .2 This Section includes requirements for:
  - .1 Through-penetration fire stops:
    - .1 For openings created to allow a penetrating item such as piping, conduits, raceways, ducts, cable trays, cables, tubing or structural components to pass completely through a fire separation or fire-resistance rated assembly.
  - .2 Membrane penetration fire stops:
    - .1 For openings where penetrating items such as piping, conduits, raceways, ducts, cable trays, cables, tubing, recessed components (e.g.: panels, electric boxes, devices) or structural components pass through only one membrane of a fire separation or fire-resistance rated assembly.
  - .3 Blank opening fire stops:
    - .1 For openings created in a fire separation where the penetrating item has not yet been installed or has been removed.
  - .4 Construction joint fire stops:
    - .1 For locations where adjacent fire separations or components of fire separations meet. These locations include: ceiling/wall and roof/wall joints, wall/wall joints at corners or in the same plane, wall/floor joints, floor/floor joints and ceiling/ceiling joints.
    - .2 Includes fire stops for seismic joints, vertical control joints, expansion joints, and joints which occur at the tops and bottoms of fire separation walls.
    - .3 Includes fire stops for head of wall to non-rated roof or floor assemblies.
- .3 This Section includes fire stopping work for entire Project including selection, installation and inspection of all required fire stops.

### 1.02 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 02 81 00 - Hazardous Materials

### 1.03 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
  - .1 ASTM E 595-15, Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment.
  - .2 ASTM E 2032-09(2013), Standard Guide for Extension of Data From Fire Resistance Tests Conducted in Accordance with ASTM E?119.
  - .3 ASTM E 2174-14b, Standard Practice for On-Site Inspection of

- Installed Firestops.
- .4 ASTM E 2307-15be1, Standard Test Method for Determining Fire Resistance of Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.
  - .5 ASTM E 2393-10a(2015), Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
  - .6 ASTM E 2837-13(2017), Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies.
- .2 Firestop Contractors International Association (FCIA)
    - .1 FCIA Firestop Manual of Practice, 6th Edition 2015.
  - .3 Factory Mutual Approvals (FM)
    - .1 FM 4991, Approval Standard for Firestop Contractors.
  - .4 International Accreditation Service (IAS)
    - .1 IAS AC291, Accreditation Criteria for Special Inspection Agencies.
  - .5 International Firestop Council (IFC)
    - .1 IFC Guidelines for Evaluating Engineering Judgments.
    - .2 IFC Guidelines for Evaluating Engineering Judgments - Perimeter Fire Barrier Systems.
    - .3 IFC Inspection Guidelines for Penetration Firestop Systems and Fire Resistive Joint Systems in Fire Resistance Rated Construction, 5th Edition.
  - .6 National Research Council Canada (NRC)
    - .1 National Building Code of Canada [2015] (NBC).
  - .7 Underwriter's Laboratories of Canada (ULC)
    - .1 CAN/ULC-S115-[11(R2016), Standard Method of Fire Tests of Firestop Systems.
    - .2 ULC Qualified Firestop Contractor Program.

#### 1.04 DEFINITIONS

- .1 Fire Blocking: materials, components or system installed in a concealed space in the building to restrict the spread of fire and smoke in that concealed space or from that concealed space to an adjacent space.
- .2 Fire Stop: a material, component or system, and its means of support, used to protect gaps between fire separations, between fire separations and other construction assemblies, or used in openings where penetrating items wholly or partially penetrate fire separations, to restrict the spread of fire and smoke thus maintaining the fire-resistance continuity of a fire separation.
- .3 Fire Stop System: the combination of specific materials and/or devices required with the penetrating item(s), the assembly and the opening to assemble the fire stop.
- .4 Intumescent: materials that expand with heat to prevent fire spread through fire separations.
- .5 Listed Fire Stop System: a specific field erected construction consisting of the assembly, fire stop materials, any penetrating items and their means

of support which have met the requirements for an F, FT, FH, FTH and/or L rating when tested in a fire-resistance rated assembly in accordance with CAN/ULC-S115 - Standard Method of Fire Tests of Firestop Systems.

- .1 F-Rating: the amount of time a fire stop system can remain in place without the passage of flame through the opening or the occurrence of flaming on the unexposed face of the fire stop.
- .2 FT-Rating: a fire stop system with an F-Rating for the required time period which can also resist the transmission of heat through the fire stop during the same period and limit the rise in temperature on the unexposed face and/or penetrating item of the fire stop.
- .3 FH-Rating: a fire stop system with an F-Rating for the required time period which can also resist the force of a hose stream without developing openings for a prescribed period.
- .4 FTH-Rating: a fire stop system with an FT-Rating for the required time period which also passed the hose stream test for a prescribed period.
- .5 L-Rating: largest test sample leakage rate, determined in accordance with the optional air leakage test of CAN/ULC-S115.
- .6 Multi-penetration: two or more service penetrations through an opening in the fire separation.
- .7 Non-rated Fire Separation: fire separation acting as a barrier to the spread of smoke until a response is initiated such as the activation of a fire suppression system.
- .8 Single-penetration: single service penetration through an opening in the fire separation.
- .9 System Design Listing: document providing proof of testing with technical details, specifications and requirements that leads to the application of a specific listed fire stop system.

#### 1.05 PRE-INSTALLATION MEETINGS

- .1 Convene pre-installation meeting two weeks prior to beginning work of this Section, with Contractor's representative and Departmental Representative, DCC Representative and Consultant to:
  - .1 Verify Project requirements.
  - .2 Review sustainable requirements.
  - .3 Review installation and substrate conditions.
  - .4 Coordinate with other building trades.
  - .5 Review system design listings, manufacturer's installation instructions and warranty requirements.
  - .6 Review quantity and location of mock-ups.
- .2 Convene pre-installation meetings with other trades to review:
  - .1 Installation procedures and precautions.
  - .2 Location, scheduling and sequencing of other work around fire stops that can affect the outcome of the installation.
  - .3 Requirements for annular opening sizes.
  - .4 Requirements and preparations for wall/floor single and multi-penetrations.
  - .5 Requirements for construction and perimeter joints.
  - .6 Mock-up requirements.

- .3 Submit copies of applicable listed fire stop system details to each trade for opening preparation. Include installation details required for the listed system.
- .4 Meeting minutes: Contractor to take minutes of pre-installation meetings and distribute to Departmental Representative and each affected trade.

#### 1.06 SEQUENCING

- .1 Proceed with installation only when submittals have been reviewed by Departmental Representative.
- .2 Fire stops located in floor assemblies: install before interior partition erections.
- .3 Metal deck bonding: unless noted otherwise on system design listing and manufacturer's installation instructions, fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Pipe and duct insulation: certified fire stop system component.
  - .1 Ensure pipe and duct insulation installation precedes fire stopping.

#### 1.07 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 10 00 - General Instructions.
- .2 Qualification Statement
  - .1 Submit contractor qualification statements and certificates demonstrating compliance with the qualification requirements of this Section, as described in PART 1 - QUALITY ASSURANCE, within 10 working days after award of contract and before starting Work.
- .3 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet. Submit complete product data for each individual component and include:
    - .1 Product name and product number.
    - .2 Product characteristics and performance criteria.
    - .3 Physical size, finish and limitations.
    - .4 Technical data on out-gassing, off-gassing and age testing.
    - .5 Curing time.
    - .6 Chemical compatibility to other construction materials.
    - .7 Shelf life.
    - .8 Life expectancy.
    - .9 Temperature range for installation.
    - .10 Humidity range for installation.
    - .11 Sound attenuation STC-Rating.
  - .2 Manufacture Product Certification:
    - .1 Submit certification by the manufacturer that products supplied comply with local regulations controlling use of Volatile Organic Compounds (VOC's) and are non-toxic to building occupants.
    - .2 Submit test reports showing compliance to ASTM E 595.
  - .3 For each individual component, Submit copies of WHMIS Safety Data Sheets (SDS) in accordance with Section 02 81 00 - Hazardous

- Materials.
- .4 Submit a comprehensive list of all products and components included in submittal.
- .4 Shop Drawings:
- .1 Submit shop drawings showing system design listings for Project including proposed materials, reinforcement, anchorage, fastenings and method of installation.
  - .2 Construction details to accurately reflect actual job conditions for each product and assembly.
  - .3 Submit details for materials and prefabricated devices.
  - .4 Submit electronic copy and printed copy in hard covered D-ring binder of shop drawings and include:
    - .1 Title page, labelled "Fire and Smoke Stop System Listings". Include project name, date and the names of the installation company and the manufacturer of proposed products. Insert title in front and spine of binder.
    - .2 Table of Contents at the front of each binder.
    - .3 List of each proposed listed fire stop system and corresponding service penetration type or joint type in a matrix spreadsheet schedule, indicating floor and wall system, including rating for each.
    - .4 Location of penetrations:
      - .1 Drawings showing the location of each penetration with a unique penetration identification number [and associated listing number.
      - .2 [Schedules listing each penetration with a unique identification number, their associated listing number, organized by floor, wall and ceiling area and indicating each room number.
    - .5 System Design Listings:
      - .1 Submit CAN/ULC-S115 design listings for each listed fire stop system and each application identified.
      - .2 When more than one product is specified for the listed fire stop system or more than one packing/damming material is indicated, identify the item that will be used on this Project.
    - .6 Certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.
- .6 Samples: submit to Departmental Representative minimum one week prior to commencing on site work:
- .1 Duplicate 300 x 300 mm samples of each system showing actual fire stop materials proposed for Project including anchors/fasteners and damming materials.
  - .2 Duplicate samples of each type of label proposed for the identification of fire stops.
- .7 Engineering Judgments:
- .1 Where there is no specific tested listed fire stop system available from the manufacturer for a particular fire stop configuration, review

- systems from other manufacturers to obtain a listed fire stop system.
- .2 Submit an Engineering Judgment (EJ) from the system manufacturer if there are no listed systems available from other manufacturers.
  - .3 Prepare and submit an EJ in accordance with best practices established in the following documents:
    - .1 IFC Guidelines for Evaluating Engineering Judgments.
    - .2 IFC Guidelines for Evaluating Engineering Judgments - Perimeter Fire Barrier Systems.
  - .4 For each EJ submitted, include:
    - .1 Project name, number and location.
    - .2 A description of the proposed system with detailed drawing.
    - .3 Installation instructions.
    - .4 Complete descriptions of critical elements for the fire stop configuration.
    - .5 Copies of all referenced system design listings on which the EJ is based on.
    - .6 EJ issuer name and contact information.
    - .7 Date of issue of EJ with authorization signature of issuer.
    - .8 Manufacturer letter stating their opinion, with supporting justification, that the EJ will perform as a fire stop system were it to be subjected to the appropriate standard fire test method for the required fire rating duration.
  - .8 Once the EJ has been reviewed, submit the EJ to the authority having jurisdiction for final approval.
  - .9 EJ shall be issued only by fire stop manufacturer's qualified technical personnel or in concert with the manufacturer by a knowledgeable registered Professional Engineer, a Fire Protection Engineer or an independent testing agency that provides testing and listing services for fire stop systems similar to the EJ being contemplated.
  - .10 EJ shall be based upon interpolations of previously tested fire stop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the Engineering Judgment is to be given. Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g.: ASTM E 2032) may also be used as further support data.
  - .11 EJ shall be based upon knowledge of the elements of the construction to be protected and understanding of the probable behaviour of that construction and the recommended fire stop system protecting it were they to be subjected to the adequate standard fire test method for the required fire rating duration.
  - .12 EJ shall be limited to the specific conditions and configurations upon which EJ was rendered and should be based upon reasonable performance expectations for the recommended fire stop system under those conditions.
  - .13 EJ shall be accepted only for a single specific job and location and should not be transferred to any other job or location without thorough and appropriate review of all aspects of the next job or location's circumstances.
  - .14 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.



### 1.08 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual. Include:
  - .1 WHMIS Safety Data Sheets (SDS).
  - .2 Product data and manufacturer's installation and maintenance instructions for each product/system used on this project.
  - .3 Approved system design listings and Engineering Judgments.
  - .4 Matrix schedule listing all system design listings and Engineering Judgments with a description of their penetration or joint type.
  - .5 Certifications:
    - .1 Proof of training for each worker that performed installation on the Project.
    - .2 Proof of company as a FCIA - Member in Good Standing.
    - .3 Certification of company as a ULC Qualified or FM 4991 Approved Firestop Contractor, including the Designated Responsible Individual (DRI) certificate.
    - .4 Accreditation of third-party inspection firm.
  - .6 Manufacturer's field reports.
  - .7 Warranty information on fire stop installations.
  - .8 Life expectancy of each product installed as part of Project. For each system, list the installation date of products and the expected expiration date (month/year).
- .3 Record Documentation:
  - .1 Maintain a daily log of all activities on site during the course of construction. Submit a copy of all daily logs after completion of fire stopping work.
  - .2 As-built Drawings:
    - .1 Submit marked-up set of drawings to provide referencing system identifying the location of each fire stop.
    - .2 Identify each penetration type fire stop with their penetration identification number.
    - .3 Provide detailed drawings of system design listings for each type of fire stop (i.e.: through-penetration, membrane penetration, blank opening, construction joint, building perimeter).
  - .3 Fire Stop Schedules:
    - .1 Submit complete fire stop schedules for floors, walls and ceilings.
    - .2 Indicate all penetration fire stops and joint fire stops through each reference wall, floor and ceiling in the schedules.
    - .3 Cross-reference fire stop schedules with as-built drawings and indicate design listing numbers associated to each penetration fire stop and joint fire stop.

### 1.09 QUALITY ASSURANCE

- .1 Provide systems selection and analysis, installation and inspection of fire stop systems in accordance with the recommended practices detailed in the following guides:
  - .1 FCIA Firestop Manual of Practice (MOP).

- .2 Qualifications:
  - .1 Contractor specializing in selection and installation of fire stops with five years documented experience approved by manufacturer. Submit a list of five successfully completed projects of similar scale and type.
  - .2 Company recognized as a Member in Good Standing with the Firestop Contractors International Association (FCIA). Submit written proof of current membership.
  - .3 Training: workers, including site supervisor, to have completed:
    - .1 Manufacturer training on the products/systems installed as part of this Section.
    - .2 Training under the FCIA Firestop Containment Worker Education Program.
  - .4 Certified Firestop Contractor: company certified with one of the following programs:
    - .1 ULC Qualified Firestop Contractor Program. Submit signed copy of ULC Qualified Firestop Contractor Program certificate.
    - .2 FM 4991 Approved Firestop Contractor. Submit signed copy of FM 4991 Approval certificate.
  - .5 Third-Party Inspection Firm: IAS AC291 Accredited inspection agency with inspectors who have passed the ULC Firestop Exam or FM Firestop Exam.
- .3 Mock-ups:
  - .1 Construct mock-up of fire stop systems in accordance with Section 01 45 00 - Quality Control.
  - .2 Prior to commencement of construction, provide mock-up of each proposed listed fire stop system for review by Departmental Representative. Mock-up shall include work by other trades to demonstrate the required finish work, such as steel stud / gypsum board trade framing out multi-penetrations openings.
  - .3 Install proposed identification labels for each penetration.
  - .4 Locations for mock-ups as directed by the Departmental Representative.
  - .5 Once a mock-up is completed and materials had adequate time to properly cure, provide minimum of 48 hours written notification to Departmental Representative to conduct review.
  - .6 Manufacturer's representative and inspection firm to be present during review of mock-ups.
  - .7 Correct mock-up deficiencies as directed by Departmental Representative and [manufacturer.
  - .8 When accepted, mock-ups will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.
  - .9 Departmental Representative may perform destructive tests to each mock-up to ensure the system meets or exceeds the approved system design listing.
- .4 Manufacturer Site Visits: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
  - .1 After delivery and storage of products, and when preparatory work is complete, but before installation begins.
  - .2 During the mock-up review.
  - .3 Three times during progress of Work at 30%, 60% and 90% completion

stages. Confirm completion percentages with Departmental Representative.

- .4 Upon completion of Work, after cleaning is carried out.

#### 1.10 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings, manufacturing date, shelf life expiry date.
- .2 Storage and Protection:
  - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective, expired or damaged materials with new.
  - .3 Coordinate delivery of materials with scheduled installation dates to allow minimum storage time on site.
  - .4 Comply with recommended procedures, precautions and measures described in WHMIS Safety Data Sheets (SDS).
- .3 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.

#### 1.11 FIELD CONDITIONS

- .1 Ambient Conditions:
  - .1 Install fire stops when ambient and substrate temperatures are within the limits prescribed by the manufacturer and when the substrate is dry and without risk of condensation.
  - .2 Maintain manufacturer's recommended ambient and substrate temperatures for 48 hours before and 72 hours after installation.
- .2 Ventilate fire stops in accordance with manufacturers' instructions by natural means or where this is inadequate using forced air circulation.

#### 1.12 WARRANTY

- .1 For the Work of this Section 07 84 00 - Fire Stopping, the 12-month warranty period is extended to 24 months.
- .2 Manufacturers shall warrant work of this section against defects and deficiencies in the product material for a period of 24 months. Promptly correct any defects or deficiencies, which become apparent within warranty period at no expense.
- .3 Contractor shall warrant workmanship on materials and installation for a period of 24 months. Promptly correct any defects or deficiencies which become apparent within warranty period at no expense.

## 2 PRODUCTS

### 2.01 MANUFACTURERS

- .1 Provide products from a single manufacturer, to the greatest extent possible, to perform all fire stopping work. Materials of different manufacturers will not be permitted without written authorization from Departmental Representative.
- .2 Where there is no specific tested listed fire stop system available from the manufacturer for a particular fire stopping application, provide a listed system from an alternative manufacturer to avoid providing an Engineering Judgment.

### 2.02 DESIGN/PERFORMANCE CRITERIA

- .1 Fire stop and smoke stop systems and systems providing a barrier to smoke spread consisting of a material or combination of materials installed to maintain the integrity of the fire resistance rating of a fire separation in accordance with the requirements of NBC-2015.
- .2 Non-rated fire separations: provide L-Rated smoke protection fire stop system for application on both sides of separation.
- .3 Acoustic insulation properties, as shown on drawings in schedule.
- .4 Dynamic joints: where required, fire and smoke stop systems to be designed to accommodate a defined amount of movement to account for expansion or contraction in construction joints and mechanical piping, for movement in structural elements and to accommodate for movement and sound and vibration control in mechanical installations.
- .5 Insulated pipes and ducts: listed fire stop system designed and tested with actual insulation materials penetrating the fire separation, as indicated on the system design listing.
- .6 Use in wet areas: water-based products are unacceptable in wet areas or areas that may be subject to occasional water exposure or flooding during and after construction.
- .7 Architectural considerations: when exposed to view, fire stop system to consider architectural finish, potential traffic, and exposure to moisture and heat.
- .8 Environment considerations: materials selected to consider the environment in which they will be used during and after curing as well as the intended use of space. Fire stop manufacturer to confirm compatibility of the proposed materials/products for the following cases:
  - .1 Spaces requiring resistance to infection and biological spread through assemblies.
  - .2 Spaces containing sensitive electronic equipment.
  - .3 Preventing contamination of laboratory and manufacturing environments.

## 2.03 MATERIALS

- .1 Fire stop and smoke stop systems: in accordance with CAN-ULC-S115.
  - .1 Asbestos-free materials and systems capable of maintaining effective barrier against the passage of flame, smoke and water and the transmission of heat in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended, as indicated on System Design Listing.
  - .2 Fire stop system rating: to match fire resistance rating of fire separation as indicated on drawings in schedule.
  - .3 Service penetration assemblies and fire stop components: certified by test laboratory to CAN/ULC-S115.
- .2 Fire and smoke stop systems at openings intended for re-entry such as cables: provide elastomeric seal or non-shrink foam cement mortar.
- .3 Fire and smoke stop systems at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: provide elastomeric protection.
- .4 Fire and smoke stops behind and around mechanical and electrical boxes within wall, floor and ceiling assemblies: provide elastomeric seal.
- .5 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .6 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .7 Packing/damming materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .8 Fire stop insulation: pre-formed, semi rigid, non-combustible mineral wool, [pre-cut in 1220 mm lengths to required depth and width].
- .9 Junction box / outlet sealing putty: intumescent putty, pre-formed in pads.
- .10 Sealants: good adhesion without use of primer, high visibility safety colours.
  - .1 Flame spread rating: maximum 25.
  - .2 Smoke development classification: maximum 50.
  - .3 For vertical joints: non-sagging.
  - .4 For horizontal joints: single component, self-levelling.

## 2.4 FIRE STOP IDENTIFICATION

- .1 Identification labels and markings to be indelible for the expected service life of the installation.
- .2 Fire Stopped Penetrations:
  - .1 Provide identification labels at each penetration.
  - .2 Identification labels: adhesive plastic stickers tamper-evident frangible stickers embossed metal tags ceramic fiber tags with metal fastening device] with the following information:

- .1 Penetration number.
- .2 Floor number.
- .3 Room number.
- .4 Product name and number.
- .5 System Design number.
- .6 Fire Rating Required: in hours.
- .7 Fire Stop Contractor's Name and phone number.
- .8 Installer's Name.
- .9 Date of Installation.
- .10 Re-penetrated by: Company, Installer and Date.
- .3 Label shall state that the fill material around the penetration is a fire stop system and it shall not be disturbed except by authorized personnel.
- .3 Fire Separation (Barrier) Markings:
  - .1 Provide identification for all vertical fire separations.
  - .2 Identification markings: adhesive tamper evident stickers stencil painted] with lettering at least 75 mm in height with a minimum 10 mm stroke in contrasting colour.
  - .3 Marking to incorporate the assembly's fire-resistance rating and the following suggested wording, "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS", or other accepted wording.
- .4 Include horizontal red painted line, 75 mm in width, between identification markings.
- .5 For occupied areas with exposed ceilings: use 50 mm red dot adhesive stickers stencil painted red dots without horizontal painted lines.

### 3 EXECUTION

#### 3.01 MANUFACTURER'S INSTRUCTIONS

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

#### 3.02 EXAMINATION

- .1 Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions and approved system design listings for each condition.
- .2 Verify each opening/annular space to ensure it does not exceed the maximum and minimum dimensions indicated on the approved system design listing.
- .3 Verify that all joints, service penetrating elements and supporting devices/hangers have been properly installed as indicated on approved system design listings. All temporary lines and markings have been removed to meet the approved system design listings.
- .4 Verify that the proposed fire stop system is composed of components that are compatible with each other, the substrates forming the openings, and the items, if any, penetrating the fire stop under conditions of application and service, as demonstrated by the fire stop manufacturer based on testing

and field experience.

- .5 Pipe and duct insulation: confirm that the proposed fire stop system has been tested with the actual insulation penetrating the fire separation on site, as indicated in the approved system design listing. Maintain insulation around pipes and ducts penetrating the fire separation.
- .6 Ensure no additional items have been installed through opening that does not appear on the approved system design listing.
- .7 Ensure areas that are to be fire stopped are accessible for proper application and conditions are suitable for installation of the fire stop system. Areas to remain accessible for inspection.
- .8 Report in writing to Departmental Representative any defective surfaces or conditions affecting the fire stop system installation, immediately and prior to commencing any installations.
- .9 Proceed only once defected surfaces or conditions have been corrected.
- .10 Beginning of installation means acceptance of site conditions.

### 3.03 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
  - .1 Ensure that substrates and surfaces are clean, dry and frost free.
  - .2 Ensure substrates and surfaces are free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
- .2 Prepare surfaces in contact with fire stop and smoke stop materials to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.
- .5 Protect adjacent work areas and finish surfaces from damage during product installation.
- .6 Ensure multi-penetration openings have been framed and boarded out, all around the annular opening as indicated in the system design listing prior to prepping the opening.

### 3.04 INSTALLATION

- .1 Install fire stop and smoke stop materials and components in accordance with manufacturer's certified tested system listing.
- .2 Coordinate with other sub-trades to ensure that all pipes, conduits, cables, and other items, which penetrate fire separations, have been permanently installed before installation of fire stop systems.

- .3 Schedule work to ensure that fire separations and all other construction that conceals penetrations are not erected before installation of fire and smoke stop systems
- .4 Protect holes or gaps made by through penetrations, poke through termination devices, and un-penetrated openings or joints to ensure that both continuity and integrity of fire separation are maintained.
- .5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing per manufacturer's instructions.
- .6 Tool or trowel exposed surfaces to neat finish.
- .7 Remove excess compound promptly as work progresses and upon completion.
- .8 Protect gaps around recessed components (e.g.: panels, electrical boxes, outlets) with sealing putty in accordance with manufacturer's instructions.
- .9 Do not use damaged or expired material.
- .10 Joint Fire Stops:
  - .1 For sealant applications, install joint fillers to support fire stop materials during application. Position joint fillers to ensure fire stop material cross-sectional shape and thickness relative to the joint width allows for optimum sealant movement, while developing the required fire-resistance rating.
  - .2 Install fire stops using techniques recommended by the manufacturer:
    - .1 Fully wetting joint substrates to optimize adhesion.
    - .2 Completely filling recesses provided for each joint configuration.
    - .3 Providing uniform, cross-sectional shapes and thickness relative to joint width that optimize movement capability.
    - .4 Tooling non-sag fire stop materials immediately after their application and prior to the time skinning begins. Form smooth, uniform beads of configuration indicated or required to:
      - .1 Provide required fire-resistance rating.
      - .2 Eliminate air pockets
      - .3 Ensure contact and adhesion with sides of joint.
  - .3 Joint Systems and Perimeter Fire Containment Systems:
    - .1 For systems with dynamic joints, ensure movement capabilities of the installation meet or exceed the movement expectations of the system design listing and manufacturer's installation instructions.

### 3.05 IDENTIFICATION

- .1 General:
  - .1 Clean substrate prior to applying identification.
  - .2 Final location of identification to be determined on site.
  - .3 Identification is not required on both sides of the fire separation.
  - .4 Refer to drawings for locations of fire separations and rating required.
- .2 Fire Stopped Penetrations:
  - .1 Install identification label adjacent to each wall/floor service



- penetrations fire stopped Provide one identification label per single opening or per grouping cluster.
- .2 Securely apply identification to substrate by providing adequate adhesive.
- .3 Secure tags with metal fasteners or hang with metal chain or wire.
- .4 Identification shall be completely filled out and installed prior to requesting substantial performance.
- .3 Fire Separations (Barriers):
  - .1 Provide identification at least 4500 mm of the end of each wall and at intervals not exceeding 9000 mm along wall/floor joint fire stops.
  - .2 Markings to be installed within ceiling spaces, 600 mm below horizontal fire separation or roof structure unless otherwise indicated.
  - .3 For occupied areas with exposed ceilings: review location of identification with Departmental Representative before proceeding.

### 3.06 REPAIRS AND MODIFICATIONS

- .1 Identify damaged or re-entered seals requiring repair or modification.
- .2 Remove loose or damaged materials. If penetrating items are to be added, remove sufficient material to insert new elements and to avoid damaging the balance of the seal.
- .3 Ensure that surfaces to be sealed are clean and dry.
- .4 Use only materials that are suitable for repair of original seal, as approved by manufacturer. Do not mix products from different manufacturers.
- .5 Repair all damage resulting from fire stop destructive testing.

### 3.07 FIELD QUALITY CONTROL

- .1 Inspections: notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stop materials and service penetration assemblies.
- .2 Manufacturer's Field Services:
  - .1 Mock-ups: manufacturer to provide written confirmation that the fire stop system installed meets or exceeds the system design listing requirements for each mock-up application.
  - .2 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 - SUBMITTALS.
  - .3 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.
  - .4 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

### 3.08 INSPECTIONS

- .1 Third-Party Inspection Firm: provide the services of a third-party inspection firm to conduct random inspections and direct exploratory review

(i.e.: destructive testing) during the course of construction and prior to closing off any concealed areas. Inspections and destructive testing shall be performed in compliance with ASTM E 2174 and ASTM E 2393.

- .2 Departmental Representative will conduct random inspections and direct exploratory review (i.e.: destructive testing) during the course of construction and prior to closing off any concealed areas. Inspections and destructive testing will be performed in compliance with ASTM E 2174 and ASTM E 2393.
  - .1 Include for a minimum of 2% for each area of 900 square meters for exploratory reviews for each approved system design listing and each trade involved. Perform cut tests at perimeter joints every 15 meters. Perform cut test at bottom and top of wall joints and wall to wall joints and building expansion joints every 15 meters.
  - .2 Perform exploratory review as directed by Departmental Representative Third-Party Inspection Firm. Cut out fire stop and remove to ensure fire stop system installation meets or exceeds the system design listing as identified.
- .3 Upon completion of construction and before requesting substantial performance review, fire stop contractor and manufacturer's representative shall inspect all fire stopping work and prepare a deficiency list. Submit deficiency list to Departmental Representative for review. Repair any deficiencies and re-inspect work to ensure that all deficiencies have been completed.
- .4 Submit formal request for substantial performance review of work once all work is completed, quality control has been performed and all fire stop installations have been inspected and identified with the approved fire stop identification labels.
- .5 Departmental Representative will conduct the substantial performance review in the presence of the fire stop contractor and the manufacturer's representative.
- .6 Perform all cutting and removal of systems for visual review by Departmental Representative. After review and acceptance are completed, replace fire stop system with new materials.

### 3.09 FIRE STOPPING LOCATIONS

- .1 Provide fire stop and L-Rated smoke-resistant fire stop systems at:
  - .1 Penetrations through fire-resistance and smoke-resistance rated masonry, concrete, and gypsum board partitions and walls.
  - .2 Penetrations through fire-resistance rated floor slabs/systems, ceilings and roof.
  - .3 Edge of floor slabs at curtain wall and precast concrete panels.
  - .4 Edge of fire-resistant floor or roof assemblies and exterior wall assemblies.
  - .5 Joints at top and bottom of fire-resistance rated masonry and gypsum board partitions. Joints to allow for independent movement.
  - .6 Joints at top and bottom of fire-resistance rated walls where they meet non-rated fire separation assemblies.
  - .7 Intersection of fire-resistance rated masonry, concrete and gypsum board partitions.
  - .8 Control and sway joints in fire-resistance rated masonry and gypsum

- board partitions and walls.
  - .9 Expansion joints in fire-resistance rated floors, walls, ceilings and roof assemblies.
  - .10 Perimeter gaps at curtain wall or other exterior wall assembly and horizontal fire-separation.
  - .11 Openings and sleeves installed for future use through fire separations.
  - .12 Around mechanical and electrical assemblies/devices penetrating fire separations.
  - .13 Mechanical and electrical recessed boxes in walls and partitions.
  - .14 Rigid ducts: fire stopping to consist of bead of fire stop material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
- .2 Provide fire stop and L-Rated smoke-resistant fire stop systems at locations shown on drawings and as indicated on drawing schedules and details.

### 3.10 CLEANING

- .1 Proceed in accordance with Section 01 10 00 - General Instructions.
- .2 Remove equipment, excess materials and debris and clean adjacent surfaces immediately after application. Use methods and cleaning materials approved by manufacturer.
- .3 Protect fire stops during and after curing period from contact with contaminating substances. Repair all damage.
- .4 Remove temporary dams after initial set of fire stop and smoke stop materials.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions

1.02 REFERENCE STANDARDS

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

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .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 SDS in accordance with Section 01 10 00 -

General Instructions.

- .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.
- .5 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan and Waste Reduction Workplan] highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 to 75% of construction wastes were recycled or salvaged.

1.04 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .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 and Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

1.06 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.

### 1.07 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Safety Data Sheets (SDS) 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. Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

## 2 PRODUCTS

### 2.01 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.

### 2.02 SEALANT MATERIAL DESIGNATIONS

- .1 Polysulfide two part:
  - .1 Self-levelling to CAN/CGSB-19.24, Type 1, Class B, colour as indicated.
- .2 Polysulfide two part:
  - .1 Non-sag: to CAN/CGSB-19.24, Type 2, Class B, colour as indicated.
- .3 Polysulfide one part:
  - .1 Self-levelling: to CAN/CGSB-19.13, MC-1-40-B-N, MC-1-25-B-N, colour as indicated.
- .4 Polysulfide one part:
  - .1 Non-sag: to CAN/CGSB-19.13, MC-2-40-B-N, MC-2-25-B-N, colour as indicated.

- .5 Urethanes two part:
  - .1 Self-levelling: to CAN/CGSB-19.24, Type 1, Class B, colour as indicated.
- .6 Urethanes two part:
  - .1 Non-sag: to CAN/CGSB-19.24, Type 2, Class B, colour as indicated.
- .7 Urethanes one part:
  - .1 Self-levelling: to CAN/CGSB-19.13, Type 1.
- .8 Urethanes one part:
  - .1 Non-sag: to CAN/CGSB-19.13, Type 2, MCG-2-25, MCG-2-40.
- .9 Silicones one part: to CAN/CGSB-19.13.
- .10 Acrylics one part: to CGSB 19-GP-5M.
- .11 Acrylic latex one part: to CAN/CGSB-19.17.
- .12 Acoustical sealant: to ASTM C 919.
- .13 Butyl: to CGSB 19-GP-14M.
- .14 Oil-based: to as indicated.
- .15 Modified oil-based: to as indicated.
- .16 Aviation fuel resistant: to FS-SS-S-200E Type 2.
- .17 Preformed compressible and non-compressible back-up materials:
  - .1 Polyethylene, urethane, neoprene or vinyl foam:
    - .1 Extruded closed cell foam backer rod.
    - .2 Size: oversize 50 %.
  - .2 Neoprene or butyl rubber:
    - .1 Round solid rod, Shore A hardness 70.
  - .3 High density foam:
    - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m<sup>3</sup> density, or neoprene foam backer, size as recommended by manufacturer.
  - .4 Bond breaker tape:
    - .1 Polyethylene bond breaker tape which will not bond to sealant.

### 2.03 SEALANT SELECTION

- .1 Perimeters of exterior openings where frames meet exterior facade of building (i.e. brick, block, precast masonry): sealant type: as indicated.
- .2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: sealant type: as indicated.
- .3 Expansion and control joints in exterior surfaces of precast, architectural wall panels: sealant type: as indicated.
- .4 Control and expansion joints in exterior surfaces of unit masonry walls: sealant type: as indicated.

- .5 Coping joints and coping-to facade joints: sealant type: as indicated.
- .6 Cornice and wash (or horizontal surface joints): sealant type: as indicated.
- .7 Exterior joints in horizontal wearing surfaces (as itemized): sealant type: as indicated.
- .8 Seal interior perimeters of exterior openings as detailed on drawings: sealant type: as indicated.
- .9 Control and expansion joints on the interior of exterior poured-in place concrete walls: sealant type: as indicated.
- .10 Expansion and control joints on the interior of exterior precast, architectural wall panels: sealant type: as indicated.
- .11 Joints of underside of precast beams or planks: sealant type: as indicated.
- .12 Control and expansion joints on the interior of exterior surfaces of unit masonry walls: sealant type: as indicated.
- .13 Interior control and expansion joints in floor surfaces: sealant type: as indicated.
- .14 Perimeters of interior frames, as detailed and itemized: sealant type: as indicated.
- .15 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): sealant type: as indicated.
- .16 Joints at tops of non-load bearing masonry walls at the underside of poured concrete: sealant type: as indicated.
- .17 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, water closets, basins, vanities): sealant type: as indicated.
- .18 Exposed interior control joints in drywall: sealant type: as indicated.

## 2.04 JOINT CLEANER

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

## 3 EXECUTION

### 3.01 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.

### 3.02 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.

### 3.03 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.

### 3.04 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.

### 3.05 MIXING

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

### 3.06 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.

### 3.07 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.08 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

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .4 Section 08 71 00 - Doors Hardware

1.02 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
  - .1 ASTM A 653/A 653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM B 29-03, Standard Specification for Refined Lead.
  - .3 ASTM B 749-03, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
  - .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.
- .3 CSA Group (CSA)
  - .1 CSA-G40.20-04 /G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association (CSDMA)
  - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2000.
  - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.
- .5 National Fire Protection Association (NFPA)
  - .1 NFPA 80-99, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252-03, Standard Methods of Fire Tests of Door Assemblies.
- .6 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1113-04, Architectural Coatings.
  - .2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .2 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
  - .3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  - .4 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.
  - .5 CAN4-S105-M85, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

### 1.03 SYSTEM DESCRIPTION

- .1 Design Requirements:
  - .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.
  - .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
  - .3 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
  - .4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E 152 or NFPA 252 and listed by nationally recognized agency having factory inspection services.

### 1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 10 00 - General Instructions.
- .2 Provide product data: in accordance with Section 01 10 00 - General Instructions.
- .3 Provide shop drawings: in accordance with Section 01 10 00 - General Instructions.
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Canada.
  - .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed louvred, arrangement of hardware and fire rating and finishes.
  - .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing fire rating finishes.
  - .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
  - .5 Submit test and engineering data, and installation instructions.
- .4 Provide samples in accordance with Section 01 10 00 - General Instructions.
- .5 Submit one 305 x 305 mm corner sample of each type of frame.
  - .1 Show butt cutout glazing stops 305 mm long removable mullion connection snap-on trim with clips.
- .6 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 to 75% of construction wastes were recycled or salvaged.
  - .2 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of

materials for project.

- .3 Regional Materials: submit evidence that project incorporates required percentage of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

## 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .2 Reinforcement [channel]: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.
- .3 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

### 2.02 DOOR CORE MATERIALS

- .1 Honeycomb construction:
  - .1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m<sup>3</sup> minimum sanded to required thickness.
- .2 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250 degrees C at 30 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E 152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

### 2.03 ADHESIVES

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
  - .1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

## 2.04 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.
  - .1 Maximum VOC limit 50 g/L to GC-03.

## 2.05 PAINT

- .1 Field paint steel doors and frames in accordance with Sections 09 91 23 - Interior Painting. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.
  - .1 Maximum VOC emission level 50 g/L to SCAQMD Rule 1113.

## 2.06 ACCESSORIES

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior and interior top and bottom] caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma steel.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Door bottom seal.
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal riveted.
- .7 Sealant:
  - .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.
- .8 Make provisions for glazing as indicated and provide necessary glazing stops.
  - .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws dry glazing of snap-on type.
  - .2 Design exterior glazing stops to be tamperproof.

## 2.07 FRAMES FABRICATION GENERAL

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Interior frames: 1.2 mm welded construction.
- .4 Blank, reinforce, drill and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.

- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.

#### 2.08 FRAME ANCHORAGE

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

#### 2.09 FRAMES: WELDED TYPE

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.
- .7 Fabricate frame products for openings in sections, splice joints for field assembly.
- .8 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only.

#### 2.10 FRAMES: SLIP-ON TYPE

- .1 Ship slip-on type frames unassembled.
- .2 Provide frames with mechanical joints which inter-lock securely and provide functionally satisfactory performance when installed in accordance with CSDMA Recommended Installation Guide for Steel Doors and Frames and manufacturers' instructions.
- .3 Provide slip-on frames with manufacturers' proprietary design of wall anchorage comprising single, adjustable tension type per jamb and provision for secure attachment of each jamb base to stud runners.

## 2.11 DOOR FABRICATION GENERAL

- .1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .2 Exterior doors: honeycomb, hollow steel construction. Interior doors: honeycomb construction.
- .3 Fabricate doors with longitudinal edges, welded. Seams: grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish].
- .4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware.
- .5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.
- .6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .7 Reinforce doors where required, for surface mounted hardware. Provide flush PVC steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .9 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in conformance with CAN4-S104 ASTM E 152, NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .10 Manufacturer's nameplates on doors are not permitted.

## 2.12 DOORS: HONEYCOMB CORE CONSTRUCTION

- .1 Form face sheets for exterior doors from 1.2 mm sheet steel with honeycomb core laminated under pressure to face sheets.
- .2 Form face sheets for interior doors from 1.2 mm sheet steel with honeycomb core laminated under pressure to face sheets.

## 2.13 HOLLOW STEEL CONSTRUCTION

- .1 Form face sheets for exterior doors from 1.2 mm sheet steel.
- .2 Form face sheets for interior doors from 1.2 sheet steel.
- .3 Reinforce doors with vertical stiffeners, securely welded to face sheets at 150 mm on centre maximum.
- .4 Fill voids between stiffeners of exterior doors with honeycomb core.



- .5 Fill voids between stiffeners of interior doors with honeycomb core.

#### 2.14 THERMALLY BROKEN DOORS AND FRAMES

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

### 3 EXECUTION

#### 3.01 MANUFACTURER'S INSTRUCTIONS

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

#### 3.02 INSTALLATION GENERAL

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

#### 3.03 FRAME INSTALLATION

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

#### 3.04 DOOR INSTALLATION

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.

- .1 Hinge side: 1.0 mm.
- .2 Latchside and head: 1.5 mm.
- .3 Finished floor, top of carpet noncombustible sill and thresholds:  
13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvres.

### 3.05 FINISH REPAIRS

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions.2 Section 01 74 00 - Cleaning
- .4 Section 06 20 00 - Finish Carpentry

1.02 REFERENCE STANDARDS

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
  - .1 Quality Standards for Architectural Woodwork 1998.
- .2 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
  - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .3 CSA Group (CSA)
  - .1 CSA A440.2-98, Energy Performance of Windows and Other Fenestration Systems.
  - .2 CSA O115-M1982 (R2001), Hardwood and Decorative Plywood.
  - .3 CAN/CSA O132.2 Series-90 (R1998), Wood Flush Doors.
  - .4 CAN/CSA-O132.5-M1992 (R1998), Stile and Rail Wood Doors.
  - .5 CAN/CSA-Z808-96, A Sustainable Forest Management System: Guidance Document.
  - .6 CSA Certification Program for Windows and Doors 00.
- .4 Environmental Choice Program (ECP).
  - .1 CCD-045-92, Sealants and Caulking Compounds.
  - .2 CCD-046-92, Adhesives.
- .5 National Fire Protection Association (NFPA).
  - .1 NFPA 80-1999, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252-1999, Standard Method of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC).
  - .1 CAN-4S104M-80 (R1985), Fire Tests of Door Assemblies.
  - .2 CAN4-S105M-85 (R1992), Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .7 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .8 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2010-2014 Standard.
- .9 Green Seal Environmental Standards (GS)
  - .1 GS-03-97, Environmental Criteria for Anti-Corrosive Paints.
  - .2 GS-11-11, Standard for Paints and Coatings.
- .10 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.11 California Air Resources Board (CARB) 93120 Airborne Toxic Control Measure

### 1.03 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 10 00 - General Instructions.

.2 Submit two copies of WHMIS SDS - Safety Data Sheets in accordance with Section 01 10 00 - General Instructions. Indicate VOC's:

.1 For caulking materials during application and curing.

.2 For door materials and adhesives.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 10 00 - General Instructions.

.2 Indicate door types and cutouts for lights and louvres, sizes, core construction, transom panel construction and cutouts.

.3 Sustainable Design Submittals

.1 Construction Waste Management

.1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 to 75% of construction wastes were recycled or salvaged.

.2 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

.3 Regional Materials: submit evidence that project incorporates required percentage 10 to 20 % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

.4 Wood Certification: submit vendor's, manufacturer's Chain-of-Custody Certificatenumber for CAN/CSA-Z809 or FSC or SFI certified wood.

.5 Low-Emitting Materials:

.1 Submit evidence of adhesives and sealants and paints and coatings] used in building, showing compliance with VOC and chemical component limits or restriction requirements.

.1 SCAQMD Rule 1113-A2016, Architectural Coatings.

.2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

### 1.04 SAMPLES

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

.2 Submit one 305 x 305 mm corner sample of each type wood door.

.3 Show door construction, core, glazing detail and faces.

.4 Manufacturer's Instructions:

- .1 Submit manufacturer's installation instructions.

#### 1.05 QUALITY ASSURANCE

- .1 Regulatory Requirements:
  - .1 Wood fire rated doors: labelled and listed by an organization accredited by Standards Council of Canada.
  - .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
  - .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
  - .4 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- .1 Storage and Protection:
  - .1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.
  - .2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.
  - .3 Protect doors from scratches, handling marks and other damage. Wrap/Crate doors.
  - .4 Store doors away from direct sunlight.

#### 1.07 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Dispose of corrugated cardboard, polystyrene plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused adhesive material from landfill to official hazardous material collections site approved by Departmental Representative.
- .5 Do not dispose of unused paint materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

## 2 PRODUCTS

### 2.01 FIRE RATED WOOD DOORS

- .1 Wood doors: tested in accordance with CAN4-S104 /NFPA 252 to achieve rating

as scheduled.  
.1 Face panels.

## 2.02 WOOD FLUSH DOORS

- .1 Solid core: to CAN/CSA-0132.2.1.
  - .1 Construction:
    - .1 Solid particleboard core: stile and rail frame bonded to particleboard core with wood lock blocks and special describe wood blocking, 7-ply construction.
    - .2 Solid wood core:
      - .1 Glued block core with wood edge band.
      - .2 Framed block glued core.
      - .3 Framed block nonglued core.
      - .4 Stile and rail core.
      - .5 7-ply construction.
  - .2 Face Panels:
    - .1 Hardwood; veneer grades: Grade II (Good), birch species.
  - .3 Adhesive: Type I (waterproof) Type II (water resistant) for interior and exterior doors.

## 2.03 TRANSOM AND SIDE PANELS

- .1 Construction: to match adjacent door.
- .2 Meeting edges of doors and transom panels: square.
- .3 Veneer of doors and transom panels: colour matched.

## 2.04 FABRICATION

- .1 Vertical edge strips to match face veneer.
- .2 Prepare doors for louvres and glazing. Provide hardwood to match face veneer, glazing stops with mitred corners.
- .3 Bevel vertical edges of single acting doors 3 mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.
- .4 Radius vertical edges of double acting doors to 60 mm radius.
- .5 Finish laminated plastic smooth and flush with stile edges of door and bevel at approximately 20 degrees.
- .6 Provide waterproof non-staining membrane at cutouts on exterior doors to exclude moisture from core.

## 3 EXECUTION

### 3.01 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### 3.02 INSTALLATION

- .1 Unwrap and protect doors in accordance with CAN/CSA-0132.2 Series, Appendix A.
- .2 Install labelled fire rated doors to NFPA 80.
- .3 Install doors and hardware in accordance with manufacturer's printed instructions and CAN/CSA-0132.2 Series, Appendix A.
- .4 Adjust hardware for correct function.
- .5 Install louvres and stops.
- .6 Secure transom and side panels by means of stops concealed fasteners or countersunk screws concealed by means of wood plugs matching panel in grain and colour.

### 3.03 ADJUSTMENT

- .1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

### 3.04 CLEANING

- .1 Progress cleaning: Clean in accordance with Section 01 10 00 - General Instructions.
  - .1 Leave Work area clean at end of each day.
- .2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .3 Remove traces of primer, caulking; clean doors and frames.
- .4 Clean glass and glazing materials with approved non-abrasive cleaner.
- .5 On completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 09 21 16 - Gypsum Board Assemblies.
- 1.2 SHOP DRAWINGS
- .1 Provide shop drawing submittals for products specified in this section.
- .2 Submit catalogue details for each type of door illustrating profiles, dimensions and methods of assembly.
- 1.3 CLOSEOUT SUBMITTALS
- .1 Provide maintenance data for cleaning and maintenance of stainless steel finishes for incorporation into Operation and Maintenance Manual.
- 1.4 WASTE MANAGEMENT AND DISPOSAL
- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
- .3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- 1.5 DELIVERY, STORAGE AND HANDLING
- .1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.
- .2 Leave protective covering in place until final cleaning of building.

PART 2 - PRODUCTS

- 2.1 ACCESS DOORS (NON FIRE RATED)
- .1 Sizes: Except as indicated otherwise, to be minimum sizes as follows:
- .1 For body entry: 600 x 600 mm.
- .2 For hand entry: 300 x 300 mm.



- 2.1 ACCESS DOORS  
(NON FIRE RATED)  
(Cont'd)
- .2 Construction: Rounded safety corners, concealed hinges, screwdriver latch, anchor straps, able to open 180°.
  - .3 Materials
    - .1 Tiled and other special areas: Stainless steel with brushed satin or polished finish as directed by Departmental Representative.
    - .2 Other areas: Prime coated steel.
- 2.2 ACCESS DOORS  
(FIRE RATED)
- .1 Sizes: except as indicated otherwise, to be minimum sizes as follows:
    - .1 For body entry: 600 x 600 mm.
    - .2 For hand entry: 300 x 300 mm.
  - .2 Construction: 18 gauge steel, door, 16 gauge steel frame, 24 gauge perforated mounting flange, 48 mm thick mineral wool insulation in door cavity, concealed hinges, self latching with inside panel release, automatic panel closer, able to open 170 degrees.
  - .3 1-1/2 hour "B" fire rating, UL, ULC listed.
  - .4 Materials:
    - .1 Tiled and other special areas: Stainless steel with brushed satin or polished finish as directed by Departmental Representative.
    - .2 Other areas: Prime coated steel.
- 2.3 EXCLUSIONS
- .1 Lay-in tile ceilings: use unobtrusive identification locators.

### PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Installation:
    - .1 Drywall surfaces: to Section 09 21 16 - Gypsum Board Assemblies.
    - .2 Bolt secure type access doors to framework.
- 3.2 LOCATION
- .1 Location: Ensure that equipment is within view and accessible for operating, inspecting, adjusting, servicing without using special tools.
-

3.2 LOCATION

(Cont'd)

- .2 Install secure type access doors in wall and ceiling assemblies forming the envelope of secure spaces. Coordinate with Architectural.

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 05 50 00 - Metal Fabrications.
- .3 Section 06 10 00 - Rough Carpentry.
- .4 Section 08 71 00 - Door Hardware.
- .5 Section 09 91 23 - Interior Painting.

1.02 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
  - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA)
  - .1 AAMA 609/610-09, Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
- .3 ASTM International
  - .1 ASTM A 167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  - .2 ASTM A 276-10, Standard Specification for Stainless Steel Bars and Shapes.
  - .3 ASTM A 480/4 80M-11, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
- .4 Architectural Woodwork Manufacturers' Association of Canada (AWMAC)
  - .1 Architectural Woodwork Standards 2009.
- .5 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.198, Cementitious Primer for Galvanized Surfaces.
  - .2 CAN/CGSB-85.100 Painting.
- .6 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
  - .2 CAN/CGSB-12.12-M90, Plastic Safety Glazing Sheets.
- .7 CSA Group (CSA)
  - .1 CSA O141-05(R2009), Softwood Lumber.
  - .2 CAN/CSA-Z809-08, Sustainable Forest Management.
- .8 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .9 Green Seal Environmental Standards (GS)
  - .1 GS-11-11, Paints and Coatings.
  - .2 GS-36-11, Commercial Adhesives.
- .10 National Fire Prevention Association (NFPA)
  - .1 NFPA 80-2010, Standard for Fire Doors and Other Opening Protectives.

- .11 National Hardwood Lumber Association (NHLA)
  - .1 Rules for the Measurement and Inspection of Hardwood and Cypress [2007].
- .12 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2007.
- .13 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .14 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2010-2014 Standard.
- .15 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - current edition.
    - .1 MPI #25 Cleaner, Etching, for Galvanized Metal.
    - .2 MPI #26 Primer, Galvanized Metal, Cementitious.
    - .3 MPI #46 Undercoat, Enamel, Interior.
    - .4 MPI #80 Primer Vinyl Wash.
- .16 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
  - .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames.

### 1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for coiling counter doors and hardware and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 10 00 - General Instructions.
    - .1 For caulking materials during application and curing.
    - .2 For door materials and adhesives.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of NL, Canada.
  - .2 Indicate each type of coiling counter door, arrangement of hardware, operating mechanism and required clearances.
- .4 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Samples will be returned for inclusion into work.
  - .3 Submit duplicate 300 mm long pieces of coiling curtain slats, guides.
- .5 Manufacturers Reports:
  - .1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in Part 3 - FIELD QUALITY CONTROL.

- .6 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan/Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50/75% of construction wastes were recycled or salvaged.
  - .3 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
  - .4 Regional Materials: submit evidence that project incorporates required percentage 10/20% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
  - .5 Wood Certification: submit vendor's manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.
  - .6 Low-Emitting Materials:
    - .1 Submit listing of adhesives and sealants and paints and coatings used in building, showing compliance with VOC and chemical component limits or restriction requirements.

#### 1.04 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Operation and Maintenance Data: submit operation and maintenance data for coiling counter doors and hardware for incorporation into manual.

#### 1.05 WARRANTY

- .1 Provide a written guarantee, signed and issued in the name of the owner, covering the coiling counter doors for both material and workmanship for a period of two (2) years from the date of Substantial Completion.
- .2 Areas which prove to be defective in any way shall be repaired or replaced and any damage to other work as a result of such defects shall be repaired at no cost to the owner.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 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 coiling counter doors from nicks, scratches, and blemishes.

- .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan/Waste Reduction Workplan related to Work of this Section.
- .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/Waste Reduction Workplan in accordance with Section 01 74 19 - Waste Management and Disposal.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Coiling counter doors.
- .2 Aluminum sheet metal: plain finish utility sheet.
- .3 Aluminum extrusions: Aluminum Association alloy AA 6063-T5.
- .4 Adhesives and Sealants: VOC limit 250 g/L maximum to SCAQMD Rule 1168 GS-36.

### 2.02 COILING COUNTER DOORS

- .1 Rivet continuous end locks to slat ends.
- .2 Provide bottom bar of equal mass, steel angles.
- .3 Form guides of metal angles sections of 5 mm minimum thickness for between jambs face wall installation.
- .4 Construct counterbalance assembly consisting of torsion spring with 25% overload factor. Enclose spring in steel pipe to support door curtain and counterbalance mechanism with maximum deflection of 1/360th of opening width. Provide ball bearings at rotating points. Provide spring tension adjusting wheel, accessible for setting.
  - .1 Enclose spring in steel pipe to support door curtain and counterbalance mechanism with maximum deflection of 1/360th of opening width.
  - .2 Use ball bearings at rotating points.
  - .3 Use spring tension adjusting wheel, accessible for setting.
- .5 Support counterbalance assembly on 5 mm minimum thickness steel plate brackets, forming end enclosures.
- .6 Enclose counterbalance assembly with aluminum sheet formed hood.

### 2.03 ALUMINUM FINISHES

- .1 Finish exposed surfaces of aluminum components to Aluminum Association Designation System for Aluminum Finishes.
  - .1 As fabricated or plain finish extruded aluminum.

## 2.04 OPERATION

- .1 Equip coiling counter doors for operation by:
  - .1 Hand install 2 lift handles at coiling counter door bottom on inside, outside face of coiling counter door or provide continuous extruded lifting strip.
  - .2 Crank operator with removable hand crank.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for coiling counter doors 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.

### 3.02 INSTALLATION

- .1 Install coiling counter door in accordance with manufacturers' printed instructions.
- .2 Adjust operable parts for correct function and smooth operation.

### 3.03 FIELD QUALITY CONTROL

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.
- .2 Manufacturer's field services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract within 3 days of review.
  - .2 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - .3 Schedule site visits:
    - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
    - .2 Upon completion of Work, after cleaning is carried out.

### 3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .1 Leave Work area clean at end of each day.
  - .2 Perform cleaning of aluminum components in accordance with: AAMA 609/610.
  - .3 Clean aluminum with damp rag and approved non-abrasive cleaner in accordance with manufacturer's instructions.
  - .4 Remove traces of primer, caulking, clean doors and frames.
  - .5 Upon completion of installation remove surplus materials, rubbish tools and equipment barriers.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.05 PROTECTION

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

### 3.06 COMMISSIONING

- .1 Contractor to instruct maintenance personnel in operation and maintenance of doors and hardware.
- .2 Confirm operation and function for all doors and hardware.
- .3 Commissioning will be witnessed by Departmental Representative and certificate will be signed by Contractor.

END OF SECTION



## 1 GENERAL

### 1.01 GENERAL REQUIREMENTS

- .1 Comply with requirements of Division 1.
- .2 Furnish and delivery of all finish hardware necessary for all doors. Also hardware as specified herein and as enumerated in "Set Numbers" and as indicated and requested by actual conditions of the building. The hardware shall include the furnishing of all necessary screws, special screws, bolts, special bolts, expansion shields, drop plates and all other devices necessary for the proper installation of the hardware.
- .3 The Engineer-Architect approval of the schedule will not be construed as certifying that the list is complete. Acceptance of the Hardware Schedule does not relieve the supplier of responsibility of errors or omissions.
- .4 Hardware should not be ordered unless a corrected copy of the shop drawings is reviewed and returned from the specification writer and bearing the approval of the Engineer-Architect.
- .5 Aluminum Door hardware is to be ordered immediately after approval of shop drawings and shipped directly to the Aluminum Door supplier.
- .6 Furnish, deliver and install all finish hardware necessary for all doors, also hardware as specified herein and as enumerated in hardware group indicated by actual conditions at the project site.
- .7 Section 08 71 00 to include the supply and installation of all electrified hardware with all final connection and termination above the frame. Section 08 71 00 to supply wire and wire pull for the card access system, power operators and all electrified hardware. The electrified hardware shall include the furnishing of plug in connections. Electrified hardware devices to be installed as per the proper operation and application of the hardware noted by connection notes in the hardware schedule.
- .8 Division 28 to provide junction boxes, high voltage wiring, conduit and pull string from power supplies to the electrified hardware locations. This will include installation and wiring of the electromagnetic wall holders.

### 1.02 RELATED SECTIONS

- .1 Section 01 10 00 - General Instructions
- .2 Section 06 20 00 - Finish Carpentry
- .3 Section 08 11 00 - Metal Doors and Frames
- .4 Section 08 14 16 - Flush Wood Doors
- .5 Section 08 31 00 - Access Doors - Mechanical

.6 Division 26 06 00 - Schedules for Electrical

### 1.03 REFERENCES

- .1 American National Standards Institute (ANSI) A117.1 Specification
  - .1 ANSI/BHMA A156.1-2006, Butts and Hinges.
  - .2 ANSI/BHMA A156.26-2006, Continuous Hinges.
  - .3 ANSI/BHMA A156.13-2005, Mortise Locks and Latches.
  - .4 ANSI/BHMA A156.3-2001, Exit Devices.
  - .5 ANSI/BHMA A156.4-2000, Door Controls (Closers)
  - .6 ANSI/BHMA A156.5-2001, Auxiliary Locks and Associated Products.
  - .7 ANSI/BHMA A156.6-2005, Architectural Door Trim.
  - .8 ANSI/BHMA A156.7-2003, Template Hinge Dimensions.
  - .9 ANSI/BHMA A156.8-2005, Door Controls - Overhead Holders.
  - .10 ANSI/BHMA A156.16-2002, Auxiliary Hardware.
  - .11 ANSI/BHMA A156.18-2006, Materials and Finishes.
  - .12 ANSI/BHMA A156.19-2007, Power Assist and Low Energy Power Operated Doors.
  - .13 ANSI/BHMA A156.21-2006, American National Standards for Thresholds.
  - .14 ANSI/BHMA A156.22-2005, Door Gasketing and Edge Seal Systems.
  - .15 ANSI/BHMA A156.31-2001, American National Standards for Electric Strikes and Frame Mounted Actuators.
- .2 Canadian Standards Association (CSA)
  - .1 CAN/CSA-B651-04. Accessible Design for the Built Environment.
- .3 Canadian Steel Door Manufacturer's Association (CSDMA).
  - .1 Standard Hardware Locations in Accordance with the Canadian Steel Door and Frame Association Guidelines.
  - .2 Recommended locations for Architectural Hardware for Wood Flush Doors.
- .4 National Fire Protection Agency (NFPA)
  - .1 NBC - National Building Code - Latest Edition
  - .2 NFPA-80 - Standard for Fire Doors and Windows - Latest Edition
  - .3 NFPA101 - Life Safety Code - Latest Edition
  - .4 NFPA-105 - Smoke and Draft Control - Latest Edition

### 1.04 ABBREVIATIONS

- .1 The following abbreviations are applicable to this section:
  - .1 AHC Architectural Hardware Consultant
  - .2 ALD ALF Aluminum Door and Frame

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.3	ATMS/STMS Screws	Arm/Strike to Template with Machine
.4	BB or FBB	Ball Bearing Hinges
.5	BC	Back Check
.6	BTB	Back to Back
.7	B3E or B4E	Bevel 3 or 4 sides
.8	C to C, C/L	Centerline to Centerline
.9	CDC	Certified Door Consultant
.10	CMK	Construction Masterkeyed
.11	CSC	Construction Specifications Canada
.12	CSK	Countersunk Screw Holes.
.13	Cyl.	Cylinder of a lock
.14	Deg.	Degree of opening
.15	DEL	Delay Action
.16	DHI	Door and Hardware Institute
.17	DR	Door
.18	FC	Full Cover
.19	FS	Fail Safe
.20	FSE	Fail Secure
.21	FTMS	Full template machine screws
.22	½ TMS	Half template machine screws
.23	GMK	Grand Masterkeyed
.24	KA/KD	Keyed Alike, Keyed Different
.25	HMD/PSF	Hollow Metal Door, Pressed Steel Frame
.26	LH/RH	Left Hand, Right Hand
.27	LHR/RHR	Left Hand Reverse, Right Hand Reverse
.28	MK or MKD	Master Keyed
.29	NBC	National Building Code
.30	NRP	Non removable pin
.31	TB/SB	Thru Bolts, Sex Bolts
.32	TJ	Top Jamb
.33	ULC	Underwriters Laboratories Canada
.34	WD	Wood Door

## 1.06 SUBMITTALS

### .1 Samples:

- .1 Upon Engineer-Architect request submit samples of door hardware. Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
- .2 After approval samples will be returned for incorporation in the Work.

### .2 Hardware List:

- .1 Submit detailed hardware list and keying schedule. Hardware Schedule is to be submitted as per DHI vertical format

which is in the "Sequence and Format for Hardware Schedules".

- .2 Indicate specified hardware including make, model, material, function, size, finish and other pertinent information.
- .3 Furnish other Sections with templates required for hardware preparation and installation. Issue templates when requested so as not to cause any delays but not before hardware list has received final review by Engineer-Architect.
- .4 Wiring Diagrams will only be supplied after the final approval of the Hardware Schedule. Submit wiring diagrams as requested for proper installation of electrical, electrical-mechanical and electrical-magnetic products.
- .3 Manufacturer's Instructions: Submit manufacturer's installation instructions.
  - .1 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation with Section 01 10 00 - General Instructions.
  - .4 Provide guarantee.
    - .1 Closers 10 year
    - .2 Electronic Closer 2 year
    - .3 Hinges Lifetime of Building
    - .4 All other Hardware 1 year

#### 1.07 QUALITY ASSURANCE

- .1 Regulatory Requirements: hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Meet requirements of National Building Code of Canada and other applicable regulations.
- .3 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .4 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.
- .6 Upon completion of finish hardware installation, hardware supplier shall inspect work and shall certify in writing that all items and their installation are in accord with requirements of Contract Documents and are functioning properly.

### 1.08 PRODUCT DELIVERY, HANDLING & STORAGE

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials in accordance with Section 01 10 00 - General Instructions.
  - .2 Package each item of hardware including fastenings, separately or in like groups of hardware, with necessary screws, keys, instructions and installation templates.
  - .3 All items of hardware should be itemized and tagged as per the approved Finish Hardware Schedule.
  - .4 Hardware for Aluminum Doors to be shipped directly to the Aluminum Door supplier. Hardware for Aluminum Doors will be ordered immediately after approval of shop drawings. Delays in ordering the Aluminum Door hardware will not be accepted.
  - .5 Shortages will not delay installation.
  - .6 Items damaged in shipment will be replaced properly with proper material.
  - .7 All Hardware shall be handled in a manner to avoid damage, marking and scratching.
  - .8 Hardware is to be inventoried on site and confirmed by the Contractor and Hardware Supplier.
- .2 Storage and Protection:
  - .1 Store hardware in locked, clean and dry area.

### 1.09 WASTE DISPOSAL AND MANAGEMENT

- .1 Separate and recycle waste materials in accordance with Section 01 10 00 General Instructions.
- .2 Collect and separate metal, plastic, paper packing and corrugated cardboard and deposit in appropriate on-site recycling bins.
- .3 Dispose of corrugated cardboard, plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

### 1.10 MAINTENANCE

- .1 Provide maintenance materials in accordance with Section 01 10 00 - General Instructions
- .2 Provide three sets of maintenance tools for closers, locks and exit devices as well as a complete set of installation instructions.
- .3 After the building is occupied, arrange for an appointment with the owner to instruct them of proper use, service, adjusting and maintenance of the hardware furnished in this section.
- .4 Extra Material if required.

## 1.11 INSPECTION

- .1 The hardware supplier shall arrange at least four visits to the job site.
  - .1 Visit project at time of delivery of hardware and inspect the personnel who will be looking after the installation and issuing of hardware at the job site. Delivered hardware to be received, sorted and itemized at the jobsite with contractor.
  - .2 Second visit will be required for key meeting with the owner/representative at a location at their request.
  - .3 Third visit will take place when about sixty percent of hardware is installed.
  - .4 Check all hardware on site and correct any errors or shortages. Co-ordinate with contractor to determine proper time for visit.
  - .5 Fourth visit shall take place just prior to building turnover. All hardware shall be checked for proper installation and adjustment. Any errors shall be corrected, and adjustments made. Check the key system and furnish a report along with maintenance manuals detailing any errors found.
  - .6 Cost of this service will be included as part of this Section and is not covered by any allowance amount.

## 2 PRODUCTS

### 2.01 HARDWARE ITEMS

- .1 Use one manufacturer's products only for all similar items.
- .2 Manufacturer's Listed:
  - .1 Hinges
    - .1 McKinney - ASSA ABLOY Door Security Solutions Canada, 160 Four Valley Drive, Vaughan, Ontario, L4H 4T9.
  - .2 Exit Devices
    - .1 Sargent - ASSA ABLOY Door Security Solutions Canada, 160 Four Valley Drive, Vaughan, Ontario, L4H 4T9.
  - .3 Closers
    - .1 Sargent - ASSA ABLOY Door Security Solutions Canada, 160 Four Valley Drive, Vaughan, Ontario, L4H 4T9.
  - .4 Power Operators
    - .1 Besam - ASSA ABLOY Entrance Systems 4020B Sladeview Crescent. Units 3&4 Ontario, L5L 6B1
  - .5 Flatware
    - .1 Rockwood Manufacturing - ASSA ABLOY Door Security Solutions Canada, 160 Four Valley Drive, Vaughan, Ontario, L4H 4T9.
  - .6 Floor/Wall Stops

- .1 Rockwood Manufacturing - ASSA ABLOY Door Security Solutions Canada, 160 Four Valley Drive, Vaughan, Ontario, L4H 4T9.
- .7 Power Supplies
  - .1 Securitron - ASSA ABLOY Door Security Solutions Canada, 160 Four Valley Drive, Vaughan Ontario, L4H 4T9.

## 2.02 DOOR HARDWARE

- .1 All fasteners to come complete with the hardware as described. Hardware supplier must be Advised immediately if required fasteners are not enclosed with hardware.
- .2 Hardware must be installed with fasteners supplied by the manufacturer.
- .3 Hinges Butts and hinges: to ANSI/BMHA A156.1, as listed in Hardware Schedule.
  - .1 Non removable pins (NRP) for all exterior and out swinging secure doors.
  - .2 Exterior hinges and hinges in wet areas of stainless steel, brass or bronze.
  - .3 Interior hinges of plated steel, unless otherwise noted.
  - .4 Size and quantity to be as the manufacturers hinge selection guide.
  - .5 Unless otherwise scheduled, supply (1) hinge for every 762mm of door height.
  - .6 The width of hinges shall be sufficient to clear all trim.
  - .7 All hinges to be five-knuckle design and ball bearing.
  - .8 All electric hinges to be supplied with Electrolynx QC plug in connectors as specified.
  - .9 Finish to Dull Chrome 26D.
  - .10 Standard of Acceptance:
 

	Specified	Acceptable Alternates	
.1	McKinney	Hager	Stanley
.2	TA2714	BB1279	FBB179
.3	TA2314	BB1191	FBB191
.4	TA3786	BB1168	FBB168
.5	TA3386	BB11699	FBB199
- .4 Tubular Locksets, Grade 1 (Extra-Heavy Duty): ANSI/BHMA A156.2 Series 4000, Grade 1 certified.
  - .1 Locksets to withstand 3000 inch pounds of torque applied to the locked lever without gaining access.
  - .2 Locksets to fit a standard 2 1/8" bore without the use of through-bolts.
  - .3 Lever handles to be made of solid material with no plastic fillers.
  - .4 Latchbolt head to be one-piece stainless steel construction encased within the lock body.

- .5 Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA A156.2 requirements to 20 million cycles
- .6 Furnish with standard 2 3/4" backset and 1/2" throw latchbolt (3/4" at rated paired openings).
- .7 Standard of Acceptance:
- |    |           |                       |                   |
|----|-----------|-----------------------|-------------------|
| .1 | Specified | Acceptable Alternates |                   |
| .2 | Sargent   | Corbin                | Schlage           |
| .3 | 11 Line   | CL3100                | ND Lever - Series |
| .4 |           |                       |                   |
- .5 Door controls (closers): to ANSI/BMHA A156.4 as listed in Hardware Schedule.
- .1 Modern type, surface applied.
- .2 All closers for both interior and exterior doors shall be the product of one manufacturer and be matched in style.
- .3 Surface closers shall be adjustable to provide sizes 1 through 6 and comply with ADA.
- .4 Full rack and pinion construction.
- .5 Closing speed, latching speed and backcheck shall be controlled by key operated valves.
- .6 Captivated valves.
- .7 Delayed action feature shall be available and controlled by a separate valve.
- .8 Delayed action shall be available in addition to, not in lieu of, backcheck.
- .9 The one piece closer body shall be of die cast aluminum alloy with 14% silicon minimum content. An increase of 15% in closing power shall be provided by means of adjustment of the arm leverage at the foot connection. (Standard Arm).
- .10 All arms shall be finely finished with heavy duty forged steel main arm.
- .11 Two mounting positions of the closer shall meet all requirements. Standard mountings shall provide 120° door opening and alternate mounting 180° door opening.
- .12 All closers shall be suitable for standard, top jamb, parallel arm and track type applications when provided with proper brackets and arms.
- .13 Closer covers shall be of high impact plastic material of flame retardant grade.
- .14 Secured by machine screws.
- .15 Spring power shall be continuously adjustable over the full range of closer sizes and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be tamper proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and backcheck.
- .16 All closer to have a forged steel main arm and forged forearm for parallel arm closers.
- .17 Finish to Aluminum 689.
- .18 Standard of acceptance:



- |    |                |                        |               |  |
|----|----------------|------------------------|---------------|--|
| .1 | Specified      | Acceptable Alternates: |               |  |
| .2 | <u>Sargent</u> | <u>Norton</u>          | <u>Corbin</u> |  |
| .3 | 1431           | 8500                   | DC6200        |  |
| .4 | 351            | 7500                   | DC3000        |  |
| .5 | 422            | 2800ST                 | DC5000        |  |
- .6 Architectural door trim: to ANSI/BHMA A156.6, as listed in Hardware Schedule, finished to stainless steel 32D.
- .1 Door protection plates: kickplates type, 1.3 mm thick stainless steel, 203mm high, unbevelled edges, width less 40mm push side, width less 25mm on pull side for single doors. Width less 25mm for pairs. Finished to stainless steel 630.
- |    |                         |                       |             |              |
|----|-------------------------|-----------------------|-------------|--------------|
| .1 | Standard of acceptance: |                       |             |              |
| .1 | Specified               | Acceptable Alternates |             |              |
| .2 | <u>Rockwood</u>         | <u>Standard Metal</u> | <u>Ives</u> | <u>Hager</u> |
| .3 | K1050                   | K10A                  | 8400        | 190S         |
- .2 Push plates: 1.3 mm thick stainless steel, size 89mm x 381mm, finished to stainless steel 630.
- |    |                         |                       |             |  |
|----|-------------------------|-----------------------|-------------|--|
| .1 | Standard of acceptance: |                       |             |  |
| .1 | Specified               | Acceptable Alternates |             |  |
| .2 | <u>Rockwood</u>         | <u>Standard Metal</u> | <u>Ives</u> |  |
| .3 | 70RC                    | K14A                  | 8200RC      |  |
- .3 Door Pulls: 19mm round pull, 228.6mm center to center pulls, with 76mm x 305mm protection plate, mount type 1, finished to stainless steel 630.
- |    |                         |                       |             |  |
|----|-------------------------|-----------------------|-------------|--|
| .1 | Standard of acceptance: |                       |             |  |
| .1 | Specified               | Acceptable Alternates |             |  |
| .2 | <u>Rockwood</u>         | <u>Standard Metal</u> | <u>Ives</u> |  |
| .3 | 111 x 73CL              | K14 x 2409-1(RC)      | 8303        |  |
- .7 Door Stops and Holders and Auxiliary hardware: to ANSI/BMHA A156.16 designated by letter L and numeral identifiers as listed in Hardware Schedule finished to 26D.
- .1 Floor stops dome style classification. Low dome or High dome. Die cast brass. Stops to be sized according to door clearances, thresholds or undercuts as noted in the Door Schedule. Fasteners to suite floor conditions.
- |    |                         |                       |             |  |
|----|-------------------------|-----------------------|-------------|--|
| .1 | Standard of acceptance: |                       |             |  |
| .1 | Specified               | Acceptable Alternates |             |  |
| .2 | <u>Rockwood</u>         | <u>Standard Metal</u> | <u>Ives</u> |  |
| .3 | 441                     | S101                  | FS13        |  |
| .4 | 443                     | S103                  | FS17        |  |
| .5 | 483                     | S110                  | FS441       |  |
- .2 Wall stops classification, convex or concave, cast brass or bronze. Fasteners to suite wall conditions.
- |    |                         |  |  |  |
|----|-------------------------|--|--|--|
| .1 | Standard of acceptance: |  |  |  |
|----|-------------------------|--|--|--|

- |  |    |                 |                       |             |
|--|----|-----------------|-----------------------|-------------|
|  | .1 | Specified       | Acceptable Alternates |             |
|  | .2 | <u>Rockwood</u> | <u>Standard Metal</u> | <u>Ives</u> |
|  | .3 | 406             | S121                  | WS406CV     |
|  | .4 | 409             | S123                  | WS406CC     |
- .8 Power assist and low energy power operated doors: to ANSI/BMHA A156.19.
- .1 Automatic operators shall be complete with all components including Operator Housing, Power Operator, Electronic Control, Soft Start, Switching Networks and all Connecting Hardware.
- .2 Size and type to be as indicated in Hardware Groups.
- .3 Operator Housing shall be complete with finished end caps prepared for mounting to door frame.
- .4 Operator shall be factory assembled with all necessary components for proper operation and switching. Relays, wiring harness and other components shall be plug-in type.
- .5 Operator controls shall include adjustable time delay, safe-swing circuit as well as provision for accessories as detailed in Hardware Groups.
- .6 All wiring shall be of the shielded type with proper number of conductor wires to install all components specified.
- .7 Operator shall include sufficient power supplies to operate all hardware and accessory items as detailed in Hardware groups. In the event additional power supplies are required it shall be added at no increase in contract price.
- .8 Complete unit shall be mounted with provisions for easy servicing or replacement without removing the door or frame.
- .9 Confirm frame detail and if necessary provide a suitable mounting plate to install operator properly.
- .10 Standard of acceptance:
- |  |    |              |                       |               |
|--|----|--------------|-----------------------|---------------|
|  | .1 | Specified    | Acceptable Alternates |               |
|  | .2 | <u>Besam</u> | <u>Stanley</u>        | <u>Horton</u> |
|  | .3 | SW200i       | Magic Force           | 4100LE        |
|  | .4 | SW100i       | Magic Access          | 7100LE        |
- .1
- .9 Power Supplies:
- .1 Dual output, field selectable 12 or 24 VDC via clearly marked toggle switch.
- .2 Supplies 1 full AMP continuous current output, even while charging back-up batteries.
- .3 SPDT AC monitoring output allows for remote monitoring of the power supply's 110V AC input.
- .4 Separate voltage inputs for load and battery allow the batteries to charge at a higher output while the load remains at exactly 12 or 24 VDC.
- .5 LED indication (AC & DC) showing power supply status UL listed low current fire alarm disconnect requires only a minimum size fire alarm relay and wire gauge Polyswitch

type breakers allow for large short duration inrush current if batteries are installed (approx. 20A for 1 second) Line voltage and DC fuses Sealed lead acid-gel battery charging capability (battery not included).

- .6 UL Class 2, linear regulated power supply provides the cleanest power available sensitive, active safety and security devices.
- .7 UL Listed.
- .8 CFAR Relay - Securitron's Fire Alarm reset module interconnects with a Securitron BPS series power supply and a fire alarm (made by others). The purpose is to provide additional safety and control in an installation where activation of the fire alarm is intended to switch off the BPS power supply.
- .9 This is often done to release power to magnetic locks which are installed on perimeter doors so as to permit safe evacuation in the event of a fire. The module has three specific functions:
  - .1 It will maintain the released condition of devices released by activation of the fire alarm even after the fire alarm resets and until the module itself is reset by key.
  - .2 It allows key controlled release of the same devices (separate from the fire alarm control).
  - .3 It signals the released or "normal" condition of the devices via a bicolor LED.
- .10 Standard of acceptance:
  - .1 Specified Acceptable Alternates
  - .2 Securitron Sargent Schlage Electronics
  - .3 BPS 3500 PS900
- .10 Electric Door Wire Harnesses:
  - .1 Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
  - .2 Standard of acceptance:
    - .1 Specified Acceptable Alternates
    - .2 McKinney Von Duprins Stanley
    - .3 QC-C Series CON WH Series
- .11 Key Switches:

- .1 Key switches furnished standard with stainless steel single gang face plate.
- .2 Standard with 12 or 24 VDC bi-color LED
- .3 Backing bracket permits integration with any 32mm or 28mm mortise cylinder (Not Included)
- .4 Additional switch position on backing bracket allows another switch to be activated by turning the key in the opposite direction 5 Amp rated plunger switch UL Listed.
- .5 Key switches available as momentary or maintained action and in narrow face plate options.
- .6 Standard of acceptance:
  - .1 Specified Acceptable Alternates
  - .2 Securitron Security Door Controls
  - .3 MK Series 800 Series

### 2.03 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

### 2.04 FINISHES

.1	<u>Description</u>	<u>Material</u>	<u>BMHA</u>
.2	Interior Hinges	Satin Chromium Plated	626
.3	Locks	Stainless Steel Metal, Satin	630
.4	Closers	Aluminum Powder Coated	689
.5	Flatware	Stainless Steel Metal, Satin	630
.6	All other items	Satin Chromium Plated	626

### 3 EXECUTION

#### 3.01 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.
- .4 Wiring Diagrams: Provide any special information, voltage requirements and wiring diagrams to other trades requiring such information.

#### 3.02 INSTALLATION

- .1 Install door hardware in accordance with manufacturer's instructions, using special tools and jigs. Fit accurately and apply securely. Ensure that hardware is installed correctly. Issue instructions if required to Sections concerned.
- .2 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door Manufacturers' Association.
- .3 Installation is to be done by a qualified tradesman, if technical assistance is required contact the hardware supplier.
- .4 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .6 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .8 Hardware should not be installed until all finishing is complete.
- .9 All hardware to be installed level plumb and true.
- .10 All operating parts to work freely and smoothly.
- .11 Exterior thresholds to be set in exterior sealants.
- .12 Install Power Operators as per manufacturer's instructions and by a qualified installer.
- .14 High voltage wiring by Division 28. Low voltage wiring by access control supplier.

### 3.03 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.
- .4 All defective or damaged hardware will have to be repaired or replaced at the contractor's expense.

### 3.04 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

### 3.05 DEMONSTRATION

- .1 Keying System Setup and Cabinet:
- .2 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.
- .3 Place file keys and duplicate keys in key cabinet on their respective hooks.
- .4 Lock key cabinet and turn over key to Owner's Representative.
- .4 Maintenance Staff Briefing:
- .6 Brief maintenance staff regarding:
- .7 Proper care, cleaning, and general maintenance of projects complete hardware.
- .8 Description, use, handling, and storage of keys.
- .9 Use, application and storage of wrenches for door closers, locksets and fire exit hardware.
- .10 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

### 3.06 FIELD QUALITY CONTROL

- .1 An inspection report will be required 6 months after substantial completion by a qualified Architectural Hardware Consultant to note any deficiencies. The inspection should include checking

each lock against the key schedule to make sure the correct locks and cylinders are on the proper doors.

### 3.07 PROTECTION

- .1 Protection must be given to all products and finishes until such time as the owner accepts the project.

### 3.08 CERTIFICATION

- .1 After installation, Hardware Supplier is to have a regular member of the Architectural Hardware Consultants' (AHC) Association inspect and certify in writing that all items and their installations are in accordance with specified requirements.

### 3.09 DOOR HARDWARE SETS

- .1 The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- .2 The supplier is responsible for handing and sizing all products as listed in the door hardware sets. Quantities listed are for each pair of doors, or for each single door.
- .3 Products listed in the Door Hardware Sets must meet the requirements described in the specification sections noted.

### 3.10 HARDWARE SCHEDULE

#### Set: 1.0

Single 2109-1, 914 x 2134 x 45, Existing x Existing,

1 Existing	Remainder of Hardware Existing		00
1 Power Operator	SW100i (Pull Side Mount)	689	BM
1 Mounting Pate	Mounting Plate x Full Header	689	BM
1 Backing Plate	Backing Plate x Full Header	689	BM
2 Wall Actuator - 114mm	10BR45 - Wall Mount Actuator	32D	BM
2 Eschutcheon	10ESCUTCHEON45	32D	BM
1 Advanced Logic Relay Controller	CX-33	Std	OT
1 Sensors (Pull Side)	Superscan11	Std	BM
1 Sensors (Push Side)	Superscan 11	Std	BM
1 Lockout Switch	LO-21	Std	00

Notes:

EXISTING FRAME, DOOR AND HARDWARE. NEW POWER OPERATOR TO BE ADDED.  
 NEW POWER OPERATOR TO BE MOUNTED TO BLOCK WALL ON THE PULL SIDE.  
 ARM TO WILL NEED TO DROP DOWN TO THE DOOR. ACTUATOR BUTTONS TO  
 BE SURFACE MOUNTED.

POWER OPERATOR TO BE MOUNTED ON THE PULL SIDE OF THE DOOR.  
 REQUIRES 120VAC POWER TO POWER OPERATOR LOCATION BY ELECTRICAL SUPPLIER.  
 REQUIRES LOW VOLTAGE FROM POWER OPERATOR TO ACTUATOR LOCATION.  
 REQUIRES LOW VOLTAGE WIRE FROM KEY SWITCH TO POWER SUPPLY.

MODE OF OPERATION:

DOOR TO PUSH PULL AT ALL TIMES. THE POWER OPERATOR CAN BE  
 ACTIVATED AT ALL TIMES BY THE ACTUATOR BUTTONS EITHER SIDE  
 OF THE DOOR. LOCATION OF ACTUATOR BUTTONS TO BE DETERMINED.

Set: 2.0

Single 2019a-1, 914 x 2134 x 45, Hollow Metal x Hollow Metal,

3 Hinge, Full Mortise	TA2714 114mm x 101mm	US26D	MK
1 Storeroom/Closet Lock	8204 LNL	US26D	SA
1 Electric Strike	1600-CLB-LM	630	HS
1 SMART Pac Bridge Rectifier	2005M3		HS
1 Surface Closer	422 CTB2 (Pull Side)	EN	SA
1 Kick Plate	K1050 203mm x 50mm LDW 4BE CSK	US32D	RO
1 Wall Stop	406 (Convex HD)	US32D	RO
1 Gasketing	312CR x 3 Sides		PE
1 Gasketing	S44BL x 3 Sides		PE
1 Concealed Door Bottom (HM Doors)	420APKL x Door Width		PE
1 Position Switch	DPS-M-BK		SU
1 Power Supply	AQD1-4F1		SU
1 By Electrical Contractor	Card Reader		00
1 By Electrical Contractor	Controller		00
1 Wiring Harness Wires W/Pins-25'0	93970-QC-C2500P-QC12-12	Std	MK
1 Wiring Diagrams	Wiring Diagrams (Elevations & Point to Point)	Std	SA

Notes:

REQUIRES 120VAC POWER TO POWER SUPPLY LOCATION BY ELECTRICAL CONTRACTOR.  
 REQUIRES LOW VOLTAGE FROM POWER SUPPLY TO ELECTRIC STRIKE LOCATION.  
 REQUIRES LOW VOLTAGE AND COMMUNICATION WIRE TO CARD READER LOCATION BY  
 ELECTRICAL CONTRACTOR.  
 REQUIRES LOW VOLTAGE AND COMMUNICATION WIRE TO DOOR POSITION SWITCH LOCATION  
 BY ELECTRICAL CONTRACTOR.



REQUIRES CONDUIT TO BE SUPPLIED AND INSTALLED BY ELECTRICAL CONTRACTOR.  
REQUIRES WIRE AND WIRE PULL BY ELECTRICAL CONTRACTOR.

MODE OF OPERATION:

DOOR TO BE LOCKED AT ALL TIMES. ENTRY BY AUTHORIZED CARD OR KEY.  
ENTRY BY AUTHORIZED CARD WILL ACTIVATE ELECTRIC STRIKE FOR DOOR  
TO BE MANUALLY PUSHED OPEN. STANDARD FUNCTIONALITY FOR DOOR  
CONTACTS AND REQUEST TO EXIT. LOCK HAS MECHANICAL KEY OVERRIDE.  
FREE EXIT AT ALL TIMES.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 02 81 00 - Hazardous Materials

1.02 REFERENCE STANDARDS

- .1 The Master Painters Institute (MPI)
  - .1 Maintenance Repainting Manual 2004, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.
- .2 Environmental Protection Agency (EPA)
  - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .4 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1113-04, Architectural Coatings.

1.03 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Contractor: to have a minimum of five years proven satisfactory experience. Provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
  - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in repainting work.
  - .3 Apprentices: may be employed provided they work under the direct supervision of qualified journeyperson in accordance with applicable trade regulations.
- .2 Conform to latest MPI requirements for interior repainting work including cleaning, preparation and priming.
- .3 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners and solvents) shall be in accordance with the latest edition of the MPI Approved Product List and shall be from a single manufacturer for each system used.
- .4 Paint materials such as linseed oil, shellac, reducers and turpentine shall be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.
- .5 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

- .6 Standard of Acceptance: when viewed using final lighting source surfaces shall indicate the following:
  - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Ceilings: no defects visible from floor at 45 degrees to surface.
  - .3 Final coat to exhibit uniformity of colour and sheen across full surface area.
- .7 Mock-ups: construct mock-ups in accordance with Section 01 10 00 - General Instructions.
  - .1 Provide a mock-up in accordance with requirements of Section 01 10 00 - General Instructions to Departmental Representative.
  - .2 Prepare and repaint mock-up designated interior room, surface or item to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Maintenance Repainting Manual standards for review and approval.
  - .3 When approved, repainted room, surface and/or item shall become acceptable standard of finish quality and workmanship for similar on-site interior repainting work.

#### 1.04 PERFORMANCE REQUIREMENTS

- .1 Environmental Performance Requirements:
  - .1 Provide paint products meeting MPI "Environmentally Friendly" E1, E2 or E3 ratings based on VOC (EPA Method 24) content levels.
  - .2 Where indoor air quality (odour) is a problem, use only MPI listed materials having a minimum E2 or E3 rating.

#### 1.05 SCHEDULING

- .1 Submit work schedule for various stages of painting to Departmental Representative for approval/review. Submit schedule a minimum of 48 hours in advance of proposed operations.
- .2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.
- .3 Obtain written authorization from Departmental Representative for changes in work schedule.
- .4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about building.

#### 1.06 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide product data and manufacturer's installation/application instructions for each paint and coating product to be used in accordance with the requirements of Section 01 10 00 - General Instructions.
- .2 Provide samples in accordance with Section 01 10 00 - General Instructions.
  - .1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.
  - .2 Submit WHMIS SDS - Safety Data Sheets for paint and coating materials

in accordance with Section 02 81 00 - Hazardous Materials.

- .3 Closeout Submittals:
  - .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
    - .1 Submit records of products used. List products in relation to finish system and include following:
      - .1 Product name, type and use (i.e. materials and location).
      - .2 Manufacturer's product number.
      - .3 Colour code numbers.
      - .4 MPI Environmentally Friendly classification system rating.
      - .5 Manufacturer's Safety Data Sheets (SDS).

#### 1.07 SUSTAINABLE REQUIREMENTS

- .1 Materials and products in accordance with Section 01 10 00 - General Instructions: Construction.

#### 1.08 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions, supplemented as follows:
  - .1 Deliver and store materials in original containers, sealed, with labels intact.
  - .2 Labels to indicate:
    - .1 Manufacturer's name and address.
    - .2 Type of paint or coating.
    - .3 Compliance with applicable standard.
    - .4 Colour number in accordance with established colour schedule.
  - .3 Remove damaged, opened and rejected materials from site.
  - .4 Store and handle in accordance with manufacturer's recommendations.
  - .5 Store materials and equipment in secure, dry, well-ventilated area with temperature range between 7 degrees C to 30 degrees C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.
  - .6 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.
  - .7 Remove paint materials from storage in quantities required for same day use.
  - .8 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
  - .9 Fire Safety Requirements:
    - .1 Provide one 9 kg Type ABC dry chemical 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 daily.
    - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada.
- .2 Waste Management and Disposal:

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
- .2 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .3 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
  - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
  - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
  - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
  - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
  - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
  - .6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .6 Where paint recycling is available, collect waste materials by type and provide for delivery to recycling or collection facility.
- .7 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by employees, individuals, or organizations for verifiable re-use or re-manufacturing.

#### 1.09 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
  - .1 Do not perform repainting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application and until paint has cured sufficiently.
  - .2 Ventilate enclosed spaces. Where required, provide continuous ventilation for seven days after completion of application of paint.
  - .3 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
  - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements. Use of gas-fired appliances is not permitted.
  - .5 Do not perform painting work unless minimum lighting level of 323

Lux is provided on surfaces to be painted.

- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, do not perform repainting work when:
    - .1 Ambient air and substrate temperatures are below 10 degrees C.
    - .2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
    - .3 Relative humidity within area to be repainted is above 85%.
  - .2 Conduct moisture tests using properly calibrated electronic Moisture Meter, except use simple "cover patch test" on concrete floors to be repainted.
  - .3 Do not perform repainting work when maximum moisture content of substrate exceeds:
    - .1 12% for concrete and masonry (clay and concrete brick/block).
    - .2 15% for wood.
    - .3 12% for plaster and gypsum board.
  - .4 Test painted concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
  - .3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise pre-approved by specific coating manufacturer.
  - .4 Apply paint in occupied facilities during silent hours only, unoccupied rooms or areas. Schedule operations to approval of the Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

## 1.10 MAINTENANCE

- .1 Extra Materials:
- .2 Submit maintenance materials in accordance with Section 01 10 00 - General Instructions.
- .3 Submit one - one litre can of each type and colour of stain finish coating. Identify type and colour in relation to established colour schedule and finish system.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Paint materials listed in latest edition of MPI Approved Product List (APL) are acceptable for use on this project.

- .2 Where required by authorities having jurisdiction, paints and coatings to provide a fire resistant rating.
- .3 Paint materials for repaint systems to be products of single manufacturer.
- .4 Only qualified products with MPI "Environmentally Friendly" E1, E2 or E3 rating are acceptable for use on this project.
- .5 Use only MPI listed L rated materials.
- .6 Paints, coatings, thinners, solvents, cleaners and other fluids used in repainting, to be as follows:
  - .1 Not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
  - .2 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
  - .3 Be manufactured without compounds which contribute to smog in lower atmosphere.
  - .4 Be manufactured where matter generating 'Biochemical Oxygen Demand' (BOD) in undiluted production plant effluent discharged to natural watercourse or a sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.
  - .5 Be manufactured where total suspended solids (TSS) content in undiluted production plant effluent discharged to natural watercourse or sewage treatment facility lacking secondary treatment does not exceed [15] mg/L.
  - .6 Recycled Content: 50 % post-consumer content, 50 % pre-consumer content.
- .7 Paints and coatings must not be formulated or manufactured with formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

## 2.02 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award. Submit proposed Colour Schedule to Departmental Representative for approval.
- .2 Colour schedule will be based upon selection of five base colours and three accent colours. No more than eight colours will be selected for entire project and no more than three colours will be selected in each area.
- .3 Selection of colours will be from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 First coat in two coat (Premium) repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

## 2.03 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed with Departmental Representative's written permission.

- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition not to exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer' instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

#### 2.04 GLOSS/SHEEN RATINGS

- .1 Paint gloss defined as sheen rating of applied paint, in accordance with following MPI gloss / sheen standard values:

<u>Category</u>	<u>Units @ 60 Degrees</u>	<u>Units @ 85 Degrees</u>
G1 - matte finish	0 to 5	maximum 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	minimum 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	
- .2 Gloss level ratings of repainted surfaces shall be as specified herein and as noted on Finish Schedule.

#### 2.05 INTERIOR PAINTING SYSTEMS

- .1 RIN 4.2 - Concrete Masonry Units: (Concrete Block and Concrete Brick).
  - .1 RIN 4.2A - Latex G4 finish.
  - .2 RIN 4.2B - Latex Aggregate Coating G4 finish.
  - .3 RIN 4.2C - Alkyd [insert gloss level].
  - .4 RIN 4.2D - 2 Component Epoxy (Tile Like) for Dry Environments G4 finish.
  - .5 RIN 4.2E - 2 Component Epoxy (Tile Like) for Wet Environments G4 finish.
  - .6 RIN 4.2F - Multicolour.
  - .7 RIN 4.2G - 2 Component Epoxy, Waterborne (Tile Like) G4 finish.
  - .8 RIN 4.2H - High Performance Acrylic G4 finish.
  - .9 RIN 4.2J - Water Repellent (Non Paintable).



- .10 RIN 4.2K- Water Repellent (Paintable).
- .11 Coatings: maximum VOC limit 250 g/L to SCAQMD Rule 1113.
  
- .2 RIN 5.1 - Structural Steel and Metal Fabrications.
  - .1 RIN 5.1A - Quick dry G4 finish.
  - .2 RIN 5.1B - High Performance Acrylic G4 finish.
  - .3 RIN 5.1C - Waterborne Dry Fall.
  - .4 RIN 5.1D - Alkyd Dry Fall.
  - .5 RIN 5.1E - Alkyd insert G4 finish.
  - .6 RIN 5.1F - 2 Component Polyurethane.
  - .7 RIN 5.1G - Aliphatic Polyurethane G4 finish.
  - .8 RIN 5.1H - Organic Zinc/Epoxy / 2 Component Polyurethane.
  - .9 RIN 5.1J - 2 Component Epoxy (Waterborne) G4 finish.
  - .10 RIN 5.1K - 2 Component Epoxy G4 finish.
  - .11 RIN 5.1L - Aluminum paint.
  - .12 RIN 5.1M - Multicolour.
  - .13 RIN5.1N - Latex.
  - .14 Maximum VOC limit 250 g/L.
  
- .3 RIN 5.3 - Galvanized Metal: (High Contact/High Traffic Areas (Doors, Frames, Railings, Pipes, and Handrails). Low Contact/Low traffic areas (Overhead Decking, Pipes, and Ducts)).
  - .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1113.
  - .2 RIN 5.3A - Latex (Low Contact/Traffic) G4 finish.
  - .3 RIN 5.3B - High Performance Acrylic G4 finish.
  - .4 RIN 5.3C - Alkyd G4 finish.
  - .5 RIN 5.3D - 2 Component Epoxy G4 finish.
  - .6 RIN 5.3E - Alkyd Dry Fall Finish low contact/traffic.
  - .7 RIN 5.3F - Aluminum Paint Finish (Low Contact/Traffic).
  - .8 RIN 5.3G - Waterborne Dry Fall (Low Contact/Traffic).
  - .9 RIN 5.3H - 2 Component Polyurethane.
  - .10 Maximum VOC limit 250 g/L to SCAQMD Rule 1113.
  
- .4 RIN 6.2 - Dimension Lumber: (Columns, Beams, Exposed Joists, and Underside of Decking)
  - .1 RIN 6.2A - Latex (Semi-Gloss, Gloss).
  - .2 RIN 6.2B - Latex (Flat, Eggshell).
  - .3 RIN 6.2C - Alkyd Semi-Gloss, Gloss.
  - .4 RIN 6.2D - Alkyd (Flat, Eggshell).
  - .5 RIN 6.2E - Multicolour.
  - .6 RIN 6.2F - Fire Retardant, Pigmented G5 finish.
  - .7 RIN 6.2G - Fire Retardant, Clear G4 finish.
  - .8 RIN 6.2H - Stain/Polyurethane (Satin/Gloss)
  - .9 RIN 6.2J - High Performance Acrylic G4 finish.
  - .10 RIN 6.2K - 2 Component Epoxy.
  - .11 RIN 6.2L - Clear Alkyd Varnish G4 finish.
  - .12 Maximum VOC limit 250 g/L to SCAQMD Rule 1113.
  
- .5 RIN 6.3 - Dressed Lumber: (Including Doors, Door and Window Frames, and Mouldings).
  - .1 RIN 6.3A - Latex (Semi-Gloss, Gloss).
  - .2 RIN 6.3B - Alkyd (Semi-Gloss, Gloss).
  - .3 RIN 6.3C - Semi-transparent Stain (Low Contact/Traffic).
  - .4 RIN 6.3D - Semi-Transparent Stain/Alkyd Semi-Transparent Stain/Varnish G5 finish.
  - .5 RIN 6.3E - Semi-Transparent Stain/Polyurethane Varnish G5 finish.

- .6 RIN 6.3F - Semi-Transparent Stain/Lacquer G5 finish.
  - .7 RIN 6.3G - Pigmented Lacquer.
  - .8 RIN 6.3H - Clear Lacquer G5 finish.
  - .9 RIN 6.3J - Clear Alkyd Varnish G5 finish.
  - .10 RIN 6.3K - Clear Polyurethane Varnish G5 finish.
  - .11 RIN 6.3L - 2 Component Epoxy.
  - .12 RIN 6.3M - Filled Stain Wax.
  - .13 RIN 6.3N - Oil Resin Sealer.
  - .14 RIN 6.3P - Multicolour.
  - .15 RIN 6.3Q - High Performance Acrylic G5 finish.
  - .16 RIN 6.3R - Waterborne Acrylic, Clear G5 finish.
  - .17 RIN 6.3S - Fire Retardant Pigmented G5 finish.
  - .18 RIN 6.3T - Fire Retardant, Clear G5 finish.
  - .19 Maximum VOC limit 250 g/L to SCAQMD Rule 1113.
- .6 RIN 9.2 - Plaster and Gypsum Board: (gypsum wallboard, drywall, and "sheet rock type material").
    - .1 RIN 9.2A - Latex G3 finish.
    - .2 RIN 9.2B - High Performance Acrylic G3 finish.
    - .3 RIN 9.2C - Alkyd G3 finish.
    - .4 RIN 9.2D - 2 Component Epoxy (Tile Like) G3 finish.
    - .5 RIN 9.2E - 2 Component Epoxy (Tile Like) G3 finish.
    - .6 RIN 9.2F - Multicolour
    - .7 RIN 9.2G - Fire Retardant Coating Solvent Based G3 finish.
    - .8 RIN 9.2H - Fire Retardant Coating Latex Based G3 finish.
    - .9 RIN 9.2J - 2 Component Polyurethane G3 finish.
    - .10 Maximum VOC limit 250 g/L to SCAQMD Rule 1113.

### 3 EXECUTION

#### 3.01 MANUFACTURER'S INSTRUCTIONS

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

#### 3.02 EXAMINATION

- .1 Interior repainting work: inspected by MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency a minimum of [one] week prior to commencement of work and provide a copy of project repainting specification and Finish Schedule (as well as plans and elevation drawings).
- .2 Interior surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .3 Where an assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered

are to be corrected, as mutually agreed, before repainting is started.

- .4 Where "special" repainting or recoating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer to provide as part of work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.

### 3.03 PREPARATION

- .1 Perform preparation and operations for interior painting in accordance with MPI Maintenance Repainting Manual requirements except where otherwise specified.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Clean and prepare interior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
  - .2 Wash surfaces with a biodegradable detergent [and bleach where applicable] and clean warm water using stiff bristle brush to remove dirt, oil and surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and to dry thoroughly. Allow sufficient drying time and test surfaces using an electronic moisture metre before commencing work.
  - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
  - .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
- .4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
- .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .6 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.
- .7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from distance up to 1000 mm.

### 3.04 EXISTING CONDITIONS

- .1 Prior to commencing work, examine site conditions and existing interior substrates to be repainted. Report in writing to Departmental Representative damages, defects, or unsatisfactory or unfavourable conditions or surfaces that will adversely affect this 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" and report findings to Departmental Representative. Maximum moisture content not to exceed specified limits.
- .3 Do not commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to Painting Subcontractor and Inspection Agency.
- .4 Degree of surface deterioration (DSD) to be assessed using MPI Identifiers and Assessment criteria indicated in MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

Condition Description	
DSD-0	Sound Surface (includes visual (aesthetic) defects that do not affect film's protective properties).
DSD-1	Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes scratches).
DSD-2	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, and staining).
DSD-3	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).
DSD-4	<u>Substrate Damage (repair or replacement of surface required)</u>

### 3.05 PROTECTION

- .1 Protect existing surfaces and adjacent fixtures and furnishings from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such 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.
- .4 Protect general public and building occupants in and about building.
- .5 Remove electrical cover plates, light fixtures, surface hardware on doors,

bath accessories and surface mounted equipment, fittings and fastenings prior to undertaking re-painting operations. Store items and re-install after painting is completed.

- .6 Move and cover furniture and portable equipment as necessary to carry out repainting operations. Replace as painting operations progress.
- .7 As repainting operations progress, place "WET PAINT" signs in occupied areas to approval of Departmental Representative.

### 3.06 APPLICATION

- .1 Apply paint by method that is best suited for substrate being repainted using brush, roller, air sprayer and/or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise. Methods of application as pre-approved by Departmental Representative before commencing work.
- .2 Brush and Roller Application:
  - .1 Apply paint in uniform layer using brush and/or roller of types suitable for application.
  - .2 Work paint into cracks, crevices and corners.
  - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple unless approved by Departmental Representative.
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray Application:
  - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Keep paint ingredients properly mixed in containers during paint application by continuous mechanical agitation intermittent agitation frequently as necessary.
  - .3 Apply paint in uniform layer, with overlapping at edges of spray pattern.
  - .4 Back roll spray applications and brush out runs and sags immediately.
  - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.
- .5 Apply paint coats in continuous manner and allow surfaces to dry and properly cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats not less than that recommended by manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Sand and dust between coats to remove visible defects.
- .7 Repaint 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.

- .8 Repaint top, bottom, and vertical edges of doors to be repainted.
- .9 Repaint inside of cupboards and cabinets as specified for outside surfaces.
- .10 Repaint closets and alcoves to match existing, unless otherwise scheduled or noted.

### 3.07 MECHANICAL/ ELECTRICAL EQUIPMENT

- .1 Unless otherwise noted, repainting to include exposed to view / previously painted mechanical and electrical equipment and components (panels, conduits, piping, hangers, and ductwork.).
- .2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour, and sheen finish to match existing unless otherwise noted or scheduled.
- .3 Do not paint over name plates or instruction labels.
- .4 Leave unfinished exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish.
- .5 Keep sprinkler heads free of paint.
- .6 Do not paint interior transformers and substation equipment.
- .7 Standard of Acceptance: when viewed using natural prevailing sunlight at peak period of day (mid-day) on surface viewed, surfaces to indicate following:
  - .1 Walls: no defects visible from distance of 1000 mm at 90 degrees to surface.
  - .2 Soffits: no defects visible from grade at 45 degrees to surface.
  - .3 Final coat to exhibit uniformity of colour and sheen across full surface area.

### 3.08 FIELD QUALITY CONTROL

- .1 Inspection:
- .2 Advise Departmental Representative and Paint Inspection Agency when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .3 Co-operate with Paint Inspection Agency and provide access to areas of work.

### 3.09 CLEANING

- .1 Proceed in accordance with Section 01 10 00 - General Instructions, supplemented as follows:
  - .1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
  - .2 Keep work area free from unnecessary accumulation of tools, equipment,

- surplus materials and debris.
- .3 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
  - .4 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as other cleaning and protective materials (e.g. rags, drop cloths, and masking papers), paints, thinners, paint removers/strippers in accordance with safety requirements of authorities having jurisdiction and as noted herein.
  - .5 Clean painting equipment in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations to be recycled or disposed of in manner acceptable to authorities having jurisdiction.
  - .6 Recycle paint and coatings in excess of repainting requirements as specified.

### 3.10 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

1      GENERAL

1.01 RELATED REQUIREMENTS

- .1      Section 01 10 00 - General Instructions
- .2      Section 07 92 00 - Joint Sealants

1.02 REFERENCE STANDARDS

- .1      Aluminum Association (AA)
  - .1      AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2      American Society for Testing and Materials (ASTM)
  - .1      ASTM C 475-02(2015), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - .2      ASTM C 514-04(2014), Standard Specification for Nails for the Application of Gypsum Board.
  - .3      ASTM C 557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
  - .4      ASTM C 840-16, Standard Specification for Application and Finishing of Gypsum Board.
  - .5      ASTM C 954-15, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
  - .6      ASTM C 1002-14, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - .7      ASTM C 1047-14a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  - .8      ASTM C 1177/C 1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - .9      ASTM C 1178/C 1178M-13, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
  - .10     ASTM C 1280-13a, Standard Specification for Application of Gypsum Sheathing.
  - .11     ASTM C 1396/C 1396M-14a, Standard Specification for Gypsum board.
- .3      Association of the Wall and Ceilings Industries International (AWCI)
  - .1      AWCI Levels of Gypsum Board Finish-GA-214-2015
- .4      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2      CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5      Green Seal Environmental Standards (GS)
  - .1      GS-11-2008, 2nd Edition, Paints and Coatings.
- .6      South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1      SCAQMD Rule 1113-A2007, Architectural Coatings.



- .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .8 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-10, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

### 1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit gypsum board assembly drawings stamped and signed by professional engineer registered or licensed in Province of Canada.
  - .2 Indicate components such as fastener type, dimensions, spacing and locations at gypsum board edges, ends and in field of board as well as installation methods. Components and work to confirm to ASTM C 840 standard specification for application and finishing of gypsum board.
  - .3 Indicate type of joint compound, and number of joint compound layers.
  - .4 Indicate number and location of electrical boxes for wall and ceiling.
- .4 Samples:
  - .1 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
  - .2 Submit duplicate 300 x 300 mm size samples of vinyl faced gypsum board and 300 mm long samples of corner and casing beads vinyl mouldings shadow mould cornice cap textured finishes insulating strip.
  - .3 Samples will be returned for inclusion into work.
- .5 Certifications:
  - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan Waste Reduction Workplan] highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
  - .2 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
  - .3 Regional Materials: submit evidence that project incorporates required percentage 20 % of regional materials and products, showing

their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

- .4 Low-Emitting Materials:
  - .1 Submit listing of adhesives and sealants and paints and coatings] used in building, showing compliance with VOC and chemical component limits or restriction requirements.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions 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 and applicable standard designation.
- .3 Exercise care in unloading gypsum board materials shipment to prevent damage.
- .4 Storage and Handling Requirements in accordance with ASTM C 840-16:
  - .1 Store gypsum board assemblies materials level flat off ground, indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
  - .3 Protect gypsum board from direct exposure to rain, snow, sunlight, or other excessive weather conditions.
  - .4 Protect ready mix joint compounds from freezing, exposure to extreme heat and direct sunlight.
  - .5 Protect from weather, elements and damage from construction operations.
  - .6 Handle gypsum boards to prevent damage to edges, ends or surfaces.
  - .7 Protect prefinished aluminum surfaces with wrapping strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
  - .8 Replace defective or damaged materials with new.
- .5 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .6 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging material as specified in Construction Waste Management Plan and Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

#### 1.05 AMBIENT CONDITIONS

- .1 Maintain temperature 10 °C minimum, 21 °C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.
- .2 Apply board and joint treatment to dry, clean, frost free surfaces.
- .3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Standard board: to ASTM C 1396/C 1396M-14 regular, 15.9 mm thick, 1200 mm thick, 1200 mm wide x maximum practical length, ends square cut.
- .2 Nails: to ASTM C 514-14.
- .3 Steel drill screws: to ASTM C 1002-14.
- .4 Stud adhesive: to CAN/CGSB-71.25 [ASTM C 557].
- .5 Laminating compound: as recommended by manufacturer, asbestos-free.
- .6 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, metal, zinc-coated by hot-dip process zinc-coated by electrolytic process, aluminum coated phosphatized, 0.5 mm base thickness, perforated flanges, one piece length per location.
- .7 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
  - .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.
  - .2 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .8 Joint compound: to ASTM C 475, asbestos-free.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies 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.

### 3.02 ERECTION

- .1 Do application and finishing of gypsum board to ASTM C 840-16 except where specified otherwise.
- .2 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .3 Install work level to tolerance of 1:1200.

### 3.03 APPLICATION

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
- .2 Apply single layer gypsum board to metal furring or framing using screw fasteners stud adhesive for first layer, laminating adhesive screw fasteners for second layer. Maximum spacing of screws 300 mm on centre.
  - .1 Single-Layer Application:
    - .1 Apply gypsum board on ceilings prior to application of walls to ASTM C 840-16.
    - .2 Apply gypsum board on walls vertically or horizontally, providing sheet lengths that will minimize number of board edges or end joints.
- .3 Apply board using stud adhesive on furring or framing laminating adhesive on base layer of gypsum board.
- .4 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .5 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .6 Install gypsum board with face side out.
- .7 Do not install damaged or damp boards.
- .8 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

### 3.04 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 using contact adhesive for full length.
- .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 Ensure that screws or nails are properly applied in process of attaching gypsum board to framing without damaging of gypsum board edges and ends.
- .5 Splice corners and intersections together and secure to each member with 3 screws.
- .6 Install access doors to electrical and mechanical fixtures specified in respective sections.
  - .1 Rigidly secure frames to furring or framing systems.
- .7 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.

- .8 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
  - .1 Levels of finish:
    - .1 Level 0: no taping, finishing or accessories required.
    - .2 Level 1: embed tape for joints and interior angles in joint compound. Surfaces free of excess joint compound; tool marks and ridges are acceptable.
    - .3 Level 2: embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
    - .4 Level 3: embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
    - .5 Level 4: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
    - .6 Level 5: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
- .9 Finish corner beads and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .10 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board, invisible after surface finish is completed.
- .11 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .12 Completed installation smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .13 Mix joint compound slightly thinner than for joint taping.
- .14 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
- .13 Allow skim coat to dry completely.
- .14 Remove ridges by light sanding or wiping with damp cloth.

### 3.05 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.

- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.06 PROTECTION

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 07 52 00 - Joint Sealants

1.02 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
  - .1 ASTM C 645-14e1, Standard Specification for Nonstructural Steel Framing Members.
  - .2 ASTM A 653/A 653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
  - .3 ASTM C 754-15, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Underwriter's Laboratories (UL)
  - .1 UL-2768-2011, Architectural Surface Coatings.
- .3 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - current edition.
    - .1 MPI #26, Primer, Galvanized Metal, Cementitious.
- .4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 10 00 - General Instructions
- .3 Samples:
  - .1 Submit duplicate 300 mm long samples of non-structural metal framing.
- .4 Sustainable Design Submittals:
  - .2 Construction Waste Management:
    - .1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
  - .3 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and

percentages of post-consumer and post-industrial content, and total cost of materials for Project.

- .4 Regional Materials: submit evidence that project incorporates required percentage of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for Project.

#### 1.04 QUALITY ASSURANCE

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

#### 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions 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 metal framing from [nicks, scratches, and blemishes].
  - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .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 and Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C 645, roll formed from 0.53 - 0.91 mm thickness hot dipped zinc-coated (galvanized) steel sheet in accordance with ASTM A 653, Z180, for screw attachment of gypsum board.
  - .1 Knock-out service holes at 460 mm centres.
- .2 Floor and ceiling tracks: to ASTM C 645, in widths to suit stud sizes, and as follows:
  - .1 Slotted Deflection Track for Fire Separations: Premanufactured slotted top runner with 63 mm down standing legs and having 6 mm wide x 38 mm high slots spaced at 25 mm on centre along length of runner; tested and certified for use in fire rated wall construction.



- .2 Double Runner Deflection Track: Outside runner using 50 mm flanges; inner runner 33 mm; maintaining 25 mm minimum deflection space.
- .3 Deep Leg Deflection Track: Top runner having 50 mm down standing legs; maintaining 13 mm minimum deflection space.
- .4 Base Runner: Bottom track with 33 mm upstanding legs.
- .3 Non-load bearing truss stud framing system: to consist of:
  - .1 Studs: 1.22 mm size; truss-type bent rod web with double rod chords 12 x 6 mm x 1.2 mm channel chords; welded together at contact points.
    - .1 Make rod of minimum 4.5 mm diameter cold drawn steel wire having tensile strength of 620 MPa.
    - .2 Design studs for clip attachment of gypsum lath or wire tying of metal lath.
  - .2 Floor track: snap-in type formed to hold studs securely in place at 50 mm intervals; fabricated from 0.5 mm thick steel sheet; size to suit studs.
  - .3 Ceiling track: channel shaped track for use with stud shoes and 1.2 mm diameter double wire ties; size to suit studs.
  - .4 After fabrication apply one shop coat of MPI #26 primer to steel surfaces.
    - .1 Descale and clean surfaces before painting.
- .4 Furring Channels: Commercial steel sheet in accordance with ASTM A 653, Z180, hot dipped zinc-coated (galvanized), as follows:
  - .1 Hat Shaped, Rigid Furring Channels: ASTM C 645, 0.75 mm thickness x 22 mm deep.
  - .2 Resilient Furring Channels: 0.46 mm thickness x 13 mm deep members designed to reduce sound transmission having asymmetrical face attached to single flange by a slotted leg (web).
- .7 Acoustical sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .8 Sealants: VOC limit 30 g/L maximum to SCAQMD Rule 1168 GS-36.
- .9 Insulating strip: rubberized, moisture resistant 3 mm foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

### 3 EXECUTION

#### 3.01 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application 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 after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### 3.02 ERECTION

- .1 Erect partitions in accordance with framing requirements of ASTM C 754.
- .2 Align partition tracks at floor and ceiling and secure at 610 mm on centre maximum.
- .3 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .4 Place studs vertically at 400mm or 600mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners.
  - .1 Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .5 Erect metal studding to tolerance of 1:1000.
- .6 Attach studs to bottom and ceiling track using screws.
- .7 Co-ordinate simultaneous erection of studs with installation of service lines. Align web openings when erecting studs.
- .8 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .9 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified.
  - .1 Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .10 Install heavy gauge single jamb studs at openings.
- .11 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs.
  - .1 Secure track to studs at each end, in accordance with manufacturer's instructions.
  - .2 Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .12 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .13 Provide [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.
- .14 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .15 Extend partitions to ceiling height except where noted otherwise on drawings.
- .16 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
  - .1 Use 50 mm leg ceiling tracks. Use double track slip joint as indicated.

- .17 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .18 Install [two continuous beads of acoustical sealant insulating strip under studs and tracks around perimeter of sound control partitions.
- .19 Curved Partition Tracks:
  - .1 Cut top and bottom track (runners) through leg and web at 50 mm intervals for arc length. In cutting lengths of track, allow for uncut straight lengths minimum 300 mm at ends of arcs. Shape curving tracks to profiles indicated on drawings in accordance with manufacturer's instructions.
  - .2 Bend track to uniform curve and locate straight lengths so they form a true tangent to arcs.
  - .3 Support outside (cut) leg of track by clinching steel sheet strip, 25 mm high, by thickness of track metal, to inside of cut legs using metal lock fasteners.
  - .4 Begin and end arc with a stud and space intermediate studs equally along arcs at stud spacing recommended in writing by gypsum board manufacturer for radii indicated. On straight lengths of minimum 2 studs at ends of arcs, place studs at 150 mm on centre.

### 3.03 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.04 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by non-structural metal framing application.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- .3 Section 09 21 16 - Gypsum Board Assemblies.
- .7 Section 09 51 13 - Acoustical Panel Ceilings.

1.02 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM International)
  - .1 ASTM C 635-00, Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - .2 Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - .3 ASTM C 636-96, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

1.03 DESIGN REQUIREMENTS

- .1 Maximum deflection: 1/360th of span to ASTM C 635 deflection test.

1.04 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit reflected ceiling plans for special grid patterns as indicated.
- .3 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines, change in level details, access door dimensions, and locations and acoustical unit support at ceiling fixture, lateral bracing and accessories.

1.05 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit one representative model of each type ceiling suspension system.
- .3 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.06 REGULATORY REQUIREMENTS

- .1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

## 1.07 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- .2 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.
- .3 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .4 Dispose of packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Basic materials for suspension system: commercial quality cold rolled steel.
- .2 Suspension system: non-fire rated, made up as follows: two directional exposed tee bar grid.
- .3 Exposed tee bar grid components: shop painted white. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face.
- .4 Hanger wire: galvanized soft annealed steel wire.
  - .1 3.6 mm diameter for access tile ceilings.
  - .2 to ULC design requirements for fire rated assemblies.
- .5 Hanger inserts: purpose made.
- .6 Carrying channels: as per manufacturer's specifications.
- .7 Accessories: splices, clips, wire ties, retainers and wall moulding flush, to complement suspension system components, as recommended by system manufacturer.

### 3.01 INSTALLATION

- .1 Installation: in accordance with ASTM C 636 except where specified otherwise.
- .2 Install suspension system to manufacturer's instructions.
- .3 Do not erect ceiling suspension system until work above ceiling has been inspected by Departmental Representative.
- .4 Secure hangers to overhead structure using attachment methods as indicated.
- .5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from

ends of main tees.

- .6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width.
- .7 Ensure suspension system is coordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, and speakers.
- .10 Support at light fixtures, diffusers, with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Install access splines to provide 10 percent ceiling access.
- .14 Finished ceiling system to be square with adjoining walls and level within 1:1000.

### 3.02 CLEANING

- .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 07 92 00 - Joint Sealants

1.02 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
  - .1 ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
  - .2 CTI A118.3-92, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
  - .3 CTI A118.4-92, Specification for Latex Cement Mortar (included in ANSI A108.1).
  - .4 CTI A118.5-92, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
  - .5 CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1).
- .2 ASTM International (ASTM)
  - .1 ASTM C 144-04, Specification for Aggregate for Masonry Mortar.
  - .2 ASTM C 207-06, Specification for Hydrated Lime for Masonry Purposes.
  - .3 ASTM C 847-06, Specification for Metal Lath.
  - .4 ASTM C 979-05, Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.
  - .3 CAN/CGSB-75.1-M88, Tile, Ceramic.
  - .4 CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .4 CSA Group (CSA)
  - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
  - .2 CAN/CSA-A3000-03(R2006), Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .5 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .6 Terrazzo Tile and Marble Association of Canada (TTMAC)
  - .1 Tile Specification Guide 09 30 00 2016/2017, Tile Installation Manual.
  - .2 Hard Surface Maintenance Guide 2017-2019.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 10 00 - General Instructions.

- .2 Provide product data in accordance with Section 01 10 00 - General Instructions.
  - .1 Include manufacturer's information on:
    - .1 Ceramic tile, marked to show each type, size, and shape required.
    - .2 Chemical resistant mortar and grout (Epoxy and Furan).
    - .3 Cementitious backer unit.
    - .4 Dry-set cement mortar and grout.
    - .5 Divider strip.
    - .6 Elastomeric membrane and bond coat.
    - .7 Reinforcing tape.
    - .8 Levelling compound.
    - .9 Latex cement mortar and grout.
    - .10 Commercial cement grout.
    - .11 Organic adhesive.
    - .12 Slip resistant tile.
    - .13 Waterproofing isolation membrane.
    - .14 Fasteners.
- .3 Provide samples in accordance with Section 01 10 00 - General Instructions.
  - .1 Base tile: submit duplicate, 305 x 305 mm sample panels of each colour, texture, size, and pattern of tile.
  - .2 Floor tile: submit duplicate, 305 x 305 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 11 mm thick plywood and grout joints to represent project installation.
- .4 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
    - .3 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
  - .2 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

#### 1.04 QUALITY ASSURANCE

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



### 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.

### 1.06 AMBIENT CONDITIONS

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

### 1.07 MAINTENANCE

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

## 2 PRODUCTS

### 2.01 FLOOR TILE

- .1 Ceramic tile: to CAN/CGSB-75.1, Type 7, Class MR I, 600 mm x 300 mm size, R10 slip resistant surface, colour as selected by Consultant. Matching coved base.
- .2 Ceramic mosaic tile (Showers): to CAN/CGSB-75.1, Type 7 Class MR I, 25mm x 25mm x size, R10 slip resistant surface, colour as selected by Consultant. Matching coved base.

### 2.02 WALL TILE

- .1 Ceramic tile: to CAN/CGSB-75.1, Type 5, Class MR 4, 610mm x 305mm size, round edges, glazed surface, colour as selected by Consultant. Matching bullnose edge trim to suit application.
- .2 Ceramic mosaic tile (Showers): to CAN/CGSB-75.1, Type 7 Class MR I, 25mm x 25mm x size, R10 slip resistant surface, colour as selected by Consultant. Matching coved base.

### 2.03 BASE TILE

- .1 Base: coved; type, size, colour and texture to match adjacent flooring

material.

## 2.04 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .4 Internal and External Corners: provide trim shapes as follows where indicated.
  - .1 Bullnose shapes for external corners including edges.
  - .2 Coved shapes for internal corners.
  - .3 Special shapes for:
    - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.
    - .2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.
    - .3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.
    - .4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.
- .5 Provide cove and bullnose shapes for counter tops and stool], and where indicated and required to complete tile work.

## 2.05 MORTAR AND ADHESIVE MATERIALS

- .1 Cement: to CSA-A5, type 10.
- .2 Sand: to ASTM C 144, passing 16 mesh.
- .3 Hydrated lime: to ASTM C 207, Type [N][NA][S][SA].
- .4 Latex additive: formulated for use in cement mortar and thin set bond coat.
- .5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- .6 Adhesives
  - .1 Maximum VOC limit 65 g/L to SCAQMD Rule 1168.

## 2.06 BOND COAT

- .1 Dry set cement mortar: to ANSI A108.1.
- .2 Organic adhesive: to CGSB 71-GP-22M, Type 1-2 ANSI A136.1.
  - .1 Maximum VOC limit 65 g/L to SCAQMD Rule 1168.
- .3 Latex Cement mortar: to ANSI A108.1, two-component universal dry-set mortar.
- .4 Epoxy bond coat: non-toxic, non-flammable, non-hazardous during storage, mixing, application, and when cured. To produce shock and chemical resistant

mortars having the following physical characteristics:

- .1 Compressive Strength: 246 kPa.
  - .2 Bond Strength: 53 kPa.
  - .3 Water Absorption: 4.0% Max.
  - .4 Ozone Resistance, 200 hours @ 200 ppm: no loss of strength.
  - .5 Smoke Contribution Factor: 0.
  - .6 Flame Contribution Factor: 0.
  - .7 Finished mortar and grout to be resistant to urine, dilute acid, dilute alkali, sugar, brine and food waste products, petroleum distillates, oil and aromatic solvents.
  - .8 Bond Coat: maximum VOC limit 65 g/L to SCAQMD Rule 1168.
- .5 Chemical-Resistant Bond Coat:
- .1 Epoxy Resin Type: CTI A118.3.
  - .2 Furan Resin Type: CTI A118.5.
  - .3 Bond Coat: maximum VOC limit 65 g/L to SCAQMD Rule 1168.

## 2.08 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.
  - .1 Use one part white cement to one part white sand passing a number 30 screen.
- .3 Commercial Cement Grout: to CTI A118.6.
- .4 Dry-Set Grout: to CTI A118.6.
- .5 Latex Cement Grout: to ANSI A108.1, fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles commercial tile grout.
- .6 Chemical-Resistant Grout:
  - .1 Epoxy grout: to ANSI A108.1, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.
  - .2 Furan grout: to CTI A118.5.

## 2.09 ACCESSORIES

- .1 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.
- .2 Divider strips:
  - .1 Laminated strips, core 32 x 3 mm black neoprene, outsides (both sides) brass 32 x 1.29 mm complete with anchors, both sides spaced at 150 mm on centre.
- .3 Cleavage plane: polyethylene film to CGSB 51-34 No. 15 asphalt saturated felt to CSA A123.3.

- .4 Metal lath: to ASTM C 847 [galvanized][painted] finish, 10 mm rib at Lath weight of 2.17 kg/m<sup>2</sup>.
- .5 Transition Strips: purpose made metal extrusion; stainless steel type.
- .6 Reducer Strips: purpose made metal extrusion; stainless steel type; maximum slope of 1:2.
- .7 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 % when used in accordance to TTMAC Detail 301EJ.
- .8 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
  - .1 Sealants: maximum VOC limit 250 g/L to SCAQMD Rule 1168.
- .9 Floor sealer and protective coating: [to CAN/CGSB-25.20, Type 1 to tile and grout manufacturers recommendations.
- .10 Thresholds: marble, 12 mm thick, rounded edges two sides, honed finish to exposed surfaces, size to suit door opening and frame width.
- .11 Ceramic Accessories: soap holder; semi-recessed, 150 x 150 mm face dimension combination soap holder and grab bar, colour shall match surrounding wall tile.
- .12 Waterproofing membrane shall be used on all walls and floors in showers.
- .13 All transitions, edges, and corner accessories by same manufacturer.

## 2.10 MIXES

- .1 Cement:
  - .1 Scratch coat: 1-part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, and latex additive where required. Adjust water volume depending on water content of sand.
  - .2 Slurry bond coat: cement and water mixed to creamy paste. Latex additive may be included.
  - .3 Mortar bed for floors: 1-part cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
  - .4 Mortar bed for walls and ceilings: 1-part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
  - .5 Levelling coat: 1-part cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
  - .6 Bond or setting coat: 1-part cement, 1/3 part hydrated lime, 1 part water.
  - .7 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Organic adhesive: pre-mixed.
  - .1 Adhesives: maximum VOC limit 65 g/L to SCAQMD Rule 1168.
- .4 Mix bond and levelling coats, and grout to manufacturer's instructions.
- .5 Adjust water volumes to suit water content of sand.

## 2.11 PATCHING AND LEVELLING COMPOUND

- .1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
  - .1 Compressive strength - 25 MPa.
  - .2 Tensile strength - 7 MPa.
  - .3 Flexural strength - 7 MPa.
  - .4 Density - 1.9 kg/m<sup>3</sup>
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

## 2.12 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.

## 3 EXECUTION

### 3.01 MANUFACTURER'S INSTRUCTIONS

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

### 3.02 WORKMANSHIP

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile or backing coats to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Make internal angles square, external angles bullnosed.

- .9 Use bullnose edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .10 Install divider strips at junction of tile flooring and dissimilar materials.
- .11 Allow minimum 24 hours after installation of tiles, before grouting.
- .12 Clean installed tile surfaces after installation and grouting cured.
- .13 Make control joints at 1.5 m in each direction where indicated. Make joint width same as tile joints. Fill control joints with sealant in accordance with Section 07 92 00 - Joint Sealants. Keep building expansion joints free of mortar and grout.

### 3.03 WALL TILE

- .1 Install in accordance with TTMAC detail.

### 3.04 FLOOR TILE

- .1 Install in accordance with TTMAC detail.

### 3.05 BASE TILE

- .1 Install in accordance with TTMAC detail.

### 3.06 FLOOR SEALER AND PROTECTIVE COATING

- .1 Apply in accordance with manufacturer's instructions.

### 3.07 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.

### 3.10 CLEANING

- .1 Proceed in accordance with Section 01 10 00 - General Instructions.

END OF SECTION

1        GENERAL

1.01 RELATED REQUIREMENTS

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 35 29.06 - Health and Safety Requirements.
- .3        Section 01 35 43 - Environmental Procedures.
- .4        Section 01 45 00 - Quality Control.
- .5        Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- .6        Section 01 78 00 - Closeout Submittals.
- .7        Section 09 21 16 - Gypsum Board Assemblies.
- .7        Section 09 22 27 - Acoustical Suspension: Suspension system.

1.02 REFERENCE STANDARDS

- .1        American Society for Testing and Materials International (ASTM)
  - .1        ASTM C 423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - .2        ASTM E 1264-98, Standard Classification for Acoustical Ceiling Products.
  - .3        ASTM E 1477-98a(2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 [1988].
  - .2        CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .3        Canadian Standards Association (CSA International)
  - .1        CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4        Department of Justice Canada (Jus)
  - .1        Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  - .2        Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .5        Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).
- .6        Underwriter's Laboratories of Canada (ULC)
  - .1        CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.03 SUBMITTALS

- .1        Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Submit duplicate samples of each type of acoustical units.
- .3        Product EPD's (Environmental Product Declaration).

#### 1.04 QUALITY ASSURANCE

- .1 Regulatory Requirements:
  - .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Mock-up:
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
  - .2 Construct mock-up 10 m<sup>2</sup> minimum of acoustical tile ceiling including one inside corner and one outside corner.
  - .3 Construct mock-up where directed.
  - .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with ceiling work.
  - .5 When accepted, mock-up will demonstrate minimum standard for this work.
- .3 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 30 - Health and Safety Requirements.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Protect on site stored or installed absorptive material from moisture damage.
- .2 Store extra materials required for maintenance, where directed by Departmental Representative.
- .3 Waste Management and Disposal:
  - .1 Separate waste materials for in accordance with Section 01 74 19 Construction /Demolition Waste Management and Disposal.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal packaging material for recycling in accordance with Waste Management Plan (WMP).
  - .4 Separate for recycling and place in designated containers in accordance with Waste Management Plan.
  - .5 Place materials defined as hazardous or toxic in designated containers in accordance with Section 01 35 43 - Environmental Procedures.
  - .6 Ensure emptied containers are sealed and stored safely in accordance with Section 01 35 43 - Environmental Procedures.
  - .7 Fold up metal and plastic banding, flatten and place in designated area for recycling.

#### 1.06 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20



-40 % before and during installation.

- .3 Store materials in work area 48 hours prior to installation.

### 1.07 EXTRA MATERIALS

- .1 Provide maintenance data for acoustical ceiling for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.

## 2 PRODUCTS

### 2.01 ACOUSTICAL CEILING PANELS

- .1 610 x 1220 x 19 mm perforated ceramic faced, square edge lay-in. Wet formed ceramic and mineral fibre composite.
- .2 Classification: ASTM E1264 Type XX, Fire Class A.
- .3 Sound Absorption: 0.55 NRC
- .4 Sound Attenuation: 40 CAC
- .5 Light Reflectance: 0.79
- .6 Location: typical unless otherwise noted.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Departmental Representative.

### 3.02 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 In fire rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification.

### 3.03 APPLICATION

- .1    Install acoustical units parallel to building lines with edge unit not less than 50% of unit width with directional pattern running in same direction. Refer to reflected ceiling plan.
- .2    Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

### 3.04 INERFACE WITH OTHER WORK

- .1    Co-ordinate with Section 09 22 27 - Acoustical Suspension.
- .2    Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions

1.02 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
- .1 ASTM C 501-84(2009), Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abraser.
  - .2 ASTM D 2047-04, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
  - .3 ASTM F 1066-04, Standard Specification for Vinyl Composition Floor Tile.
  - .4 ASTM F 1303-04(2009), Standard Specification for Sheet Vinyl Floor Covering with Backing.
  - .5 ASTM F 1344-15, Standard Specification for Rubber Floor Tile.
- .2 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
- .1 SCAQMD Rule 1113- A2007, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .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 SDS in accordance with Section 01 10 00 - General Instructions.
- .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 base and edge strips.
- .4 Sustainable Design Submittals:
- .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating 75% of construction wastes were recycled or salvaged.
  - .2 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials

and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.

- .3 Regional Materials: submit evidence that project incorporates required percentage 10% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
- .4 Low-Emitting Materials:
  - .1 Submit listing of adhesives, primers and coatings used in building, showing compliance with VOC and chemical component limits or restriction requirements.

#### 1.04 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Operation and Maintenance Data: submit operation and maintenance data for resilient flooring for incorporation into manual.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions 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 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .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 and Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

#### 1.06 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.

## 2 PRODUCTS

### 2.01 RESILIENT SHEET FLOORING MATERIALS

- .1 Linoleum sheet flooring: composed of natural ingredients which are mixed and calendered onto a jute backing:
  - .1 Pattern: solid, uni-coloured.
  - .2 Thickness: 2.5 mm.
  - .3 Colour: as selected by Consultant from manufacturer's standard colour range.
  - .4 Slip resistance: static coefficient of friction to ASTM D 2047.
  - .5 Wear resistance to ASTM C 501.

### 2.03 ACCESSORIES

- .1 Resilient base: continuous, top set, complete with premoulded end stops and external corners:
  - .1 Type: rubber, 3.0 mm thick.
  - .2 Style: cove.
  - .3 Height: 101.6 mm.
  - .4 Lengths: cut lengths minimum 2400 mm.
  - .5 Colour: as selected by Consultant from manufacturer's standard colour range.
- .2 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
  - .1 Adhesives: VOC limit 50 g/L maximum to SCAQMD Rule 1168.
  - .2 Primer: in accordance with manufacturer's recommendations for surface conditions:
    - .1 VOC limit: 100 g/L maximum to SCAQMD Rule 1113
- .3 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste 2 part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product.
- .4 Metal edge strips: extruded aluminum, smooth, mill finish polished stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .5 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.
  - .1 Coating: VOC limit 50 g/L maximum to SCAQMD Rule 1113.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section, co-ordinate with Section 01 10 00 - General Instructions.
- .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.

### 3.02 PREPARATION

- .1 Prepare for installation in accordance with manufacturer's written recommendations.
- .2 Remove sub-floor ridges and bumps and fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface.
  - .1 Prohibit traffic until filler is completely cured and dry.
- .4 Ensure existing vinyl flooring is removed by trained personnel.
- .5 Remove or treat existing adhesives to prevent residual bleeding through to new flooring or interfering with bonding of new adhesives.
- .6 Prime and Seal concrete slab and plywood sub-floor as recommended by resilient flooring manufacturer's written instructions.

### 3.03 APPLICATION: FLOORING

- .1 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive that can be covered by flooring before initial set takes place.
- .2 Resilient sheet flooring:
  - .1 Lay flooring with seams parallel to building lines to produce minimum number of seams.
  - .2 Border widths: 1/3 minimum width of full material.
- .3 Run sheets in direction of traffic. Double cut sheet joints and continuously seal, heat weld according to manufacturer's written instructions.
- .4 Heat weld seams of linoleum sheet flooring in accordance with manufacturer's written instructions.
- .5 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .6 Cut flooring neatly around fixed objects.
- .7 Continue flooring over areas which will be under built-in furniture.
- .8 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .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.

### 3.04 APPLICATION: BASE

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners using premoulded corner units for right angle external corners and formed straight base material for external corners of other angles.
- .8 Use toeless type base where floor finish will be carpet, coved type elsewhere.
- .9 Install toeless type base before installation of carpet on floors.

### 3.05 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.06 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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions

1.02 REFERENCE STANDARDS

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

1.03 ADMINISTRATIVE REQUIREMENTS

- .1 Scheduling:
  - .1 Submit work schedule for various stages of painting to Departmental Representative for review. Provide schedule minimum of 48 hours in advance of proposed operations.
  - .2 Obtain written authorization from Departmental Representative for changes in work schedule.
  - .3 Schedule new additions to existing building coordinate painting operations with other trades.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Provide manufacturer's instructions, printed product literature and data sheets for paint and paint products and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 10 00 - General Instructions.
  - .3 Confirm products to be used are in MPI's approved product list.



- .3 Upon completion, provide records of products used. List products in relation to finish system and include the following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour numbers.
  - .4 MPI Environmentally Friendly classification system rating.
  - .5 Manufacturer's Safety Data Sheets (SDS).
  - .6 MPI Number.
- .4 Samples:
  - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
  - .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating, special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
    - .1 3 mm plate steel for finishes over metal surfaces.
    - .2 13 mm birch plywood for finishes over wood surfaces.
    - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
    - .4 13 mm gypsum board\ for finishes over gypsum board and other smooth surfaces.
    - .5 10 mm cedar hardboard siding plywood for finishes over wood surfaces.
  - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .5 Test reports: Provide certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
  - .1 Lead, cadmium and chromium: presence of and amounts.
  - .2 Mercury: presence of and amounts.
  - .3 Organochlorines and PCBs: presence of and amounts.
- .6 Certificates: Provide certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .7 Manufacturer's Instructions:
  - .1 Provide manufacturer's installation and application instructions.
- .8 Sustainable Design Submittals:
  - .2 Construction Waste Management:
    - .1 Provide project Waste Management Plan and Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2 Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
  - .3 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
  - .4 Regional Materials: Provide evidence that project incorporates

required percentage of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

- .5 Low-Emitting Materials:
  - .1 Provide listing of adhesives and sealants and paints and coatings] used in building, showing compliance with VOC and chemical component limits or restriction requirements.

#### 1.05 CLOSEOUT SUBMITTALS

- .1 Provide in accordance with Section 01 10 00 - General Instructions.
- .2 Operation and Maintenance Data: Provide operation and maintenance data for [painting materials] for incorporation into manual.
- .3 Include:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour numbers.
  - .4 MPI Environmentally Friendly classification system rating.

#### 1.06 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials:
  - .1 Provide maintenance materials in accordance with Section 01 10 00 - General Instructions.
  - .2 Submit one - one litre can of each type and colour of primer, stain, finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

#### 1.07 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Contractor: to have a minimum of 5 years proven satisfactory experience. When requested, provide list of last 3 comparable jobs including, job name and location, specifying authority, and project manager.
  - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
  - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
  - .4 Conform to latest MPI requirements for exterior painting work including preparation and priming.
  - .5 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
  - .6 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Departmental Representative.
  - .7 Standard of Acceptance:
    - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
    - .2 Soffits: no defects visible from floor at 45 degrees to surface

- when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .2 Mock-Ups:
    - .1 When requested by Departmental Representative or Paint Inspection Agency, prepare and paint designated surface, area, room or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and quality of work to MPI Painting Specification Manual standards for review and approval.
    - .2 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
      - .1 Provide 200 mm x 300 mm mock-up. Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
      - .2 Mock-up will be used:
        - .1 To judge quality of work, substrate preparation, operation of equipment and material application and skill to MPI Architectural Painting Specification Manual standards.
      - .3 Locate where directed.
      - .4 Allow 24 hours for inspection of mock-up before proceeding with Work.
      - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work. Remove mock-up and dispose of materials when no longer required and when directed by Departmental Representative.

#### 1.08 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .1 Labels: to indicate:
    - .1 Type of paint or coating.
    - .2 Compliance with applicable standard.
    - .3 Colour number in accordance with established colour schedule.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Observe manufacturer's recommendations for storage and handling.
  - .3 Store materials and supplies away from heat generating devices.
  - .4 Store materials and equipment in well ventilated area with temperature range degrees C to 30 degrees C.
  - .5 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.

- .6 Remove paint materials from storage only in quantities required for same day use.
- .7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .8 Fire Safety Requirements:
  - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (NFC).
- .4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.
- .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 and Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

#### 1.09 SITE CONDITIONS

- .1 Ambient Conditions:
  - .1 Heating, Ventilation and Lighting:
    - .1 Ventilate enclosed spaces.
    - .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
    - .3 Provide continuous ventilation for 7 days after completion of application of paint.
    - .4 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
    - .5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
    - .6 Provide minimum lighting level of 323 Lux on surfaces to be painted.
    - .7 Temperature, Humidity and Substrate Moisture Content Levels:
      - .1 Unless pre-approved written approval by Specifying body Paint Inspection Agency Authority and product manufacturer, perform no painting when:
        - .1 Ambient air and substrate temperatures are below 10 degrees C.
        - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
        - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.

- .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
- .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
- .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .2 Perform painting work when maximum moisture content of the substrate is below:
  - .1 12% for concrete and masonry (clay and concrete brick/block). Allow new concrete and masonry to cure minimum of 28 days.
  - .2 15% for hard wood.
  - .3 17% for soft wood.
  - .4 12% for plaster and gypsum board.
- .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .8 Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
  - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .9 Additional interior application requirements:
  - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
  - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

## 2 PRODUCTS

### 2.01 PERFORMANCE REQUIREMENTS

- .1 Environmental Performance Requirements:
  - .1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.
  - .2 Green Performance in accordance with MPI Standard GPS-1 GPS-2.

## 2.02 MATERIALS

- .1 Only Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .5 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.
- .6 Use MPI listed materials having minimum E2 or E3 rating where indoor air quality (odour) requirements exist.
- .7 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids to be:
  - .1 Be non-flammable.
  - .2 Be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
  - .3 Be manufactured without compounds which contribute to smog in the lower atmosphere.
  - .4 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .8 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:
  - .1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.
  - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.
- .9 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.
- .10 Recycled water-borne surface coatings to contain 50% post-consumer material by volume.
- .11 Recycled water-borne surface coatings must not contain:
  - .1 Lead in excess of 600.0 ppm weight/weight total solids.
  - .2 Mercury in excess of 50.0 ppm weight/weight total product.
  - .3 Cadmium in excess of 1.0 ppm weight/weight total product.
  - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
  - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

## 2.03 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award Submit proposed Colour Schedule to Departmental Representative for review.

- .2 Colour schedule will be based upon selection of 5 base colours and 3 accent colours. No more than 8 colours will be selected for entire project and no more than 3 colours will be selected in each area.
- .3 Selection of colours will be from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats, if requested by Departmental Representative.
- .6 For deep and ultra deep colours; 4 coats may be required.

#### 2.04 MIXING AND TINTING

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

#### 2.05 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

<u>Gloss @ 60 degrees</u>	<u>Sheen @ 85 degrees</u>	
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated and as noted on Finish

Schedule.

## 2.06 INTERIOR PAINTING SYSTEMS

- .1 Concrete Vertical Surfaces: including horizontal soffits
  - .1 INT 3.1A Latex G4 finish (over sealer).
- .2 Concrete Horizontal Surfaces: floors and stairs
  - .1 INT 3.2B Alkyd floor enamel low gloss finish.
- .3 Concrete Masonry Units: smooth and split face block and brick.
  - .1 INT 4.2A Latex G4 finish.
- .4 Structural Steel and Metal Fabrications: columns, beams, joists, etc.
  - .1 INT 5.1E Alkyd G4 finish.
- .5 Galvanized Metal: doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.
  - .1 INT 5.3A Latex G4 finish.
- .6 Dimension Lumber: columns, beams, exposed joists, underside of decking, etc.
  - .1 INT 6.2D Latex G4 finish (over latex primer).
- .7 Dressed Lumber: including doors, door and window frames casings, mouldings, etc.
  - .1 INT 6.3T Latex G5 finish (over latex primer).
- .8 Wood Paneling and Casework: partitions, panels, shelving, millwork, etc.
  - .1 INT 6.4C Semi-transparent stain finish.
- .9 Wood Floors and Stairs: including hardwood flooring, etc.
  - .1 INT 6.5B Polyurethane varnish gloss finish (over stain).
  - .2 INT 6.5C Polyurethane varnish gloss finish.
- .10 Gypsum Board Surfaces
  - .1 INT 6.2D Latex G3 finish (over latex primer).

## 2.07 SOURCE QUALITY CONTROL

- .1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.
  - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
  - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
  - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.



### 3 EXECUTION

#### 3.01 MANUFACTURER'S INSTRUCTIONS

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

#### 3.02 GENERAL

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

#### 3.03 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable to be painted in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from [Departmental Representative.
- .2 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 Maximum moisture content as follows:
  - .1 Stucco, plaster and gypsum board: 12%.
  - .2 Concrete: 12%.
  - .3 Clay and Concrete Block/Brick: 12%.
  - .4 Hard Wood: 15%.
  - .5 Soft Wood: 17%.

#### 3.04 PREPARATION

- .1 Protection (not applicable to new painting work):
  - .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.
  - .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .2 Surface Preparation (not applicable to new painting work):
  - .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.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
- .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
  - .2 Wash surfaces with a biodegradable detergent [and bleach where applicable] and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly.
  - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
  - .6 Use trigger operated spray nozzles for water hoses.
  - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Clean following surfaces with high pressure water washing.
- .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 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 Carried out during shop priming: clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by [brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.
- .9 Touch up of shop primers with primer as specified.
- .10 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

### 3.05 EXISTING CONDITIONS

- .1 Conduct moisture testing of surfaces to be painted using properly calibrated

electronic moisture meter, except test concrete floors for moisture using simple "cover patch test" and report findings to Departmental Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

- .2 Maximum moisture content as follows:
  - .1 Stucco: 12%.
  - .2 Concrete: 12%.
  - .3 Clay and Concrete Block/Brick: 12%.
  - .4 Hard Wood: 15%.
  - .5 Soft Wood: 17%.

### 3.06 APPLICATION

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

- .9 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .10 Finish closets and alcoves as specified for adjoining rooms.
- .11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
- .12 Wood, drywall, plaster, stucco, concrete, concrete masonry units and brick; if sprayed, must be back rolled.

### 3.07 MECHANICAL/ ELECTRICAL EQUIPMENT

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Do not paint over nameplates.
- .5 Keep sprinkler heads free of paint.
- .6 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .7 Paint fire protection piping red.
- .8 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .9 Paint natural gas piping yellow.
- .10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .11 Do not paint interior transformers and substation equipment.

### 3.08 SITE TOLERANCES

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

### 3.09 FIELD QUALITY CONTROL

- .1 Interior painting and decorating work to be inspected by a MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and

local Painting Contractor's Association. Painting contractor will notify Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.

- .2 Interior surfaces requiring painting to be inspected by Paint Inspection Agency who will notify Departmental Representative in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.
- .3 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer will provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.
- .4 Standard of Acceptance:
  - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Ceilings: no defects visible from floor at 45 degrees degrees to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .5 Field inspection of painting operations to be carried out be independent inspection firm as designated by Departmental Representative.
- .6 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .7 Cooperate with inspection firm and provide access to areas of work.
- .8 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

### 3.10 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.11 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.

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

END OF SECTION

## 1 GENERAL

### 1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 10 28 10 - Toilet and Bath Accessories.

### 1.02 REFERENCE STANDARDS

- .1 ASTM International
  - .1 ASTM A 480/A 480M -14a, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting, Sheet, and Strip.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .3 CSA Group (CSA)
  - .1 CSA B651-12, Accessible Design for the Built Environment.
- .4 CAN/CSA-Z809-08(R2013), Sustainable Forest Management.
- .5 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001 (V4-0)-2013, FSC Principle and Criteria for Forest Stewardship.
- .6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .7 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.
- .8 Sustainable Forestry Initiative (SFI)
  - .1 SFI-010-2014 Standard.

### 1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for plastic toilet compartments and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit 2 copies of WHMIS SDS in accordance with Section 01 10 00 - General Instructions.
- .4 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of NL Canada.

- .5 Indicate fabrication details, plans, elevations, hardware, and installation details.
- .6 Samples:
  - .1 Submit duplicate 300 x 300 mm samples of panel showing finish on both sides, two finished edges and core construction.
  - .2 Submit duplicate representative samples of each hardware item, including brackets, fastenings and trim.
- .7 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan/Waste Reduction Workplan highlighting recycling and salvage requirements.
    - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50/75% of construction wastes were recycled or salvaged.
  - .2 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
- .8 Wood Certification: submit manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

#### 1.04 QUALITY ASSURANCE

- .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions 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 specified materials from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan/Waste Reduction Workplan related to Work of this Section.
- .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/Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.



## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Laminated plastic toilet partitions.
- .2 Laminated plastic sheets: 25mm.
- .3 Core material:
  - .1 Particle board to CAN3 0188.1, sanded both faces.
  - .2 Urea-formaldehyde free.
- .4 Laminated plastic adhesive: to CAN/CGSB-71.20.
  - .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.
  - .2 Urea-formaldehyde free.
- .5 Laminated plastic panels:
  - .1 to ASTM A480/480M, Type 304 with brushed finish.
- .6 Stainless steel sheet metal: to ASTM A 480/A 480M, with brushed finish.
- .7 Sealer: water resistant sealer or glue as recommended by laminate manufacturer.
  - .1 Sealer: maximum VOC limit 250 g/L to SCAQMD Rule 1168.
- .8 Pilaster shoe 0.8 mm stainless steel, 75 mm high.
- .9 Attachment: stainless steel tamper proof type screws and bolts.
- .10 Door gap dimensions: hinge side 2.4mm max; keeping side: 2.8m max.
- .11 Height dimensions: door and panel height: 1829mm; floor clearance 110mm.

### 2.02 COMPONENTS

- .1 Hinges:
  - .1 Heavy duty, non-lubricating nylon bushings.
  - .2 Material/finish: Heavy gauge type 304 stainless steel
  - .3 Swing: inward and outward.
  - .4 Return movement: gravity.
  - .5 Adjustable to hold door open at any angle up to 90 degrees.
  - .6 Emergency access feature.
- .2 Latch set: surface mounted, combination latch, door-stop, keeper and bumper, type 304 stainless steel, with emergency access feature.
- .3 Wall and connecting brackets: type 304 stainless steel.
- .4 Coat hook: combination hook and rubber door bumper, type 304 stainless steel.
- .5 Door pull: Barrier-free type suited for out swinging doors, type 304 stainless steel.

### 2.03 FABRICATION

- .1 Doors, panels and screens: 25 mm thick, composite plastic laminate panels, to sizes indicated.

- .2 Laminate plastic to core material ensuring core and laminate profiles coincide to provide continuous support and bond over entire surface.
- .3 Finish edges of composite laminated plastic panels with laminated plastic strip.
  - .1 Chamfer exposed edges uniformly at approximately 20 degrees.
- .4 Provide formed and closed edges for doors, panels and pilasters.
  - .1 Mitre and weld corners and grind smooth.
- .5 Provide internal reinforcement at areas of attached hardware and fittings.
  - .1 Temporarily mark location of reinforcement for grab bars and benches.

### 3 EXECUTION

#### 3.01 INSTALLATION

- .1 Ensure supplementary anchorage, if required, is in place.
- .2 Do work in accordance with CSA B651.

#### 3.02 ERECTION

- .1 Partition erection:
  - .1 Install partitions secure, plumb and square.
  - .2 Leave 12 mm space between wall and panel or end pilaster.
  - .3 Anchor mounting brackets to masonry or concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors.
  - .4 Attach panel and pilaster to brackets with through type sleeve bolt and nut.
  - .5 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with stainless steel shoes.
  - .6 Provide templates for locating threaded studs through finished ceilings.
  - .7 Equip each door with hinges, latch set, and each stall with coat hook mounted on door mounting heights 1550mm. Adjust and align hardware for proper function. Set door open position at 30 degrees to front. Install door bumper door mounted.
  - .8 Equip outswinging doors with door pulls on outside of door in accordance with CSA B651, Accessible Design for the Built Environment.
  - .9 Install hardware and grab bars.
- .2 Floor supported and overhead braced partition erection:
  - .1 Attach pilasters to floor with pilaster supports and level, plumb, and tighten installation with levelling device.
  - .2 Secure pilaster shoes in position.
  - .3 Secure headrail to pilaster face with not less than two fasteners per face.
  - .4 Set tops of doors parallel with overhead brace when doors are in closed position.
- .3 Screen erection:
  - .1 Provide urinal stall screens consisting of panel, pilaster and headrail as specified for toilet compartments as indicated.

- .2 Anchor screen panels to walls with 3 panel brackets pilaster complete with floor shoes anchored to floor.

### 3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .1 Leave Work area clean at end of each day.
  - .2 Perform cleaning after installation to remove construction and accumulated environmental dirt.
  - .3 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
  - .4 Clean aluminum with damp rag and approved non-abrasive cleaner.
  - .5 Clean and polish hardware and stainless components.
  - .6 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 10 00 - General Instructions.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions

1.02 REFERENCE STANDARDS

- .1 ASTM International
  - .1 ASTM A 167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM A 653/A 653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .3 ASTM A 924/A 924M-10a, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.36-97, General Purpose Interior Alkyd Varnish.
  - .2 CAN/CGSB-71.20-M88, Adhesive Contact Brushable.
  - .3 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
  - .4 CAN/CGSB-1.88-92, Gloss Alkyd Enamel Air Drying and Baking.
  - .5 CAN/CGSB-1.104-91, Semigloss Alkyd Air Drying and Baking Enamel.
- .3 CSA Group (CSA)
  - .1 CSA B651-12, Accessible Design for the Built Environment.
  - .2 CAN/CSA-Z809-08, Sustainable Forest Management.
- .4 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .5 Green Seal Environmental Standards (GS)
  - .1 GS-11-11, Standard for Paints and Coatings.
  - .2 GS-36-11, Standard for Adhesives for Commercial Use.
- .6 National Electrical Manufacturers' Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High Pressure Laminates.
- .7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .8 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2010-2014 Standard.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and

data sheets for shower and dressing compartments and include

product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 10 00 - General Instructions. Indicate VOC's:
  - .1 For caulking materials during application and curing.
  - .2 For adhesives.
  - .3 For laminates.
- .3 Installation Drawings:
  - .1 Submit installation drawings.
  - .2 Indicate fabrication details, plans, elevations, hardware, and installation details.
- .4 Samples:
  - .1 Submit duplicate 300 x 300 mm samples of panel showing finishes, edge and corner construction and core construction.
  - .2 Submit duplicate representative samples of each hardware item, including brackets, fastenings and trim.
- .5 Sustainable Design Submittals:
  - .1 Recycled Content:
    - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
    - .2 Regional Materials: submit evidence that project incorporates required percentage 10/20 % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
    - .3 Low-Emitting Materials:
      - .1 Submit listing of adhesives and sealants and paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.
    - .4 Wood Certification: submit vendor's manufacturer's Chain-of-Custody Certificate number for CAN/CSA-Z809 or FSC or SFI certified wood.

#### 1.04 QUALITY ASSURANCE

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

#### 1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original

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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 shower and dressing compartments from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan/Waste Reduction Workplan related to Work of this Section.
- .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/Waste Reduction Workplan in accordance with Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 MATERIALS

- .1 Shower and dressing compartments.
- .2 Sheet steel: to ASTM A 653/A 653M with zinc coating.  
ASTM A 924/A 924M Commercial Quality Lock-Forming Quality.
- .3 Minimum steel core thickness:
  - .1 Doors and panels: 0.80 mm.
  - .2 Pilaster: 1.0 mm.
  - .3 Reinforcement: 3.0 mm.
- .4 Laminated plastic sheets: to ANSI/NEMA LD3.
- .5 Core material:
  - .1 Specify material.
  - .2 CAN/CSA-Z809 or FSC or SFI certified.
  - .3 Urea-formaldehyde free.
- .6 Laminated plastic adhesive: water-based polyvinyl acetate (PVA).
  - .1 Adhesives and sealants: in accordance with Section 07 92 00 - Joint Sealants.
    - .1 Adhesives and sealants: VOC limit 30,70, 250 g/L maximum to SCAQMD Rule 1168 GS-36.
- .7 Solid laminated plastic panels.
  - .1 Headrails: 1.65 mm thick, clear anodized, extruded aluminum, anti-grip design tubular steel, cast end preformed socket brackets.
  - .2 Stainless steel sheet metal: to ASTM A 167, Type 304, with finish

as indicated.

- .3 Pilaster shoe ceiling trim: 0.80 mm thick stainless-steel chrome plated non-ferrous; 75 mm high.
- .4 Curtain rods and hooks: 25 mm diameter 1.2 mm wall thickness chrome plated, stainless steel tubing.
- .5 Shower curtain: 0.178 mm thick translucent vinyl anti-bacterial fire resistive self-extinguishing vinyl laminated fabric.
  - .6 Attachment: stainless steel chrome plated aluminum tamperproof type screws and bolts.

## 2.02 COMPONENTS

- .1 Hinges:
  - .1 Heavy duty, non-lubricating nylon bushings.
  - .2 Material/finish: stainless steel.
  - .3 Swing: inward, outward double action.
  - .4 Return movement: gravity spring action cam torsion rod, non-rising.
  - .5 Adjustable to hold door open at any angle up to 90 degrees Adjustable door-open angle.
  - .6 Emergency access feature.
- .2 Latch set: combination latch, doorstop, keeper and bumper, stainless steel.
- .3 Wall and connecting brackets: stainless steel.
- .4 Coat hook: combination hook and rubber door bumper, stainless steel.
- .5 Door pull: type suited for out swinging doors, stainless steel.

## 2.03 FABRICATION

- .1 Doors and panels: 25 mm thick, two steel sheets faces bonded to honeycomb core composite solid plastic laminate panel to sizes indicated.
- .2 Pilasters: 32 mm thick, constructed same as door, to sizes indicated.
- .3 Laminate plastic to core material ensuring core and laminate profiles coincide to provide continuous support and bond over entire surface.
- .4 Finish edges of composite laminated plastic panels with laminated plastic strip, stainless steel, aluminum channel edging and mitre corners.
  - .1 Chamfer exposed edges uniformly at approximately 20 degrees.
  - .2 Include formed and closed edges for doors, panels and pilasters.
    - .1 Miter and weld corners and grind smooth.
  - .3 Include internal reinforcement at areas of attached hardware and fittings. Temporarily mark location of reinforcement for grab bars and benches.

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## 2.04 FINISHES

- .1 Clean, degrease and neutralize steel components with phosphate or chromate treatment.
- .2 Spray apply primer to CAN/CGSB-1.81, 1 coat.
  - .1 Primer: VOC limit 250 g/L maximum to SCAQMD Rule 1113 GS-11.
- .3 Spray apply finish enamel to CAN/CGSB-1.88, type 2 gloss CAN/CGSB-1.104, type 2, semi-gloss, 2 coats, minimum 0.025 mm thick.
  - .1 Enamel Finish: VOC limit 50 g/L maximum to SCAQMD Rule 1113 GS-11.
- .4 Finish: doors and pilaster/panels same colour.

## 3 EXECUTION

### 3.01 EXAMINATION

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

### 3.02 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### 3.03 PREPARATION

- .1 Ensure supplementary anchorage, required, is in place.

### 3.04 ERECTION

- .1 Do work in accordance with CSA B651 and manufacturer's written instructions.
- .2 Partition erection.
  - .1 Install partitions secure, plumb and square.



- .2 Leave 12 mm space between wall and panel or end pilaster.
- .3 Anchor mounting brackets to masonry-concrete surfaces using screws and shields, to blocking/backing must be provided hollow walls using bolts and toggle type anchors threaded rods to steel supports with bolts in threaded holes.
- .4 Attach panel and pilaster to mounting brackets with self-drilling sheet metal screws through type sleeve bolt and nut.
- .5 Provide for adjustment of floor braced pilasters ceiling braced pilasters variations with screw jack through steel saddles made integral with pilaster.
  - .1 Make adjustment and attachment of overhead pilasters through 16 mm steel channel fastened to floor.
    - .1 Conceal floor ceiling fixings with stainless steel shoes.
- .6 Include templates drilling dimensions for locating threaded studs through finished ceilings.
- .7 Equip doors with hinges, latch set, and each stall with coat hook mounted on partition wall mounted on door, mounted on side wall, mounting heights as indicated.
  - .1 Adjust and align hardware for easy, proper function. Set door open position at 30 degrees to front full open.
  - .2 Install door bumper wall/door mounted, type as indicated.
- .8 Equip out swinging doors with door pulls inside and outside of door in accordance with CSA B651.
- .9 Install hardware grab bars, benches, curtain rods, mounting height as indicated, curtain hooks, curtain, with floor to bottom of curtain clearance as indicated.
- .3 Floor supported and overhead braced partition erection.
  - .1 Attach pilasters to floor with pilaster supports floor channel and level, plumb, and tighten installation with levelling device secure to floor channel.
  - .2 Secure pilaster shoes in position.
  - .3 Secure headrail to pilaster face with not less than two fasteners per face.
  - .4 Set tops of doors parallel with overhead brace when doors are in closed position.
- .4 Floor supported partition erection:
  - .1 Secure pilasters to floor with pilaster supports anchored with 50 mm minimum penetration in structural floor.
  - .2 Level, plumb and tighten installation with levelling device.
  - .3 Secure pilaster shoes in position.
- .5 Set tops of doors level with tops of pilasters when doors are in closed position.

### 3.05 ADJUSTING

- .1 Adjust doors and locks for optimum, smooth operating condition.
- .2 Lubricate hardware and other moving parts.

### 3.06 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.

- .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 10 00 - General Instructions.
  - .1 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
  - .2 Clean aluminum with damp rag and approved non-abrasive cleaner.
  - .3 Clean and polish hardware and stainless components.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.07 PROTECTION

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions

1.02 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
  - .1 ASTM A 167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2 ASTM B 456-03, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
  - .3 ASTM A 653/A 653M-09, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4 ASTM A 924/A 924M-09, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
  - .2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.
  - .3 CGSB 31-GP-107MA-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 CSA Group (CSA)
  - .1 CAN/CSA-B651-04, Accessible Design for the Built Environment.
  - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 10 00 - General Instructions.
- .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 Canada.
  - .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars].
- .4 Samples:
  - .1 Submit samples for acceptance by Owner.
  - .2 Samples will be returned for inclusion into work.

.5 Sustainable Standards Certification:

- .1 Low-Emitting Materials: submit listing of laminate adhesives used in building, verifying that they contain no urea-formaldehyde.

1.04 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 10 00 - General Instructions.

1.05 MAINTENANCE MATERIAL SUBMITTALS

- .1 Tools:
  - .1 Provide special tools required for assembly, disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 10 00 - General Instructions.
  - .2 Deliver special tools to Departmental Representative.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions 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 toilet and bathroom accessories 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 in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .1 Materials and Resources Credit MRc2.1 Construction Waste Management: Divert 50% From Landfill and MRc2.2 Construction Waste Management: Divert 75% From Landfill]: prepare Construction Waste Management plan in accordance with Section 01 10 00 - General Instructions.

2 PRODUCTS

2.01 MATERIALS

- .1 Sheet steel: to ASTM A 653/A 653M with ZF001 designation zinc coating.
- .2 Stainless steel sheet metal: to ASTM A 167, Type 304, with BA finish.

- .3 Sustainability Characteristics:
  - .1 Laminate Adhesives.
    - .1 Urea Formaldehyde Free.
- .4 Stainless steel tubing: Type 304, commercial grade, seamless welded, 1.2 mm wall thickness.
- .5 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

## 2.02 COMPONENTS

- .1 Toilet tissue dispenser: single roll type, surface mounted, chrome plated steel frame, capacity of 500 double ply roll, roll under spring tension for controlled delivery.
- .2 Combination paper towel dispenser/waste receptacle: surface mounted wall unit, approximately 430 mm wide, 1700 mm high. Interior of 0.8 mm galvanized steel, exterior of 0.8 mm stainless steel. Suitable for dispensing folded or roll paper towels. Removable galvanized steel waste receptacle, lockable access door with continuous full height stainless steel hinge.
- .3 Soap dispenser: liquid push-in valve 64 mm spout, self-contained 1.2 L tank, stainless steel piston and valve assembly, tamper proof filler lock, surface mounted, exposed metal components chrome plated.
- .4 Sanitary napkin disposal bin: stainless steel, surface mounted unit including rough-in frame, continuous hinged door, self-closing, embossed with "napkin disposal", removable stainless-steel receptacles fitted with spring clip for deodorizer block.
- .5 Shower curtain: anti-bacterial fire resistive self-extinguishing vinyl laminated fabric shower curtain. Provide curtain hold-back hook and chain at each curtain.
- .6 Shower rods: 25 mm diameter x 1.2 mm wall thickness, stainless steel tubing of required length with satin chrome finished flanges, 12 shower curtain hooks and curtain hold-back hook and chain. Shower rod material and anchorage to withstand downward pull of 0.9 kN.
- .7 Shower Shelf: corner shelf, integrated into tile joint with no exposed fasteners, 4 mm thick brushed stainless-steel finish, self-draining through multiple patterned perforations, 195mm x 195mm.
- .8 Robe hook: Stainless steel with 50mm projection, flat-faced type only.
- .9 Mirror: Plate glass 4.0 mm to CAN/CGSB-12.5, Stainless steel frame, electrolytically copper plated and guaranteed against silver spoilage for 10 years, concealed fasteners for mounting.

## 2.03 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.

- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes to prevent electrolysis.
- .6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CAN/CSA-G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide steel anchor plates and components for installation on studding and building framing.

#### 2.04 FINISHES

- .1 Chrome and nickel plating: to ASTM B 456, satin polished finish.
- .2 Baked enamel: condition metal by applying one coat of metal conditioner to CGSB 31-GP-107Ma, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Departmental Representative.
- .3 Manufacturer's or brand names on face of units not acceptable.

### 3 EXECUTION

#### 3.01 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrates and surfaces to receive toilet and bathroom accessories previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to toilet and bathroom accessories installation.
- .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 from Departmental Representative.

#### 3.02 INSTALLATION

- .1 Install and secure accessories rigidly in place as follows:
  - .1 Stud walls: install steel back-plate to stud prior to plaster or

- drywall finish. Provide plate with threaded studs or plugs.
- .2 Hollow masonry units, existing plaster or drywall: use toggle bolts drilled into cell or wall cavity.
  - .3 Solid masonry, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.
  - .4 Toilet and shower compartments: use male to female through bolts.
- .2 Use tamper proof screws/bolts for fasteners.
  - .3 Fill units with necessary supplies shortly before final acceptance of building.

### 3.03 ADJUSTING

- .1 Adjust toilet and bathroom accessories components and systems for correct function and operation in accordance with manufacturer's written instructions.
- .2 Lubricate moving parts to operate smoothly and fit accurately.

### 3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.05 PROTECTION

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

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 10 00 - General Instructions
- .2 Section 08 71 00 - Door Hardware

1.02 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-44.40-01, Steel Clothing Locker.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 10 00 - General Instructions.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and data sheets for metal lockers 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 Canada.
  - .2 Indicate on drawings: type and class of locker, thicknesses of metal, fabricating and assembly methods, assembled banks of lockers, tops, rods, hooks, shelves, bases, trim, numbering, filler panels, end/back panels doors handles locking method ventilation method finishes.
- .4 Samples:
  - .1 Submit duplicate 50 x 50 mm samples of colour and finish on actual base metal.
- .5 Sustainable Standards Certification:
  - .1 Construction Waste Management: submit copy of Waste Management Plan for project highlighting recycling and salvage requirements.
  - .2 Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75 % of construction wastes were recycled or salvaged.

1.04 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 10 00 - General Instructions and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name 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 metal lockers 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 in accordance with Section 01 10 00 - General Instructions.
  - .1 Materials and Resources Credit MRC2.1 Construction Waste Management: Divert 50% From Landfill and MRC2.2 Construction Waste Management: Divert 75% From Landfill: prepare Construction Waste Management plan in accordance Section 01 10 00 - General Instructions.

## 2 PRODUCTS

### 2.01 MANUFACTURED UNITS

- .1 Lockers: to CAN/CGSB-44.40, Type 1 - single-tier locker and Type 2 double-tier locker, freestanding.
  - .1 Size: 305mm wide x 457mm deep x 1828mm high, base metal thickness thickness .51 mm.
  - .2 Assembly: riveted construction.
  - .3 Top: flat.
  - .4 Doors: single-wall construction, steel thickness .81 mm base metal thickness outer panel, .51 mm base metal thickness inner panel
  - .5 Door handle: nickel-plated
  - .6 Factory painted finish. Colour to be selected by Departmental Representative from manufacturer's standard range of colours.

### 2.02 ACCESSORIES

- .1 Options: to CAN/CGSB-44.40, including shelf, 3 coat hooks per locker, steel base, steel end panels, steel trim including corner angles and jamb trim fillers, and number plates.

## 3 EXECUTION

### 3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive metal lockers previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to metal locker installation.
- .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 from Departmental Representative.

### 3.02 INSTALLATION

- .1 Assemble and install lockers in accordance with manufacturer's written instructions.

- .2 Securely fasten lockers to grounds and nailing strips.
- .3 Install filler panels (false fronts) where indicated and where obstructions occur.
- .4 Install finished end back panels to exposed ends, backs of locker banks.
- .5 Install locker numbers and locks.

### 3.03 ADJUSTING

- .1 Adjust metal lockers for correct function and operation in accordance with manufacturer's written instructions.
- .2 Lubricate moving parts to operate smoothly and fit accurately.

### 3.04 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 10 00 - General Instructions.
  - .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 10 00 - General Instructions.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 - General Instructions
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.05 PROTECTION

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

END OF SECTION

PART 1 - GENERAL

1.1 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador, Canada, where indicated.
- .3 Shop drawings to show:
  - .1 Mounting arrangements.
  - .2 Operating and maintenance clearances.
- .4 Shop drawings and product data accompanied by:
  - .1 Detailed drawings of bases, supports, and anchor bolts.
  - .2 Acoustical sound power data, where applicable.
  - .3 Points of operation on performance curves.
  - .4 Manufacturer to certify current model production.
  - .5 Certification of compliance to applicable codes.
- .5 Closeout Submittals:
  - .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 operation of systems at various loads together with reset schedules and seasonal variances.
    - .4 Operation instruction for systems and component.
    - .5 Description of actions to be taken in event of equipment failure.
    - .6 Valves schedule and flow diagram.
    - .7 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 work is complete.

- 
- 1.1 ACTION AND INFORMATIONAL SUBMITTALS  
(Cont'd)
- .5 (Cont'd)
- .4 (Cont'd)
- .2 Equipment performance verification test results.
- .3 Special performance data as specified.
- .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .5 Approvals:
- .1 Submit 1 copy 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 of white prints as required for each phase of work. Mark changes as work progresses and as changes occur.
- .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
- .3 Use different colour waterproof ink for each service.
- .4 Make available for reference purposes and inspection.
- .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.
-

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- 1.2 MAINTENANCE .1 Furnish spare parts.
- .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.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

- 3.1 PAINTING  
REPAIRS AND  
RESTORATION .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

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

- 3.3 DEMONSTRATION .1 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.
- .2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .3 Departmental Representative may record these demonstrations on video tape for future reference.

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

3.4 PROTECTION  
(Cont'd)

- .2 The Mechanical Contractor(s) shall coordinate with the Firestopping Contractor and make any openings they are responsible for suitable for firestopping.

PART 1 - GENERAL

1.1 REFERENCE  
STANDARDS

- .1 National Fire Prevention Association (NFPA)
  - .1 NFPA 13-2019, Standard for the Installation of Sprinkler Systems.
  - .2 NFPA 25-2020, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
- .2 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN4 S543-M984, Standard for Internal Lug Quick Connect Couplings for Fire Hose.

1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT  
SUBMITTALS

- .1 Provide operation, maintenance and engineering data for incorporation into Operation and Maintenance Manual and in accordance with ANSI/NFPA 20.
- .2 Manufacturer's catalogue Data, including specific model, type, and size for:
  - .1 Sprinkler heads.

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 spare sprinklers and tools in accordance with NFPA 13.

- 1.6 DELIVERY,  
STORAGE AND  
HANDLING
- .1 Deliver, store and handle materials in accordance 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, in dry location.
      - .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 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 Perform welding in shop; field welding will not be permitted.
  - .3 Conceal piping in areas with suspended ceiling.

- 2.2 PIPE, FITTINGS  
AND VALVES
- .1 Pipe:
    - .1 Ferrous: to NFPA 13.
    - .2 Copper tube: 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 Copper tube: screwed, soldered, brazed, grooved.
    - .3 Provide threaded, fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded.
    - .4 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.
-



- 2.2 PIPE, FITTINGS AND VALVES  
(Cont'd)
- .2 (Cont'd)
    - .5 Rubber gasketted grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 32 mm and larger.
    - .6 Fittings: ULC approved for use in wet pipe sprinkler systems.
    - .7 Ensure fittings, mechanical couplings, and rubber gaskets are supplied by same manufacturer.
    - .8 Side outlet tees using rubber gasketted fittings are not permitted.
    - .9 Sprinkler pipe and fittings: metal.
  - .3 Pipe hangers:
    - .1 ULC listed for fire protection services in accordance with NFPA.
- 2.3 SPRINKLER HEADS
- .1 General: to NFPA 13 and ULC listed for fire services.
  - .2 Sprinkler Head Type:
    - .1 Type C: pendant chrome glass bulb type.
  - .3 Provide nominal 1.2 cm orifice sprinkler heads.
    - .1 Release element of each head to be of intermediate temperature rating or higher as suitable for specific application.
    - .2 Provide polished stainless steel ceiling plates.
    - .3 Provide corrosion-resistant sprinkler heads and sprinkler head guards in accordance with NFPA 13.
    - .4 Provide sprinkler heads as indicated.
    - .5 Deflector: not more than 75 mm below suspended ceilings.
    - .6 Ceiling plates: not more than 25 mm deep.
    - .7 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 CONNECTIONS TO  
EXISTING WATER  
SUPPLY SYSTEMS

- .1 Notify Contracting Officer in writing at least 15 days prior to connection date.
- .2 Use tapping or drilling machine valve and mechanical joint type sleeves for connections to be made under pressure.
- .3 Bolt sleeves around main piping.
- .4 Bolt valve to branch connection. Open valve, attach drilling machine, make tap, close valve, and remove drilling machine, without interruption of service.
- .5 Furnish materials required to make connections into existing water supply systems, and perform excavating, backfilling, and other incidental labour as required.

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.
  - .4 Provide installation certificate indicating compliance with NFPA standards.

3.6 CLEANING

- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

---

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 REFERENCE  
STANDARDS

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

1.3 DEFINITIONS

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

1.4 ADMINISTRATIVE  
REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Scheduling: Account for Owner's continued occupancy requirements during selective demolition.

1.5 QUALITY  
ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with the following:
  - .1 Provincial/Territorial Workers' Compensation Boards/Commissions
  - .2 Provincial/Territorial Occupational Health and Safety Standards and Programs

1.6 SITE CONDITIONS

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

PART 2 - PRODUCTS

2.1 REPAIR  
MATERIALS

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

2.2 (SALVAGE AND)  
DEBRIS MATERIALS

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- .1 Protection of Existing Systems to Remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
  - .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts of existing buildings scheduled to remain.

3.2 PREPARATION  
(Cont'd)

- .1 (Cont'd)
  - .2 Notify Representative and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
  - .3 Prevent debris from blocking drainage inlets.
  - .4 Protect mechanical systems that must remain in operation.
  
- .2 Protection of Building Occupants: Sequence demolition work so that interference with the use of the building by the Owner and users is minimized and as follows:
  - .1 Prevent debris from endangering the safe access to and egress from occupied buildings.
  - .2 Notify Representative and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

3.3 EXECUTION

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

3.4 CLOSEOUT  
ACTIVITIES

- .1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) except where explicitly noted otherwise for materials being salvaged for re use in new construction in accordance with Section 02 42 16.

PART 1 - GENERAL

1.1 REFERENCE  
STANDARDS

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

1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet for fixtures and equipment.
  - .2 Submit WHMIS MSDS. Indicate VOC's for adhesive and solvents during application and curing.
- .2 Shop Drawings.
  - .1 Submit shop drawings to indicate:
    - .1 Equipment, including connections, fittings, control assemblies and ancillaries. Identify whether factory or field assembled.
    - .2 Wiring and schematic diagrams.
    - .3 Dimensions and recommended installation.
    - .4 Pump performance and efficiency curves.
- .3 Instructions: submit manufacturer's installation instructions.
- .4 Closeout submittals: submit maintenance and engineering data for incorporation into Operation and Maintenance Manual:
  - .1 Manufacturers name, type, model year, capacity and serial number.
  - .2 Details of operation, servicing and maintenance.
  - .3 Recommended spare parts list with names and addresses.

1.3 DELIVERY  
STORAGE AND  
HANDLING

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal paper, plastic, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
  - .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

- 
- 1.3 DELIVERY .1 (Cont'd)  
STORAGE AND .5 Unused sealant materials must not be disposed  
HANDLING of into sewer system, into streams, lakes, onto  
(Cont'd) ground or in other location where it will pose  
health or environmental hazard.  
.6 Fold up metal and plastic banding, flatten and  
place in designated area for recycling.

PART 2 - PRODUCTS

- 2.1 DOMESTIC HOT .1 Capacity: as indicated.  
WATER CIRCULATING .2 Construction: closed-coupled, in-line centrifugal  
PUMPS all lead free bronze or stainless steel  
construction, stainless steel or bronze shaft  
sleeve, EPDM gasket material. Design for 1034 kPa  
and 105 degrees C continuous service.  
.3 Motor: three speed with thermal overload protection,  
120 VAC.  
.4 Supports: provide as recommended by manufacturer.

PART 3 - EXECUTION

- 3.1 MANUFACTURER'S .1 Compliance: comply with manufacturer's written  
INSTRUCTIONS recommendations or specifications, including product  
technical bulletins, handling, storage and  
installation instructions, and data sheet.
- 3.2 INSTALLATION .1 Make piping and electrical connections to pump and  
motor assembly and controls as indicated.  
.2 Ensure pump and motor assembly do not support  
piping.
- 3.3 FIELD QUALITY .1 Site Tests/Inspection:  
CONTROL .1 Check power supply.  
.2 Check starter protective devices.  
.2 Start-up, check for proper and safe operation.
-



3.4 START-UP

.1 General:

.1 Procedures:

- .1 Check power supply.
- .2 Check starter O/L heater sizes.
- .3 Start pumps, check impeller rotation.
- .4 Check for safe and proper operation.
- .5 Run-in pumps for 12 continuous hours.
- .6 Adjust alignment of piping and conduit to ensure full flexibility.
- .7 Eliminate causes of cavitation, flashing, air entrainment.

PART 1 - GENERAL

1.1 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME).
  - .1 ANSI/ASME B16.15-Latest Edition, Cast Bronze Threaded Fittings, Classes 125 and 250.
  - .2 ANSI/ASME B16.18-Latest Edition, Cast Copper Alloy Solder Joint Pressure Fittings.
  - .3 ANSI/ASME B16.22-Latest Edition, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
  - .4 ANSI/ASME B16.24-Latest Edition, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.
- .2 ASTM International Inc.
  - .1 ASTM A 307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .2 ASTM A 536-84(2014), Standard Specification for Ductile Iron Castings.
  - .3 ASTM B 88M-16, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 Canadian Standards Association (CSA International).
  - .1 CSA B242-Latest Edition, Groove and Shoulder Type Mechanical Pipe Couplings.
- .4 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Protection Act, Latest Edition, c. 33 (CEPA).
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS). Valves, Flanged and Threaded Ends.
  - .1 MSS-SP-80-Latest Edition, Bronze Gate, Globe, Angle and Check Valves.
- .7 National Research Council (NRC)/Institute for Research in Construction.
  - .1 NRCC 38728, National Plumbing Code of Canada (NPC) - Latest Edition.
- .8 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act, Latest Edition, c. 34 (TDGA).

1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.
  - .3 Closeout Submittals:
    - .1 Provide maintenance data for incorporation into Operation and Maintenance Manual.

1.3 DELIVERY,  
STORAGE AND  
HANDLING

- .1 Place materials defined as hazardous or toxic in designated containers.
- .2 Handle and dispose of hazardous materials in accordance with CEPA , TDGA , Regional and Municipal regulations.

PART 2 - PRODUCTS2.1 PIPING

- .1 Domestic hot and cold systems, within building.
  - .1 Above ground: copper tube, hard drawn, type L: to ASTM B 88M.

2.2 FITTINGS

- .1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ANSI/ASME B16.24.
- .2 Cast bronze threaded fittings, Class 125 and 250: to ANSI/ASME B16.15.
- .3 Cast copper, solder type: to ANSI/ASME B16.18.
- .4 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.
- .5 NPS 1 ½ and smaller : cast copper to ANSI/ASME B16.18; with 301 stainless steel internal components and EPDM seals. Suitable for operating pressure to 1380 kPa.

2.3 JOINTS

- .1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.
-

2.3 JOINTS  
(Cont'd)

- .2 Bolts, nuts, hex head and washers: to ASTM A 307, heavy series.
- .3 Solder: 95/5 tin copper alloy, lead free.
- .4 Teflon tape: for threaded joints.
- .5 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 BALL VALVES

- .1 NPS 2 and under, screwed:
  - .1 Class 150.
  - .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle as specified Section 23 05 23.01 - Valves - Bronze.
- .2 NPS 2 and under, soldered:
  - .1 To ANSI/ASME B16.18, Class 150.
  - .2 Bronze body, stainless steel ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors as specified Section 23 05 23.01 - Valves - Bronze

PART 3 - EXECUTION3.1 APPLICATION

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

3.2 INSTALLATION

- .1 Install in accordance with NPC and local authority having jurisdiction.
  - .2 Install pipe work in accordance with Section 23 05 05 - Installation of Pipework, supplemented as specified herein.
  - .3 Assemble piping using fittings manufactured to ANSI standards.
  - .4 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
-

- 3.3 VALVES .1 Isolate equipment, fixtures and branches with ball valves.
- 3.4 PRESSURE TESTS .1 Conform to requirements of Section 21 05 01 - Common Work Results for Mechanical.
- .2 Test pressure: greater of 1 times maximum system operating pressure or 860 kPa.
- 3.5 FLUSHING AND CLEANING .1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to Provincial Federal potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing.
- 3.6 PRE-START-UP INSPECTIONS .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- 3.7 DISINFECTION .1 Flush out, disinfect and rinse system to requirements of authority having jurisdiction approval of Departmental Representative.
- .2 Upon completion, provide laboratory test reports on water quality for Departmental Representative's approval.
- 3.8 START-UP .1 Timing: start up after:
- .1 Pressure tests have been completed.
- .2 Disinfection procedures have been completed.
- .3 Certificate of static completion has been issued.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
- .1 Establish circulation and ensure that air is eliminated.
- .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
-

- 3.8 START-UP  
(Cont'd)
- .3 (Cont'd)
- .3 Bring HWS storage tank up to design temperature slowly.
- .4 Monitor HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
- .5 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.
- .5 Balancing hot water recirculation system within 5% of design valve. Refer to Section 23 05 93 - Testing, Adjusting and Balancing for HVAC, for applicable procedures.
- 3.9 PERFORMANCE  
VERIFICATION
- .1 Scheduling:
- .1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.
- .2 Procedures:
- .1 Verify that flow rate and pressure meet Design Criteria.
- .2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.
- .3 Sterilize HWS and HWC systems for Legionella control.
- .4 Verify performance of temperature controls.
- .5 Verify compliance with safety and health requirements.
- .6 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut off water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
- .7 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.
- 3.10 OPERATION  
REQUIREMENTS
- .1 Co-ordinate operation and maintenance requirements including, cleaning and maintenance of specified materials and products with Section 23 05 05 - Installation of Pipework.
- 3.11 CLEANING
- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM International Inc.
  - .1 ASTM B 32-08 (2014), Standard Specification for Solder Metal.
  - .2 ASTM B 306-2013, Standard Specification for Copper Drainage Tube (DWV).
  - .3 ASTM C 564-03a, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .2 Canadian Standards Association (CSA International).
  - .1 CAN/CSA-B70-12 (2016), Cast Iron Soil Pipe, Fittings and Means of Joining.
  - .2 CSA-B125.3-2012 Plumbing Fittings.
- .3 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .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 materials to site in original factory packaging, labelled with manufacturer's name, address.

PART 2 - PRODUCTS

2.1 SUSTAINABLE MATERIAL

- .1 Adhesives and Sealants: in accordance with Section 07 92 00 - Joint Sealants.
  - .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.

2.2 COPPER TUBE AND FITTINGS

- .1 Above ground sanitary Type DWV to: ASTM B 306.
  - .1 Fittings.
    - .1 Cast brass: to CSA-B125.3-2012.
    - .2 Wrought copper: to CSA-B125.3-2012.

- 2.2 COPPER TUBE AND FITTINGS .1 (Cont'd)  
(Cont'd) .2 Solder: lead free, tin-antimony 95:5, type TA to ASTM B 32.
- 2.3 CAST IRON PIPING AND FITTINGS .1 Sanitary and vent minimum NPS 3, to: CAN/CSA-B70-012 (2016).  
.1 Joints:  
.1 Mechanical joints:  
.1 Neoprene or butyl rubber compression gaskets: to CAN/CSA-B70-12 (2016).  
ASTM C 564 or  
.2 Stainless steel clamps.  
.2 Hub and spigot:  
.1 Caulking lead: to CSA B67.  
.2 Cold caulking compounds.
- .2 Above ground sanitary and vent: to CAN/CSA-B70-12 (2016).  
.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 INSTALLATION .1 In accordance with Section 23 05 01 - Use of HVAC Systems During Construction.  
.2 Install in accordance with National Plumbing Code and local authority having jurisdiction.
- 3.3 TESTING .1 Hydraulically test to verify grades and freedom from obstructions.



3.4 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).

3.5 CLEANING

- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 RELATED  
SECTIONS

- .1 Section 02 81 01 - Hazardous Materials.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
  - .1 ASTM A 126-Latest Edition, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
  - .2 ASTM B 62-Latest Edition, Specification for Composition Bronze or Ounce Metal Castings.
- .2 Canadian Standards Association (CSA International).
  - .1 CSA-B79-Latest Edition, Floor, Area and Shower Drains, and Cleanouts for Residential Construction.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .4 Plumbing and Drainage Institute (PDI).
  - .1 PDI-WH201-Latest Edition, Water Hammer Arresters Standard.

1.3 SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.
  - .2 Indicate dimensions, construction details and materials for specified items.
  - .3 Submit WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials. Indicate VOC's for adhesive and solvents during application and curing.
- .3 Shop Drawings:
  - .1 Submit shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions construction and assembly details and accessories for following:
    - .1 Water hammer arresters.
- .4 Instructions: submit manufacturer's installation instructions.

- 
- 1.3 SUBMITTALS  
(Cont'd)
- .5 Manufacturers' Field Reports: manufacturers' field reports specified.
  - .6 Closeout submittals: submit maintenance and engineering data for incorporation into Operation and Maintenance Manual, include:
    - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year and capacity.
    - .2 Details of operation, servicing and maintenance.
    - .3 Recommended spare parts list.
- 1.4 DELIVERY, STORAGE AND HANDLING
- .1 Waste Management and Disposal:
    - .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
    - .2 Collect and separate for disposal paper, plastic, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
    - .3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
    - .4 Fold up metal and plastic banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

- 2.1 FLOOR DRAINS
- .1 Floor Drains and Trench Drains: to CSA B79.
  - .2 Type 1: General duty, dura-coated cast iron body with bottom outlet, trap primer connection, combination invertable membrane clamp, adjustable collar with seepage slots and polished nickel bronze light duty levelling strainer.
- 2.2 CLEANOUTS
- .1 Floor Access:
    - .1 Plugs: bolted bronze with neoprene gasket.
    - .2 Cover: nickel bronze round, gasket, vandal-proof screws. Match to existing body.
- 2.3 THERMAL BALANCING VALVES
- .1 Adjustable hot water recirculation system thermal balancing valve. Adjustable from 35-60°C with by-pass cartridge that opens at 70°C for thermal disinfection.
-

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2.3 THERMAL  
BALANCING VALVES  
(Cont'd)

- .2 Construction: Low lead brass body, balancing thermostatic cartridge, thermal disinfection by-pass cartridge, temperature gauge.
- .3 Size: 12mm, NPT connections.

2.4 COMBINATION  
DRENCH SHOWER

- .1 Stainless steel piping, 32mm inlet piping, unit drain near bottom.
- .2 Shower:
  - .1 Capacity no less than 76L/min for at least 15 minutes.
  - .2 Supplied with flow regulator and stay-open control valve.
  - .3 Pull rod control-valve actuator.
  - .4 Stainless steel shower head, 267mm diameter.
- .3 Eye/Face Wash Unit:
  - .1 Capacity not less than 11.3 L/min for at least 15 minutes.
  - .2 Supplied with flow regulator and stay-open control valve.
  - .3 Paddle control-valve actuator.
  - .4 Single stainless-steel eye/face wash spray head.
  - .5 Stainless steel bowl.
- .4 Pedestal Mounted.

2.5 COMBINATION  
DRENCH SHOWER  
THERMOSTATIC MIXING  
VALVE

- .1 To ANSI Z358.1.
- .2 Provide 27 Deg. C water to emergency fixtures.
- .3 Maintain temperature plus or minus 3 Deg. C.
- .4 Cold water bypass in case of unit failure or loss of hot water. Positive water shut-off on loss of cold water.
- .5 Paraffin wax thermostatic mixing element.
- .6 Outlet temperature gauge.
- .7 Mounted in stainless steel cabinet.

2.6 COMBINATION  
DRENCH SHOWER FLOW  
SWITCH ALARM

- .1 For 32mm piping.
  - .2 Power Supply: 120 VAC.
-

2.6 COMBINATION  
DRENCH SHOWER FLOW  
SWITCH ALARM  
(Cont'd)

- .3 Flashing amber light and buzzer at 90 db from 3m.
- .4 Switch activation at 9.1 L/min.
- .5 CSA Certified.

2.7 POTABLE WATER  
THERMAL EXPANSION  
TANK  
TANK

- .1 Quantity: as indicated.
- .2 Application: Absorb expanded water from domestic hot water tanks because of the inability to expand back into the Town potable water system due to the presence of a backflow preventer or check valve in the cold water side of the system.
- .3 ASME Section VIII construction and label.
- .4 FDA approved butyl bladder.
- .5 NPT stainless steel system connection.
- .6 Standard tire air charging valve connection.
- .7 103 kPa maximum working pressure.
- .8 Vertical tank, floor mounted or suspended.
- .9 Dimensions: as indicated.
- .10 Tank volume: as indicated.
- .11 Acceptance volume: as indicated.
- .12 Red primer exterior finish.
- .13 Air pre-charge to be adjusted in field by the Mechanical Contractor to equal the residual cold water pressure on the discharge side of the pressure reducing valve on the domestic water service entrance by the Mechanical Contractor.

2.8 WASH DOWN  
STATIONS  
STATIONS

- .1 HB-1 Wash Down Station with the following:
  - .1 Isolation ball valve (3/4").
  - .2 Vacuum breaker.
  - .3 Stainless steel hose rack.
  - .4 50 ft. of reinforced 2-ply hose.
  - .5 Industrial spray nozzle.

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 data sheet.
- 3.2 INSTALLATION .1 Install in accordance with National Plumbing Code of Canada provincial codes, and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.
- 3.3 CLEANOUTS .1 Install new cleanout covers to fit existing cleanout bodies.
- 3.4 START-UP .1 General:  
.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified herein.
- .2 Timing: start-up only after:  
.1 Pressure tests have been completed.  
.2 Disinfection procedures have been completed.  
.3 Certificate of static completion has been issued.
- .3 Provide continuous supervision during start-up.
- 3.5 TESTING AND ADJUSTING .1 Timing:  
.1 After start-up deficiencies rectified.  
.2 After certificate of completion has been issued by authority having jurisdiction.
- .2 Application tolerances:  
.1 Pressure at fixtures: +/- 70 kPa.  
.2 Flow rate at fixtures: +/- 20%.
- .3 Adjustments:  
.1 Verify that flow rate and pressure meet design criteria.

- 
- 3.5 TESTING AND ADJUSTING  
(Cont'd)
- .3 (Cont'd)
    - .2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.
  - .4 Access doors:
    - .1 Verify size and location relative to items to be accessed.
  - .5 Floor drains:
    - .1 Verify operation of trap seal primer.
    - .2 Prime, using trap seal primer. Adjust flow rate to suit site conditions.
    - .3 Check operations of flushing features.
    - .4 Check security, accessibility, removability of strainer.
  - .6 Cleanouts:
    - .1 Verify covers are gas-tight, secure, yet readily removable.

PART 1 - GENERAL

1.1 REFERENCE  
STANDARDS

- .1 CSA Group (CSA)
  - .1 CAN/CSA-B45 Series-02(R2013), Plumbing Fixtures, (Consists of B45.0, B45.1, B45.2, B45.3, B45.4, B45.5, B45.6, B45.7, B45.8 and B45.9).
  - .2 CSA B125.3-18, Plumbing Fittings.
  - .3 CSA B651-18, Accessible Design for the Built Environment.
- .2 Green Seal (GS)
  - .1 GS-36-2013, Adhesives for Commercial Use.
- .3 National Research Council Canada (NRC)
  - .1 National Building Code of Canada 2015 (NBC).
- .4 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.

1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for washroom fixtures and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Indicate fixtures and trim:
    - .1 Dimensions, construction details, roughing-in dimensions.
    - .2 Factory-set water consumption per flush at recommended pressure.
    - .3 (For water closets, urinals): minimum pressure required for flushing.

1.3 CLOSEOUT  
SUBMITTALS

- .1 Include:
  - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
  - .2 Details of operation, servicing, maintenance.
  - .3 List of recommended spare parts.



1.4 DELIVERY,  
 STORAGE AND  
 HANDLING

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

PART 2 - PRODUCTS

2.1 MANUFACTURED  
 UNITS

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CSA B125.3.
- .3 Exposed plumbing brass to be chrome plated.
- .4 Number, locations: as indicated.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Water closets:

WC	Mounting		Bowl		Flush Valve		Flush Tank	Handicapped
	Wall	Floor	Elong	Reg	Exp'd	Conc'd		
WC-1	X		X			X		

- .1 WC-1: wall-mounted, concealed flush valve, back spud ultra-low flush, 4.2 litres/flush.
  - .1 Bowl: vitreous china, syphon jet, elongated rim.
- .8 Water Closet Electronic Flush Valves:

2.1 MANUFACTURED  
UNITS  
(Cont'd)

- .8 (Cont'd)
  - .1 Concealed, quiet diaphragm-type, flushmeter, with chloramine resistant, dual seal diaphragm with a clog resistant, triple filtered by-pass. Complete with high back pressure vacuum breaker, one piece hex coupling nut, adjustable tailpiece, spud coupling and flange for back spud connection. Control stop with internal siphon-guard protection, sweat solder kit. Internal seals made of chloramine resistant materials.
  - .2 motorized actuator with a fully configurable sensor range adjustment and a manual push-button override.
  - .3 Transformer: 120/6 VDC Class 2, UL and CSA listed, hardwire, sized for up to 8 sensors/actuators.
  - .4 Equipped with manual override button.
- .9 Water Closet Seats.
  - .1 Seat: white, elongated open front, moulded solid plastic, less cover, stainless steel check hinges, stainless steel insert post.
- .10 Urinals:
  - .1 U-1: wall mounted, ultra-low flush, exposed flush valve, top spud.
    - .1 Urinal: vitreous china, washout type, integral flushing rim, extended shields, integral trap, removable stainless steel strainer, back outlet.
- .11 Urinal Electronic Flush Valves:
  - .1 Exposed, quiet diaphragm-type, chrome-plated flushmeter, with chloramine resistant, dual seal diaphragm with a clog resistant, triple filtered by-pass. Complete with high back pressure vacuum breaker, one piece hex coupling nut, adjustable tailpiece, spud coupling and flange for top spud connection. Control stop with internal siphon-guard protection, vandal resistant stop cap, sweat solder kit, and a cast wall flange with set screw. Internal seals made of chloramine resistant materials.
  - .2 Motorized actuator with an integral infrared convergence-type proximity sensor and a manual push-button override into an all-metal, polished chrome plated housing.
  - .3 Transformer: 120/6 VDC Class 2, UL and CSA listed, hardwire, sized for up to 8 sensors/actuators.
  - .4 Equipped with manual override button.

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 washroom fixtures 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 Mounting heights:
  - .1 Standard: to match existing.
  - .2 Wall-hung fixtures: to match existing.

3.3 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
  - .1 Adjust water flow rate to design flow rates.
  - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
  - .3 Adjust flush valves to suit actual site conditions.
  - .4 Adjust urinal flush timing mechanisms.
  - .5 Set controls of automatic flush valves for WCs and urinals to prevent unnecessary flush cycles.
- .3 Checks:
  - .1 Water closets, urinals: flushing action.
  - .2 Aerators: operation, cleanliness.
  - .3 Vacuum breakers, backflow preventers: operation under all conditions.
- .4 Thermostatic controls:
  - .1 Verify temperature settings, operation of control, limit and safety controls.

3.4 CLEANING

- .1 Progress Cleaning:
  - .1 Leave Work area clean at end of each day.

3.4 CLEANING  
(Cont'd)

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

PART 1 - GENERAL

- 1.1 REFERENCES .1 Canadian Standards Association (CSA International).  
.1 CAN/CSA-B45 Series-Latest Edition, Plumbing  
Fixtures.  
.2 CAN/CSA-B125.3-Latest Edition, Plumbing  
Fittings.  
.3 CAN/CSA-B651-Latest Edition, Accessible Design  
for the Built Environment.

- 1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS .1 Provide shop drawing submittals for products  
specified in this section.  
.2 Product Data:  
.1 Provide manufacturer's printed product  
literature and datasheets for fixtures, and include  
product characteristics, performance criteria,  
physical size, finish and limitations.

- 1.3 CLOSEOUT  
SUBMITTALS .1 Provide maintenance data for incorporation into  
Operation and Maintenance Manual.  
.2 Include:  
.1 Description of fixtures and trim, giving  
manufacturer's name, type, model, year, capacity.  
.2 Details of operation, servicing, maintenance.  
.3 List of recommended spare parts.

- 1.4 DELIVERY,  
STORAGE AND  
HANDLING .1 Deliver materials to site in original factory  
packaging, labelled with manufacturer's name,  
address.

PART 2 - PRODUCTS

- 2.1 MANUFACTURED  
UNITS .1 Fixtures: manufacture in accordance with CAN/CSA-B45  
series.  
.2 Trim, fittings: manufacture in accordance with  
CAN/CSA-B125.  
.3 Exposed plumbing brass to be chrome plated.  
.4 Number, locations: architectural drawings to govern.

- 
- 2.1 MANUFACTURED .5 Fixtures to be product of one manufacturer.  
UNITS  
(Cont'd) .6 Trim to be product of one manufacturer.
- .7 Lavatories:  
.1 L-1: Wall-hung, integral back:  
.1 Vitreous china, with faucet ledge, three hole on 102 mm centers, front overflow, for a wall hanger or concealed arm support.  
.2 Overall dimensions, 464 x 521 mm.  
.3 Bowl dimensions, 381 x 254 x 165 mm.
- .8 Lavatory Trim:  
.1 Washroom Lavatory Electronic Trim for L-1.  
.1 Hard wire.  
.2 102 mm electronic faucet.  
.3 Cast one-piece body with integral waterproof sensor and connector.  
.4 DMD self-adaptive technology no external adjustments required.  
.5 Serviceable filter screen upstream of solenoid valve.  
.6 Metal hold-down package.  
.7 Hands free (touchless) operation.  
.8 Water flows when sensor is activated.  
.9 Water flow stops upon de-activation sensor.  
.10 Adjustable sensing distance.  
.11 Pre-set 45 second maximum run time.  
.12 Will reset once obstruction is removed.  
.13 110 to 24 VAC transformer.  
.14 Chrome finish.  
.15 Vandal resistant (1.9 L/min.) flow control non-aerating spray.  
.16 Factory assembled in surface mounted 250 mm metal box with stainless steel cover - includes thermostatic mixing valve.
- .9 Hand Wash Sink  
.1 HS-1: Wall hung;  
.1 Wall hung basin, centre, back waste location, 18 gauge 304SS, #4 satin finish, radius coved bowl covers, one piece wall hanger.  
.2 Overall dimensions, 432 x 419mm.  
.3 Bowl dimensions, 305 x 356 x 152mm.
- .10 Hand Wash Sink Trim.  
.1 Electronic trim for HS-1.  
.1 Hard wire.  
.2 Gooseneck spout 150mm long.  
.3 Chrome-plated, one-piece cast main body with integral sensor.  
.4 Surface mount housing.
-

2.1 MANUFACTURED  
UNITS  
(Cont'd)

- .10 (Cont'd)
  - .1 (Cont'd)
    - .5 Hands free (touchless) operation.
    - .6 Water flows when sensor is activated.
    - .7 Water flow stops upon de-activation of sensor.
    - .8 Adjustable auto shut off feature, factory set to 45 seconds. Will reset once obstruction is removed.
    - .9 Adjustable sensing distance 76 to 381mm, factory set to 229mm.
    - .10 110 to 24 VAC transformer.
    - .11 Vandal resistant (5.7 L/min.) laminar outlet.
    - .12 Factory assembled in surface mounted 250mm metal box with stainless steel cover - includes thermostatic mixing valve.
  - .11 Stainless steel sinks.
    - .1 SS-1: Double compartment, ADA compliant, ledge back.
      - .1 From 20 gauge thick type 18-8 302 stainless steel, self rimming, undercoated clamps, satin finish, 89mm crumb cup waste assembly. Inside bowl sizes: as indicated.
      - .2 Trim:
        - .1 Dual handle kitchen deck faucets for exposed mounting on three hole sinks. 203mm spacing.
        - .2 Cast brass fabricated body. Polished chrome plated finish.
        - .3 203mm long spout swings 360°.
        - .4 Vandal resistant aerator, 5.7 L/min.
        - .5 Vandal resistant 76mm blade handles.
        - .6 Ceramic structures 90% flow with first 1/4 turn of operation.
  - .12 Fixture piping:
    - .1 Hot and cold water supplies:
      - .1 Chrome plated rigid supply pipes each with screwdriver stop, reducers, escutcheon.
    - .2 Waste:
      - .1 Brass P trap with clean out on each fixture not having integral trap.
      - .2 Chrome plated in all exposed places.
      - .3 Offset as required for barrier free installation.

PART 3 - EXECUTION

- 3.1 APPLICATION .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- 3.2 INSTALLATION .1 Mounting heights:  
.1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
- 3.3 ADJUSTING .1 Conform to water conservation requirements specified this section.  
.2 Adjustments:  
.1 Adjust water flow rate to design flow rates.  
.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.  
.3 Checks:  
.1 Aerators: operation, cleanliness.  
.4 Thermostatic controls:  
.1 Verify temperature settings, operation of control, limit and safety controls.
- 3.4 CLEANING .1 Remove surplus materials, excess materials, rubbish, tools and equipment.



PART 1 - GENERAL

- 1.1 REFERENCES .1 Canadian Standards Association (CSA International).  
.1 CAN/CSA-B45 Series-Latest Edition, Plumbing  
Fixtures.  
.2 CAN/CSA-B125.3-Latest Edition, Plumbing  
Fittings.  
.3 CAN/CSA-B651-Latest Edition, Accessible Design  
for the Built Environment.

- 1.2 ACTION AND  
INFORMATIONAL  
SUBMITTALS .1 Provide shop drawing submittals for products  
specified in this section.  
.2 Product Data:  
.1 Provide manufacturer's printed product  
literature and datasheets for fixtures, and include  
product characteristics, performance criteria,  
physical size, finish and limitations.

- 1.3 CLOSEOUT  
SUBMITTALS .1 Provide maintenance data including monitoring  
requirements for incorporation into Operation and  
Maintenance Manual.  
.2 Include:  
.1 Description of fixtures and trim, giving  
manufacturer's name, type, model, year, capacity.  
.2 Details of operation, servicing, maintenance.  
.3 List of recommended spare parts.

- 1.4 DELIVERY,  
STORAGE AND  
HANDLING .1 Deliver materials to site in original factory  
packaging, labelled with manufacturer's name,  
address.

PART 2 - PRODUCTS

- 2.1 MANUFACTURED  
UNITS .1 Fixtures: manufacture in accordance with CAN/CSA-B45  
series.  
.2 Trim, fittings: manufacture in accordance with  
CAN/CSA-B125.3.  
.3 Exposed plumbing brass to be chrome plated.

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- 2.1 MANUFACTURED UNITS  
(Cont'd)
- .4 Number, locations: architectural drawings to govern.
  - .5 Fixtures in any one location to be product of one manufacturer and of same type.
  - .6 Trim in any one location to be product of one manufacturer and of same type.
  - .7 Individual shower stall shower head.
    - .1 SH-1: individual shower head.
      - .1 Shower head with arm and flange, rated 5.7 LPM maximum.
      - .2 Shower supply valve:
        - .1 Pressure-balanced-actuated element (replaceable), accessible lever handle, volume control, 40 degrees C maximum setting, strainer and check-stops on each inlet, forged brass body, square plaster guard.
  - .8 Fixture piping:
    - .1 Hot and cold water supplies to each fixture.

PART 3 - EXECUTION

- 3.1 APPLICATION
- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- 3.2 INSTALLATION
- .1 Mounting heights:
    - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
    - .2 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.
- 3.3 ADJUSTING
- .1 Conform to water conservation requirements specified this section.
  - .2 Adjustments:
    - .1 Adjust water flow rate to design flow rates.
    - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
  - .3 Checks:
    - .1 Aerators: operation, cleanliness.
-

3.4 CLEANING .1 Remove surplus materials, excess materials, rubbish,  
tools and equipment.

PART 1 - GENERAL

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

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SUMMARY

- .1 This Section includes requirements for selective demolition and removal of heating, ventilation and air conditioning systems, controls and automated automation components, and related mechanical components and incidentals required to complete work described in this Section ready for new construction.

1.2 REFERENCE  
STANDARDS

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

1.3 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of HVAC items from existing construction including removal of ductwork, fans, grilles, diffusers, duct insulation and HVAC controls taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.

1.3 DEFINITIONS  
(Cont'd)

- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Scheduling: Account for Owner's continued occupancy requirements during selective demolition.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with the following
- .1 Provincial/Territorial Workers' Compensation Boards/Commissions
  - .2 Provincial/Territorial Occupational Health and Safety Standards and Programs

1.6 SITE CONDITIONS

- .1 Existing Conditions: Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination before tendering.
- .2 Existing Hazardous Substances: Owner performed a hazardous substances assessment and it is not expected that hazardous substances will be encountered in the Work.
- .3 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in the Work; immediately notify Representative if materials suspected of containing hazardous substances are encountered and perform the following activities:
- .1 Refer to Section 01 41 00 - Regulatory Requirements for directives associated with specific material types.
  - .2 Hazardous substances will be as defined in the Hazardous Products Act.
  - .3 Stop work in the area of the suspected hazardous substances.

- 1.6 SITE CONDITIONS .3 (Cont'd)  
(Cont'd)
- .4 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.
  - .5 Hazardous substances will be removed by Representative under a separate contract or as a change to the Work.
  - .6 Proceed only after written instructions have been received from Representative.

PART 2 - PRODUCTS

- 2.1 REPAIR MATERIAL .1 HVAC Repair Materials: Use only new materials required for completion or repair matching materials damaged during performance of work of this Section; new materials are required to meet assembly or system characteristics as existing systems indicated to remain and carry CSA approval labels required by the Authority Having Jurisdiction.
- .2 Firestopping Repair Materials: Use firestopping materials compatible with existing firestopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.
- 2.2 (SALVAGE AND) DEBRIS MATERIALS .1 Material Ownership: Demolished materials become Contractor's property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain Owner's property.
- .2 Salvaged Materials: Carefully remove materials designated for salvage and store in a manner to prevent damage or devaluation of materials.

PART 3 - EXECUTION

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

3.2 PREPARATION

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

3.3 EXECUTION

- .1 Demolition and Removal: Coordinate requirements of this Section with information contained in Section 02 41 16 as follows:
  - .1 An Indoor Air Quality (IAQ) Management Plan shall be implemented during construction. The plan shall conform to the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) Standard IAQ Guidelines for Occupied Buildings Under Construction. Measures to include, but are not limited to, HVAC systems protection, source control, pathway interruption, housekeeping and scheduling.
  - .2 Do not disrupt active or energized utilities without approval of the Representative.
  - .3 Erect and maintain dust proof and weather tight partitions to prevent the spread of dust and fumes to occupied building areas; remove partitions when complete.
  - .4 Demolish parts of existing building to accommodate new construction and remedial work as indicated.
  - .5 At end of each day's work, leave worksite in safe condition.
  - .6 Perform demolition work in a neat and workmanlike manner:



3.3 EXECUTION  
(Cont'd)

.1 (Cont'd)

.6 (Cont'd)

.1 Remove any tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.

.2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.

.7 Carefully remove existing building automation system devices (thermostats, temperature sensors, etc.) installed in assemblies to be demolished and keep active and tie up to associated VAV box or controller.

3.4 CLOSEOUT  
ACTIVITIES

.1

Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) except where explicitly noted otherwise for materials being salvaged for re use in new construction.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section includes:
  - .1 Bronze - valves.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME).
  - .1 ANSI/ASME B1.20.1-2013 Pipe Threads, General Purpose (Inch).
  - .2 ANSI/ASME B16.18-2012, Cast Copper Alloy Solder Joint Pressure Fittings.
- .2 ASTM International.
  - .1 ASTM A 276-17, Standard Specification for Stainless Steel Bars and Shapes.
  - .2 ASTM B 62-17, Standard Specification for Composition Bronze or Ounce Metal Castings.
  - .3 ASTM B 283-13, Standard Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).
  - .4 ASTM B 505/B 505M-14, Standard Specification for Copper-Base Alloy Continuous Castings.
- .3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
  - .1 MSS-SP-25-Latest Edition, Standard Marking System for Valves, Fittings, Flanges and Unions.
  - .2 MSS-SP-80-Latest Edition, Bronze Gate Globe, Angle and Check Valves.
  - .3 MSS-SP-110-Latest Edition, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product Data:
  - .1 Submit WHMIS MSDS - Material Safety Data Sheets.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into Operation and Maintenance Manual.

- 1.5 DELIVERY,  
STORAGE AND  
HANDLING
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .2 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Valves:
    - .1 Except for speciality valves, to be single manufacturer.
    - .2 Products to have CRN registration numbers.
  - .2 End Connections:
    - .1 Connection into adjacent piping/tubing:
      - .1 Steel pipe systems: screwed ends to ANSI/ASME B1.20.1.
      - .2 Copper tube systems: solder ends to ANSI/ASME B16.18.
  - .3 Ball Valves:
    - .1 NPS 2 and under:
      - .1 Body and cap: cast high tensile bronze to ASTM B 62.
      - .2 Pressure rating: Class 125.
      - .3 Connections: screwed ends to ANSI B1.20.1 and with hexagonal shoulders solder ends to ANSI.
      - .4 Stem: tamper-proof ball drive.
      - .5 Stem packing nut: external to body.
      - .6 Ball and seat: replaceable stainless steel solid ball and Teflon seats.
      - .7 Stem seal: TFE with external packing nut.
      - .8 Operator: removable lever handle.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Remove internal parts before soldering.
  - .2 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance, and equipment removal.

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society of Mechanical Engineers (ASME).
  - .1 ASME B31.1-2016, Power Piping.
- .2 ASTM International.
  - .1 ASTM A 125-96(2013)e1, Standard Specification for Steel Springs, Helical, Heat-Treated.
  - .2 ASTM A 307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - .3 ASTM A 563-15, Standard Specification for Carbon and Alloy Steel Nuts.
- .3 Factory Mutual (FM).
- .4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS).
  - .1 MSS SP 58-2009, Pipe Hangers and Supports - Materials, Design and Manufacture.
  - .2 MSS SP 69-2003, Pipe Hangers and Supports - Selection and Application.
  - .3 MSS SP 89-2003-Latest Edition, Pipe Hangers and Supports - Fabrication and Installation Practices.
- .5 Underwriter's Laboratories of Canada (ULC).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Shop Drawings:
  - .1 Submit shop drawings for:
    - .1 Bases, hangers and supports.
    - .2 Connections to equipment and structure.
    - .3 Structural assemblies.
- .3 Manufacturers' Instructions:
  - .1 Provide manufacturer's installation instructions.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into Operation and Maintenance Manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

- 1.4 DELIVERY,  
STORAGE AND  
HANDLING  
(Cont'd)
- .2 Delivery and Acceptance Requirements:
    - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

PART 2 - PRODUCTS

- 2.1 SYSTEM  
DESCRIPTION
- .1 Design Requirements:
    - .1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
    - .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1-2016 or MSS SP 58-2009.
    - .3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
    - .4 Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
    - .5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP 58-2009.
- 2.2 GENERAL
- .1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1-2016 and MSS SP 58.
  - .2 Use components for intended design purpose only. Do not use for rigging or erection purposes.
- 2.3 PIPE HANGERS
- .1 Finishes:
    - .1 Pipe hangers and supports: No finish for steel piping.
    - .2 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated.
  - .2 Upper attachment structural: suspension from lower flange of I-Beam:
    - .1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut.
      - .1 Rod: 9 mm UL listed 13 mm FM approved.
-

2.3 PIPE HANGERS  
(Cont'd)

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- .2 (Cont'd)
    - .2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed to MSS-SP 58 and MSS-SP 69-2003.
  - .3 Upper attachment structural: suspension from upper flange of I-Beam:
    - .1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed to MSS SP 69.
    - .2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed FM approved.
  - .4 Upper attachment to concrete:
    - .1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.
    - .2 Concrete inserts: wedge shaped body with knockout protector plate UL listed to MSS SP 69.
  - .5 Shop and field-fabricated assemblies:
    - .1 Trapeze hanger assemblies:.
    - .2 Steel brackets:.
  - .6 Hanger rods: threaded rod material to MSS SP 58:
    - .1 Ensure that hanger rods are subject to tensile loading only.
    - .2 Provide linkages where lateral or axial movement of pipework is anticipated.
    - .3 Do not use 22 mm or 28 mm rod.
  - .7 Pipe attachments: material to MSS SP 58:
    - .1 Attachments for steel piping: carbon steel black.
    - .2 Attachments for copper piping: copper plated black steel.
    - .3 Use insulation shields for hot pipework.
    - .4 Oversize pipe hangers and supports.
  - .8 Adjustable clevis: material to MSS SP 69 UL listed, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
    - .1 Ensure "U" has hole in bottom for rivetting to insulation shields.
  - .9 U-bolts: carbon steel to MSS SP 69 with 2 nuts at each end to ASTM A 563-15.
    - .1 Finishes for steel pipework: black.
-

- 
- 2.3 PIPE HANGERS  
(Cont'd)
- .9 (Cont'd)  
.2 Finishes for copper, glass, brass or aluminum pipework: black, with formed portion plastic coated.
- 2.4 RISER CLAMPS
- .1 Steel or cast iron pipe: black carbon steel to MSS SP 58, type 42, UL listed.
- .2 Copper pipe: carbon steel copper plated to MSS SP 58, type 42.
- .3 Bolts: to ASTM A 307-14e1.
- .4 Nuts: to ASTM A 563-15.
- 2.5 INSULATION  
PROTECTION SHIELDS
- .1 Insulated cold piping:  
.1 64 kg/m<sup>3</sup> density insulation plus insulation protection shield to: MSS SP 69, galvanized sheet carbon steel. Length designed for maximum 3 m span.
- .2 Insulated hot piping:  
.1 Curved plate 300 mm long, with edges turned up, welded-in centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP 69.
- 2.6 EQUIPMENT  
SUPPORTS
- .1 Fabricate interior equipment supports not provided by equipment manufacturer from structural grade steel.
- .2 Fabricate exterior equipment supports not provided by equipment manufacturer from aluminum or stainless steel. Use stainless steel fasteners.
- 2.7 EQUIPMENT  
ANCHOR BOLTS AND  
TEMPLATES
- .1 Provide templates to ensure accurate location of anchor bolts.
- 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 in accordance with:
  - .1 Manufacturer's instructions and recommendations.
  - .2 Clamps on riser piping:
    - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
    - .2 Bolt-tightening torques to industry standards.
  - .3 Clevis plates:
    - .1 Attach to concrete with 4 minimum concrete inserts, one at each corner.
  - .4 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.3 HANGER SPACING

- .1 Plumbing piping: to Canadian Plumbing Code.
- .2 Fire protection: to applicable fire code.
- .3 Copper piping: up to NPS 1/2: every 1.5 m.
- .4 Flexible joint roll groove pipe: in accordance with table below for steel, but not less than one hanger at joints. Table listings for straight runs without concentrated loads and where full linear movement is not required.

- .5 Within 300 mm of each elbow.

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

3.4 HANGER  
INSTALLATION

- .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.



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- 3.4 HANGER  
INSTALLATION  
(Cont'd)
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.
- 
- 3.5 HORIZONTAL  
MOVEMENT
- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.
- .2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.
- 
- 3.6 FINAL  
ADJUSTMENT
- .1 Adjust hangers and supports:  
.1 Ensure that rod is vertical under operating conditions.  
.2 Equalize loads.
- .2 Adjustable clevis:  
.1 Tighten hanger load nut securely to ensure proper hanger performance.  
.2 Tighten upper nut after adjustment.
- .3 C-clamps:  
.1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
- .4 Beam clamps:  
.1 Hammer jaw firmly against underside of beam.
- 
- 3.7 CLEANING
- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-1.60-Latest Edition, Interior Alkyd Gloss Enamel.
  - .2 CAN/CGSB-24.3-92, Identification of Piping Systems.
- .2 National Fire Protection Association (NFPA).
  - .1 NFPA 13-2019, Standard for the Installation of Sprinkler Systems.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product data to include paint colour chips, other products specified in this section.
- .3 Samples:
  - .1 Samples to include nameplates, labels, tags, lists of proposed legends.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
  - .1 Dispose of unused paint coating material at official hazardous material collections site approved by Departmental Representative.
  - .2 Do not dispose of unused paint coating material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

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



2.3 EXISTING  
IDENTIFICATION  
SYSTEMS

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

2.4 PIPING SYSTEMS  
GOVERNED BY CODES

- .1 Identification:
  - .1 Sprinklers: to NFPA 13.

2.5 IDENTIFICATION  
OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3-92 except where specified otherwise.
- .2 Pictograms:
  - .1 Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.
- .3 Legend:
  - .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3-92.
- .4 Arrows showing direction of flow:
  - .1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.
  - .2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.
  - .3 Use double-headed arrows where flow is reversible.
- .5 Extent of background colour marking:
  - .1 To full circumference of pipe or insulation.
  - .2 Length to accommodate pictogram, full length of legend and arrows.
- .6 Materials for background colour marking, legend, arrows:
  - .1 Pipes and tubing 20 mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.
  - .2 Other pipes: pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.

2.5 IDENTIFICATION  
OF PIPING SYSTEMS  
(Cont'd)

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

<u>Background colour:</u>	<u>Legend, arrows:</u>
Yellow	BLACK
Green	WHITE
Red	WHITE

- .3 Background colour marking and legends for piping systems:

<u>Contents</u>	<u>Background colour</u>	<u>Legend</u>
Domestic hot water supply	Green	DOM. HW SUPPLY
Domestic cold water supply	Green	DOM. CWS
Domestic hot water recirculation	Green	DOM. HW CIRC
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT
Sprinklers	Red	SPRINKLER

2.6 IDENTIFICATION  
DUCTWORK SYSTEMS

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

2.7 VALVES,  
CONTROLLERS

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

2.8 CONTROLS  
COMPONENTS  
IDENTIFICATION

- .1 Identify all systems, equipment, components, controls, sensors with system nameplates.  
.2 Inscriptions to include function and (where appropriate) fail-safe position.

2.9 LANGUAGE .1 Identification in English.

PART 3 - EXECUTION

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

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

3.3 INSTALLATION .1 Perform work in accordance with CAN/CGSB-24.3-92 except as specified otherwise.  
.2 Provide ULC and or CSA registration plates as required by respective agency.  
.3 Identify systems, equipment to conform to PWGSC PMSS.

3.4 NAMEPLATES .1 Locations:  
.1 In conspicuous location to facilitate easy reading and identification from operating floor.  
.2 Standoffs:  
.1 Provide for nameplates on hot and/or insulated surfaces.  
.3 Protection:  
.1 Do not paint, insulate or cover.

3.5 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: at not more than 17 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.  
.2 Adjacent to each change in direction.  
.3 At least once in each small room through which piping or ductwork passes.

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3.5 LOCATION OF  
IDENTIFICATION ON  
PIPING AND DUCTWORK  
SYSTEMS  
(Cont'd)

- .4 On both sides of visual obstruction or where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.
- .6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.
- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.
- .9 Identification easily and accurately readable from usual operating areas and from access points.
  - .1 Position of identification approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.6 VALVES,  
CONTROLLERS

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

3.7 CLEANING

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 QUALIFICATIONS  
OF TAB PERSONNEL

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



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- 1.2 QUALIFICATIONS OF TAB PERSONNEL (Cont'd) .8 (Cont'd)  
.2 Where new procedures, and requirements, are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC, NEBB, or TABB), requirements and recommendations contained in these procedures and requirements are mandatory.
- 1.3 PURPOSE OF TAB .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads  
.2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.  
.3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.
- 1.4 EXCEPTIONS .1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction.
- 1.5 CO-ORDINATION .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.  
.2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.
- 1.6 PRE-TAB REVIEW .1 Review contract documents before project construction is started and confirm in writing to Departmental Representative adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.  
.2 Review specified standards and report to Departmental Representative in writing proposed procedures which vary from standard.
-

- 
- 1.6 PRE-TAB REVIEW (Cont'd) .3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.
- 1.7 START-UP .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in Division 23.
- 1.8 OPERATION OF SYSTEMS DURING TAB .1 Operate systems for length of time required for TAB and as required by Departmental Representative for verification of TAB reports.
- 1.9 START OF TAB .1 Notify Departmental Representative 7 days prior to start of TAB.
- .2 Start TAB when building is essentially completed, including:
- .3 Installation of ceilings, doors, windows, other construction affecting TAB.
- .4 Application of weatherstripping, sealing, and caulking.
- .5 Pressure, leakage, other tests specified elsewhere Division 23.
- .6 Provisions for TAB installed and operational.
- .7 Start-up, verification for proper, normal and safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:
- .1 Proper thermal overload protection in place for electrical equipment.
- .2 Air systems:
- .1 Filters in place, clean.
- .2 Duct systems clean.
- .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
- .4 Correct fan rotation.
- .5 Fire, smoke, volume control dampers installed and open.
- .6 Coil fins combed, clean.
- .7 Access doors, installed, closed.
-

- 
- 1.9 START OF TAB .7 (Cont'd)  
(Cont'd)
- .2 (Cont'd)
- .8 Outlets installed, volume control dampers open.
- .3 Liquid Systems:
- .1 Flushed, filled, vented.
- .2 Correct Pump Rotation.
- .3 Strainers in place, baskets, clean.
- .4 Isolating and balancing valves.
- .5 Calibrated balancing valves installed, at factory settings.
- 
- 1.10 APPLICATION .1 Do TAB to following tolerances of design values:  
TOLERANCES
- .1 HVAC systems: plus 5%, minus 5%.
- 
- 1.11 ACCURACY .1 Measured values accurate to within plus or minus 2 %  
TOLERANCES of actual values.
- 
- 1.12 INSTRUMENTS .1 Prior to TAB, submit to Departmental Representative  
list of instruments used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within 3 months of TAB. Provide certificate of calibration to Departmental Representative.
- 
- 1.13 ACTION AND .1 Submit, prior to commencement of TAB:  
INFORMATIONAL  
SUBMITTALS .2 Proposed methodology and procedures for performing TAB if different from referenced standard.
- 
- 1.14 PRELIMINARY .1 Submit for checking and approval of Departmental  
TAB REPORT Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
- .1 Details of instruments used.
- .2 Details of TAB procedures employed.
- .3 Calculations procedures.
- .4 Summaries.
-

- 
- 1.15 TAB REPORT .1 TAB report to show results in SI units and to include:  
.1 Project record drawings.  
.2 System schematics.
- .2 Submit 3 copies of TAB Report to Departmental Representative for verification and approval, in English in D-ring binders, complete with index tabs.
- 1.16 VERIFICATION .1 Reported results subject to verification by Departmental Representative.
- .2 Provide personnel and instrumentation to verify up to 30% of reported results.
- .3 Number and location of verified results as directed by Departmental Representative.
- .4 Pay costs to repeat TAB as required to satisfaction of Departmental Representative.
- 1.17 SETTINGS .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.
- .2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.
- 1.18 COMPLETION OF TAB .1 TAB considered complete when final TAB Report received and approved by Departmental Representative.
- 1.19 AIR SYSTEMS .1 Standard: TAB to most stringent of TAB standards of AABC NEBB SMACNA ASHRAE.
- .2 Do TAB of following systems, equipment, components, controls:  
.1 Ventilation System.
- .3 Qualifications: personnel performing TAB qualified to standards of AABC or NEBB.
- .4 Quality assurance: perform TAB under direction of supervisor qualified to standards of AABC or NEBB.
-

1.19 AIR SYSTEMS  
(Cont'd)

- .5 Measurements: to include as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage.
- .6 Locations of equipment measurements: to include as appropriate:
  - .1 Inlet and outlet of dampers, filter, coil, humidifier, fan, other equipment causing changes in conditions.
  - .2 At controllers, controlled device.
- .7 Locations of systems measurements to include as appropriate: main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

1.20 OTHER TAB  
REQUIREMENTS

- .1 General requirements applicable to work specified this paragraph:
  - .1 Qualifications of TAB personnel: as for air systems specified this section.
  - .2 Quality assurance: as for air systems specified this section.
- .2 Smoke management systems:
  - .1 Test for proper operation of all smoke and fire dampers, sensors, detectors, installed as component parts of air systems specified Division 23.
  - .2 Emergency evacuation: see post-occupancy TAB activities specified below.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 REFERENCE  
STANDARDS

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
  - .1 ANSI/ASHRAE/IESNA 90.1-16, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .2 ASTM International (ASTM)
  - .1 ASTM B 209M-14, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
  - .2 ASTM C 335-17, Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
  - .3 ASTM C 411-19, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
  - .4 ASTM C 449/C 449M-07 (2019), Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
  - .5 ASTM C 547-19, Standard Specification for Mineral Fiber Pipe Insulation.
  - .6 ASTM C 553-13 (2019), Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
  - .7 ASTM C 612-2019, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
  - .8 ASTM C 795-08 (2018), Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
  - .9 ASTM C 921-10 (2015), Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
  - .1 CGSB 51-GP-52Ma-89, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
- .4 Green Seal Environmental Standards (GSES)
  - .1 Standard GS-36-13, Commercial Adhesives.
- .5 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.
- .6 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (2005).
- .7 Underwriters Laboratories of Canada (ULC)

- 
- 1.1 REFERENCE STANDARDS  
(Cont'd)
- .7 (Cont'd)
- .1 CAN/ULC-S102-18, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .2 CAN/ULC-S701-17, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- 1.2 DEFINITIONS
- .1 For purposes of this section:
- .1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.
- .2 "EXPOSED" - means "not concealed" as previously defined.
- .3 Insulation systems - insulation material, fasteners, jackets, and other accessories.
- .2 TIAC Codes:
- .1 CRD: Code Round Ductwork,
- .2 CRF: Code Rectangular Finish.
- 1.3 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product Data:
- .1 Provide manufacturer's printed product literature and datasheets for duct insulation, and include product characteristics, performance criteria, physical size, finish and limitations.
- .1 Description of equipment giving manufacturer's name, type, model, year and capacity.
- .2 Details of operation, servicing and maintenance.
- .3 Recommended spare parts list.
- .3 Manufacturers' Instructions:
- .1 Provide manufacturer's written duct insulation jointing recommendations. and special handling criteria, installation sequence, cleaning procedures.
- 1.4 QUALITY ASSURANCE
- .1 Qualifications:
- .1 Installer: specialist in performing work of this section, and have at least 3 years successful experience in this size and type of project, qualified to standards member of TIAC.
-

- 1.5 DELIVERY,  
STORAGE AND  
HANDLING
- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address and ULC markings.
  - .2 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials.

PART 2 - PRODUCTS

- 2.1 FIRE AND SMOKE  
RATING
- .1 To CAN/ULC-S102:
    - .1 Maximum flame spread rating: 25.
    - .2 Maximum smoke developed rating: 50.

- 2.2 INSULATION
- .1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.
  - .2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C 335.
  - .3 TIAC Code C-1: Rigid mineral fibre board to ASTM C 612, with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this Section).
  - .4 TIAC Code C-2: Mineral fibre blanket to ASTM C 553 faced with factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this section).
    - .1 Mineral fibre: to ASTM C 553.
    - .2 Jacket: to CGSB 51-GP-52Ma.
    - .3 Maximum "k" factor: to ASTM C 553.

- 2.3 ACCESSORIES
- .1 Vapour retarder lap adhesive:
    - .1 Water based, fire retardant type, compatible with insulation.
      - .1 Maximum VOC limit 200 g/L to SCAQMD Rule 1168.
  - .2 Indoor Vapour Retarder Finish:
    - .1 Vinyl emulsion type acrylic, compatible with insulation.
  - .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449.
-



2.3 ACCESSORIES

(Cont'd)

- .4 ULC Listed Canvas Jacket:
  - .1 220 gm/m<sup>2</sup> cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C 921.
- .5 Outdoor Vapour Retarder Mastic:
  - .1 Vinyl emulsion type acrylic, compatible with insulation.
  - .2 Reinforcing fabric: Fibrous glass, untreated 305 g/m<sup>2</sup>.
- .6 Tape: self-adhesive, aluminum, plain, 50mm wide minimum.
- .7 Contact adhesive: quick-setting
  - .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.
- .8 Canvas adhesive: washable.
  - .1 Maximum VOC limit 250 g/L to SCAQMD Rule 1168.
- .9 Tie wire: 1.5 mm stainless steel.
- .10 Banding: 12 mm wide, 0.5 mm thick stainless steel.
- .11 Facing: 25 mm stainless steel hexagonal wire mesh stitched on one face of insulation.
- .12 Fasteners: 2 mm diameter pins with 35 mm diameter clips, length to suit thickness of insulation.

PART 3 - EXECUTION3.1 APPLICATION

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

3.2  
PRE-INSTALLATION  
REQUIREMENTS

- .1 Ensure surfaces are clean, dry, free from foreign material.

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
  - .2 Apply materials in accordance with manufacturers instructions and as indicated.
-

3.3 INSTALLATION  
 (Cont'd)

- .3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
  - .1 Ensure hangers, and supports are outside vapour retarder jacket.
- .5 Hangers and supports in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
  - .1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.
- .6 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side.
- .7 Repair and retape any existing duct insulation where required.

3.4 DUCTWORK  
 INSULATION SCHEDULE

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

	TIAC Code	Vapour Retarder	Thickness (mm)
Rectangular cold and dual temperature supply air ducts	C-2	yes	25
Round cold and dual temperature supply air ducts	C-2	yes	25

- .2 Exposed round ducts 600 mm and larger, smaller sizes where subject to abuse:
  - .1 Use TIAC code C-1 insulation, scored to suit diameter of duct.
    - .1 Finishes: conform to following table:

TIAC Code	Round	
Rectangular		
Indoor, concealed	none	none

3.5 CLEANING .1 Remove surplus materials, excess materials, rubbish,  
tools and equipment.

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
  - .1 ASHRAE Standard 90.1-Latest Edition, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).
- .2 American Society for Testing and Materials International (ASTM)
  - .1 ASTM B 209M-2014, Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate Metric.
  - .2 ASTM C 335-2010, Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
  - .3 ASTM C 411-2011, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
  - .4 ASTM C 449/C 449M-2013, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
  - .5 ASTM C 547-15, Mineral Fiber Pipe Insulation.
  - .6 ASTM C 795-13, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
  - .7 ASTM C 921-15, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
- .3 Canadian General Standards Board (CGSB)
  - .1 CGSB 51-GP-52Ma-1989, Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
  - .2 CAN/CGSB-51.53-95, Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- .4 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
  - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 Manufacturer's Trade Associations

1.1 REFERENCES  
(Cont'd)

- .6 (Cont'd)
  - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-2010, Surface Burning Characteristics of Building Materials and Assemblies.
  - .2 CAN/ULC-S701-2011, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .3 CAN/ULC-S702-2014, Thermal Insulation, Mineral Fibre, for Buildings
  - .4 CAN/ULC-S702.2-2015, Thermal Insulation for Buildings, Part 2: Mineral Fibre, for Application Guidelines.

1.2 DEFINITIONS

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
  - .2 Product Data:
    - .1 Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria, and limitations.
      - .1 Submit one copy of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
  - .3 Quality assurance submittals: submit following:
    - .1 Instructions: submit manufacturer's installation instructions.
-

1.4 QUALITY  
ASSURANCE

- .1 Qualifications:
- .2 Installer: specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project, qualified to standards or member of TIAC.

1.5 DELIVERY,  
STORAGE AND  
HANDLING

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

PART 2 - PRODUCTS

2.1 FIRE AND SMOKE  
RATING

- .1 In accordance with CAN/ULC-S102-2010.
  - .1 Maximum flame spread rating: 25.
  - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

- .1 Mineral fibre specified includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C 335-2010.

2.2 INSULATION  
(Cont'd)

- .3 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.
  - .1 Mineral fibre: to CAN/ULC-S702-2014 and ASTM C 547-15-2015.
  - .2 Jacket: to CGSB 51-GP-52Ma.
  - .3 Maximum "k" factor: to CAN/ULC-S702-2014.

2.3 INSULATION  
SECUREMENT

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

2.4 CEMENT

- .1 Thermal insulating and finishing cement:
  - .1 Hydraulic setting or Air drying on mineral wool, to ASTM C 449/C 449M-2013.

2.5 VAPOUR RETARDER  
LAP ADHESIVE

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

2.6 INDOOR VAPOUR  
RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 JACKETS

- .1 Polyvinyl Chloride (PVC):
  - .1 One-piece moulded type and sheet to CAN/CGSB-51.53-95 with pre-formed shapes as required.
  - .2 Colours: to match existing jacketing.
  - .3 Minimum service temperatures: -20 degrees C.
  - .4 Maximum service temperature: 65 degrees C.
  - .5 Moisture vapour transmission: 0.02 perm.
  - .6 Thickness: 0.55 mm.
  - .7 Fastenings:
    - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
    - .2 Tacks.
    - .3 Pressure sensitive vinyl tape of matching colour.

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  
PRE-INSTALLATION  
REQUIREMENT

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.
- .2 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturers instructions and this specification.
- .3 Use two layers with staggered joints when required nominal wall thickness exceeds 75 mm.
- .4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
  - .1 Install hangers, supports outside vapour retarder jacket.
- .5 Supports, Hangers:
  - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.
- .6 Repair and retape existing pipe insulation where required. Install new insulation on any existing uninsulated pipe.

3.4 PIPING  
INSULATION  
SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 TIAC Code: A-3.
  - .1 Securements: Tape at 300 mm on centre.
  - .2 Seals: VR lap seal adhesive, VR lagging adhesive.
  - .3 Installation: TIAC Code: 1501-C.
- .3 Thickness of insulation as listed in following table.



3.4 PIPING INSULATION SCHEDULES (Cont'd) .3 (Cont'd)  
 .1 Run-outs to individual units and equipment not exceeding 4000 mm long.  
 .2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

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

.4 Finishes:  
 .1 Exposed indoors: PVC jacket.  
 .2 Exposed in mechanical rooms: PVC jacket.  
 .3 Concealed, indoors: canvas on valves, fittings.  
 No further finish.  
 .4 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.  
 .5 Finish attachments: SS screws or bands, at 150 mm on centre. Seals: wing or closed.  
 .6 Installation: to appropriate TIAC code CRF/1 through CPF/5.

3.5 CLEANING .1 Proceed in accordance with Section 01 74 10 -  
 Cleaning.  
 .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
  - .1 ASTM E 202-2012, Standard Test Methods for Analysis of Ethylene Glycols and Propylene Glycols.

1.2 POTABLE WATER SYSTEMS

- .1 When cleaning is completed and system filled:
  - .1 Verify performance of equipment and systems as specified elsewhere in Division 23.
  - .2 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or recharge air chambers. Repeat for each outlet and flush valve.
  - .3 Confirm water quality consistent with supply standards, verifying that no residuals remain resulting from flushing and/or cleaning.

1.3 WET AND DRY PIPE SPRINKLER SYSTEM, STANDPIPE AND HOSE SYSTEMS

- .1 Cleaning, testing, start-up, performance verification of equipment, systems, components, and devices is specified elsewhere in Division 23.
- .2 Verification of controls, detection devices, alarm devices is specified Division 26.
- .3 Demonstrate that fire hose will reach to most remote location regardless of partitions, and obstructions.
- .4 Verify operation of interlocks between HVAC systems and fire alarm systems.

1.4 SANITARY AND STORM DRAINAGE SYSTEMS

- .1 Ensure that traps are fully and permanently primed.
- .2 Ensure that fixtures are properly anchored, connected to system.
- .3 Operate flush valves, tank and operate each fixture to verify drainage and no leakage.
- .4 Cleanouts: Refer to Section 22 42 01 - Plumbing Specialities and Accessories.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 REFERENCES

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
- .2 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM A 480/A 480M-19a, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
  - .2 ASTM A 635/A 635M-15, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot Rolled.
  - .3 ASTM A 653/A 653M-19a, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- .3 Department of Justice Canada (Jus).
  - .1 Canadian Environmental Protection Act (CEPA), Latest Edition, c. 33.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .5 National Fire Protection Association (NFPA).
  - .1 NFPA 90A-18, Standard for the Installation of Air-Conditioning and Ventilating Systems.
  - .2 NFPA 90B-18, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
- .6 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
  - .1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, Latest Edition and Addendum No. 1, Latest Edition.
  - .2 SMACNA HVAC Air Duct Leakage Test Manual, Latest Edition.
  - .3 IAQ Guideline for Occupied Buildings Under Construction Latest Edition.
- .7 Transport Canada (TC).
  - .1 Transportation of Dangerous Goods Act (TDGA), Latest Edition, c. 34.

1.3 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials for the following:
  - .1 Sealants.
  - .2 Tape.
  - .3 Proprietary Joints.
- .3 Submit Indoor Air Quality (IAQ) Management Plan.

1.4 QUALITY  
ASSURANCE

- .1 Certification of Ratings:
  - .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.
- .2 Indoor Air Quality (IAQ) Management Plan.
  - .1 Develop and implement an Indoor Air Quality (IAQ) Management Plan for construction.
  - .2 During construction meet or exceed the requirements of SMACNA IAQ Guideline for Occupied Buildings under Construction.

1.5 DELIVERY,  
STORAGE AND  
HANDLING

- .1 Protect on site stored or installed absorptive material from moisture damage.

PART 2 - PRODUCTS

2.1 SEAL  
CLASSIFICATION

- .1 Classification as follows:

Maximum Pressure Pa	SMACNA Seal Class
500	C
250	C
125	C
- .2 Seal classification:
  - .1 Class A: longitudinal seams, transverse joints, duct wall penetrations and connections made airtight with sealant and tape.
  - .2 Class B: longitudinal seams, transverse joints and connections made airtight with sealant, tape or combination thereof.
  - .3 Class C: transverse joints and connections made air tight with gaskets, sealant, tape or combination

2.1 SEAL  
CLASSIFICATION  
(Cont'd)

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thereof. Longitudinal seams unsealed.

2.2 SEALANT

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

2.3 TAPE

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

2.4 DUCT LEAKAGE

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

2.5 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows.
  - .1 Rectangular: standard radius. Centreline radius: 1.5 times width of duct.
  - .2 Round: five piece. Centreline radius: 1.5 times diameter.
- .3 Mitred elbows, rectangular:
  - .1 To 400 mm: with single thickness turning vanes.
  - .2 Over 400 mm: with double thickness turning vanes.
- .4 Branches:
  - .1 Rectangular main and branch: with radius on branch 1.5 times width of duct 45 degrees entry on branch.
  - .2 Round main and branch: enter main duct at 45 degrees with conical connection.
  - .3 Provide volume control damper in branch duct near connection to main duct.
  - .4 Main duct branches: with splitter damper.
- .5 Transitions:
  - .1 Diverging: 20 degrees maximum included angle.
  - .2 Converging: 30degrees maximum included angle.
- .6 Offsets:
  - .1 Full radiused elbows.

2.5 FITTINGS  
(Cont'd)

- .7 Obstruction deflectors: maintain full cross-sectional area.
  - .1 Maximum included angles: as for transitions.

2.6 FIRE STOPPING

- .1 Retaining angles around duct, on both sides of fire separation in accordance with Section 07 84 00 - Firestopping.
- .2 Fire stopping material and installation must not distort duct.

2.7 GALVANIZED STEEL

- .1 Lock forming quality: to ASTM A 653/A 653M-15e1, Z90 zinc coating.
- .2 Thickness, fabrication and reinforcement: to SMACNA.
- .3 Joints: to SMACNA proprietary manufactured duct joint. Proprietary manufactured flanged duct joint to be considered to be a class A seal.

2.8 HANGERS AND SUPPORTS

- .1 Hangers and Supports: in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
  - .1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct.
    - .1 Maximum size duct supported by strap hanger: 500.
  - .2 Hanger configuration: to ASHRAE and SMACNA.
  - .3 Hangers: black steel angle with black steel rods to the following table:

Duct Size (mm)	Angle Size (mm)	Rod Size (mm)
up to 750	25 x 25 x 3	6
751 to 1050	40 x 40 x 3	6
1051 to 1500	40 x 40 x 3	10
1501 to 2100	50 x 50 x 3	10
2101 to 2400	50 x 50 x 5	10
2401 and over	50 x 50 x 6	10

- .4 Upper hanger attachments:
  - .1 For concrete: manufactured concrete inserts.
  - .2 For steel joist: manufactured joist clamp.
  - .3 For steel beams: manufactured beam clamps:

PART 3 - EXECUTION

3.1 GENERAL

- .1 Do work in accordance with SMACNA.
- .2 Do not break continuity of insulation vapour barrier with hangers or rods.
  - .1 Insulate strap hangers 100 mm beyond insulated duct.
- .3 Support risers in accordance with SMACNA.
- .4 Install breakaway joints in ductwork on sides of fire separation.
- .5 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.
- .6 Manufacture duct in lengths and diameter to accommodate installation of acoustic duct lining.
- .7 Provide all necessary offsets to complete installation of ductwork. Drawings may not indicate all necessary offsets.
- .8 Cover all open ends of ductwork during construction to prevent dust and debris from entering duct. Clean ductwork after construction is complete.

3.2 HANGERS

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

<u>Duct Size</u> (mm)	<u>Spacing</u> (mm)
to 1500	3000
1501 and over	2500

3.3 WATERTIGHT DUCT

- .1 Provide watertight duct for:
  - .1 Exhaust air duct within 3 m of discharge.
  - .2 As indicated.
- .2 Form bottom of horizontal duct without longitudinal seams.
  - .1 Solder weld joints of bottom and side sheets.
  - .2 Seal other joints with duct sealer.



3.4 SEALING AND  
TAPING

- .1 Apply sealant to outside of joint to manufacturer's recommendations.
- .2 Bed tape in sealant and recoat with minimum of one coat of sealant to manufacturers recommendations.
- .3 Test section minimum of 30 m long with not less than three branch takeoffs and two 90 degrees elbows.
- .4 Complete test before performance insulation or concealment Work.

PART 1 - GENERAL1.1 RELATED  
SECTIONS

- .1 Section 02 81 01 - Hazardous Materials.

1.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
  - .1 Material Safety Data Sheets (MSDS).
- .2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
  - .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible, Latest Edition.

1.3 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Provide shop drawing submittals for products specified in this section.
  - .2 Product Data:
    - .1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:
      - .1 Flexible connections.
      - .2 Duct access doors.
      - .3 Turning vanes.
      - .4 Instrument test ports.
    - .2 Submit WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials.
  - .3 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
    - .1 Certification of ratings: catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.
  - .4 Instructions: submit manufacturer's installation instructions.
  - .5 Closeout submittals: submit maintenance and engineering data for incorporation into Operation and Maintenance Manual.
-

- 1.4 DELIVERY,  
STORAGE AND  
HANDLING
- .1 Waste Management and Disposal:
    - .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
    - .2 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
    - .3 Separate for reuse and recycling and place in designated containers Steel Metal Plastic waste in accordance with Waste Management Plan (WMP).
    - .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.

## PART 2 - PRODUCTS

- 2.1 GENERAL
- .1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.
- 2.2 FLEXIBLE  
CONNECTIONS
- .1 Frame: galvanized sheet metal frame 0.66 mm thick with fabric clenched by means of double locked seams.
  - .2 Material:
    - .1 Fire resistant, self extinguishing, neoprene coated glass fabric, temperature rated at minus 40 degrees C to plus 90 degrees C, density of 1.3 kg/m<sup>2</sup>.
- 2.3 ACCESS DOORS IN  
DUCTS
- .1 Non-Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame.
  - .2 Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6 mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.
  - .3 Gaskets: neoprene.
  - .4 Hardware:
    - .1 Up to 300 x 300 mm: two sash locks complete with safety chain.
    - .2 301 to 450 mm: four sash locks complete with safety chain.
-

- 2.3 ACCESS DOORS IN DUCTS (Cont'd)
- .4 (Cont'd)
  - .3 451 to 1000 mm: piano hinge and minimum two sash locks.
  - .4 Doors over 1000 mm: piano hinge and two handles operable from both sides.
  - .5 Hold open devices.
  - .6 300 x 300 mm glass viewing panels.

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

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 data sheet.

- 3.2 INSTALLATION
- .1 Flexible Connections:
    - .1 Install in following locations:
      - .1 Inlets and outlets to supply air units and fans.
      - .2 Inlets and outlets of exhaust and return air fans.
      - .3 As indicated.
    - .2 Length of connection: 100mm.
    - .3 Minimum distance between metal parts when system in operation: 75 mm.
    - .4 Install in accordance with recommendations of SMACNA.
    - .5 When fan is running:
      - .1 Ducting on sides of flexible connection to be in alignment.
      - .2 Ensure slack material in flexible connection.
  - .2 Access Doors and Viewing Panels:
    - .1 Size:
      - .1 600 x 600 mm for person size entry.
      - .2 450 x 450 mm for servicing entry.
      - .3 300 x 300 mm for viewing.
      - .4 As indicated.
    - .2 Locations:
      - .1 Fire and smoke dampers.
-

- 3.2 INSTALLATION .2 (Cont'd)  
(Cont'd) .2 (Cont'd)
- .2 Control dampers.
  - .3 Devices requiring maintenance.
  - .4 Required by code.
  - .5 Reheat coils.
  - .6 Elsewhere as indicated.
- 
- 3.3 CLEANING .1 Upon completion and verification of performance of  
installation, remove surplus materials, excess  
materials, rubbish, tools and equipment.

PART 1 - GENERAL

- 1.1 SYSTEM DESCRIPTION .1 Performance Requirements:  
.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS .1 Product Data:  
.1 Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria, and limitations.  
.1 Submit one copy of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).  
.2 Indicate following:  
.1 Capacity.  
.2 Throw and terminal velocity.  
.3 Noise criteria.  
.4 Pressure drop.  
.5 Neck velocity.  
.2 Quality assurance submittals: submit following:  
.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.  
.2 Instructions: submit manufacturer's installation instructions.
- 1.3 DELIVERY, STORAGE, AND HANDLING .1 Packing, shipping, handling and unloading:  
.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- 1.4 MAINTENANCE .1 Extra Materials:  
.1 Provide maintenance materials.  
.2 Include:  
.1 Keys for volume control adjustment.  
.2 Keys for air flow pattern adjustment.

PART 2 - PRODUCTS

- 2.1 GENERAL .1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity as indicated.
- .2 Frames:  
.1 Full perimeter gaskets.  
.2 Plaster frames where set into plaster or gypsum board and as specified.  
.3 Concealed fasteners.
- .3 Concealed manual volume control damper operators.
- .4 Colour: standard as indicated.
- 2.2 MANUFACTURED UNITS .1 Grilles, registers and diffusers of same generic type, products of one manufacturer.
- 2.3 SUPPLY GRILLES AND REGISTERS .1 General: see schedule.
- 2.4 RETURN AND EXHAUST GRILLES AND REGISTERS .1 General: see schedule.
- 2.5 DIFFUSERS .1 General: see schedule.

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 in accordance with manufacturers instructions.

3.2 INSTALLATION  
(Cont'd)

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

3.3 CLEANING

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.



PART 1 - GENERAL1.1 REFERENCE  
STANDARDS

- .1 American National Standards Institute (ANSI)/The Instrumentation, Systems and Automation Society (ISA).
    - .1 ANSI/ISA 5.5-Latest Edition, Graphic Symbols for Process Displays.
  - .2 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE).
    - .1 ANSI/IEEE 260.1-Latest Edition, American National Standard Letter Symbols Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units).
  - .3 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
    - .1 ASHRAE STD 135-Latest Edition, BACNET - Data Communication Protocol for Building Automation and Control Network.
  - .4 CSA Group (CSA).
    - .1 CAN/CSA-Z234.1-Latest Edition, Canadian Metric Practice Guide.
  - .5 Consumer Electronics Association (CEA).
    - .1 CEA-709.1-Latest Edition, Control Network Protocol Specification.
  - .6 Department of Justice Canada (Jus).
    - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
    - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
  - .7 Electrical and Electronic Manufacturers Association (EEMAC).
    - .1 EEMAC 2Y-1-Latest Edition, Light Grey Colour for Indoor Switch Gear.
  - .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
    - .1 Safety Data Sheets (SDS).
  - .9 Transport Canada (TC).
    - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
-

1.2 ABBREVIATIONS  
AND ACRONYMS

- .1 Acronyms used in EMCS:
- .1 AEL - Average Effectiveness Level
  - .2 AI - Analog Input
  - .3 AIT - Agreement on International Trade
  - .4 AO - Analog Output
  - .5 BACnet - Building Automation and Control Network.
  - .6 BC(s) - Building Controller(s).
  - .7 BECC - Building Environmental Control Centre.
  - .8 CAD - Computer Aided Design.
  - .9 CDL - Control Description Logic.
  - .10 CDS - Control Design Schematic.
  - .11 COSV - Change of State or Value.
  - .12 CPU - Central Processing Unit.
  - .13 DI - Digital Input.
  - .14 DO - Digital Output.
  - .15 DP - Differential Pressure.
  - .16 ECU - Equipment Control Unit.
  - .17 EMCS - Energy Monitoring and Control System.
  - .18 HVAC - Heating, Ventilation, Air Conditioning.
  - .19 IDE - Interface Device Equipment.
  - .20 I/O - Input/Output.
  - .21 ISA - Industry Standard Architecture.
  - .22 LAN - Local Area Network.
  - .23 LCU - Local Control Unit.
  - .24 MCU - Master Control Unit.
  - .25 NAFTA - North American Free Trade Agreement.
  - .26 NC - Normally Closed.
  - .27 NO - Normally Open.
  - .28 OS - Operating System.
  - .29 O&M - Operation and Maintenance.
  - .30 OWS - Operator Work Station.
  - .31 PC - Personal Computer.
  - .32 PCI - Peripheral Control Interface.
  - .33 PCMCIA - Personal Computer Micro-Card Interface Adapter.
  - .34 PID - Proportional, Integral and Derivative.
  - .35 RAM - Random Access Memory.
  - .36 SP - Static Pressure.
  - .37 ROM - Read Only Memory.
  - .38 TCU - Terminal Control Unit.
  - .39 USB - Universal Serial Bus.
  - .40 UPS - Uninterruptible Power Supply.
  - .41 VAV - Variable Air Volume.

1.3 DEFINITIONS

- .1 Point: may be logical or physical.
- .1 Logical points: values calculated by system such as setpoints, totals, counts, derived corrections and may include, but not limited to result of and statements in CDL's.
-

1.3 DEFINITIONS(Cont'd)

- .1 (Cont'd)
  - .2 Physical points: inputs or outputs which have hardware wired to controllers which are measuring physical properties, or providing status conditions of contacts or relays which provide interaction with related equipment (stop, start) and valve or damper actuators.
  - .2 Point Name: composed of two parts, point identifier and point expansion.
    - .1 Point identifier: comprised of three descriptors, "area" descriptor, "system" descriptor and "point" descriptor, for which database to provide 25 character field for each point identifier. "System" is system that point is located on.
      - .1 Area descriptor: building or part of building where point is located.
      - .2 System descriptor: system that point is located on.
      - .3 Point descriptor: physical or logical point description. For point identifier "area", "system" and "point" will be shortforms or acronyms. Database must provide 25 character field for each point identifier.
    - .2 Point expansion: comprised of three fields, one for each descriptor. Expanded form of shortform or acronym used in "area", "system" and "point" descriptors is placed into appropriate point expansion field. Database must provide 32 character field for each point expansion.
    - .3 Bilingual systems to include additional point identifier expansion fields of equal capacity for each point name for second language.
      - .1 System to support use of numbers and readable characters including blanks, periods or underscores to enhance user readability for each of the above strings.
  - .3 Point Object Type: points fall into following object types:
    - .1 AI (analog input).
    - .2 AO (analog output).
    - .3 DI (digital input).
    - .4 DO (digital output).
    - .5 Pulse inputs.
  - .4 Symbols and engineering unit abbreviations utilized in displays: to ANSI/ISA S5.5.
    - .1 Printouts: to ANSI/IEEE 260.1.
-

1.4 SYSTEM  
DESCRIPTION

---

- .1 Refer to control schematics for system architecture.
- .2 Work covered by sections referred to above consists of fully operational EMCS, including, but not limited to, following:
  - .1 Building Controllers.
  - .2 Control devices as listed in I/O point summary tables.
  - .3 Field control devices.
  - .4 Software/Hardware complete with full documentation.
  - .5 Complete operating and maintenance manuals.
  - .6 Training of personnel.
  - .7 Acceptance tests, technical support during commissioning, full documentation.
  - .8 Miscellaneous work as specified in these sections and as indicated.
- .3 Design Requirements:
  - .1 Design and provide conduit and wiring linking elements of system.
  - .2 Supply sufficient programmable controllers of types to meet project requirements. Quantity and points contents as reviewed by Departmental Representative prior to installation.
  - .3 Location of controllers as reviewed by Departmental Representative prior to installation.
  - .4 Metric references: in accordance with CAN/CSA Z234.1.
- .4 Language Operating Requirements:
  - .1 Provide English operator selectable access codes.
  - .2 Use non-linguistic symbols for displays on graphic terminals wherever possible. Other information to be in English.
  - .3 Operating system executive: provide primary hardware-to-software interface specified as part of hardware purchase with associated documentation to be in English.
  - .4 System manager software: include in English system definition point database, additions, deletions or modifications, control loop statements, use of high level programming languages, report generator utility and other OS utilities used for maintaining optimal operating efficiency.
  - .5 Include, in English:
    - .1 Input and output commands and messages from operator-initiated functions and field related changes and alarms as defined in CDL's or assigned limits (i.e. commands relating to day-to-day operating functions and not related to system modifications, additions, or logic re-definitions).

- 
- 1.4 SYSTEM .4 (Cont'd)  
DESCRIPTION .5 (Cont'd)  
(Cont'd)
- .2 Graphic "display" functions, point commands to turn systems on or off, manually override automatic control of specified hardware points. To be in English at specified OWS and to be able to operate one terminal in English and second in French. Point name expansions in both languages.
- .3 Reporting function such as trend log, trend graphics, alarm report logs, energy report logs, maintenance generated logs.
- 
- 1.5 ACTION AND .1 Submit for review:  
INFORMATIONAL .1 Equipment list at time of bid within 10 days  
SUBMITTALS .2 List existing field control devices to be  
re-used included in bid, along with unit price.
- .2 Quality Control:  
.1 Provide equipment and material from manufacturer's regular production, CSA certified, manufactured to standard quoted plus additional specified requirements.  
.2 Where CSA certified equipment is not available submit such equipment to inspection authorities for special inspection and approval before delivery to site.  
.3 Submit proof of compliance to specified standards with shop drawings and product data.  
.4 In lieu of such evidence, submit certificate from testing organization, approved by Departmental Representative, certifying that item was tested in accordance with their test methods and that item conforms to their standard/code.  
.5 For materials whose compliance with organizational standards/codes/specifications is not regulated by organization using its own listing or label as proof of compliance, furnish certificate stating that material complies with applicable referenced standard or specification.  
.6 Permits and fees: in accordance with general conditions of contract.  
.7 Submit certificate of acceptance from authority having jurisdiction to Departmental Representative.  
.8 Existing devices intended for re-use: submit test report.
-

1.6 QUALITY  
ASSURANCE

- .1 Have local office within 50km of project staffed by trained personnel capable of providing instruction, routine maintenance and emergency service on systems,
- .2 Provide record of successful previous installations submitting tender showing experience with similar installations utilizing computer-based systems.
- .3 Have access to local supplies of essential parts and provide 7 year guarantee of availability of spare parts after obsolescence.
- .4 Ensure qualified supervisory personnel continuously direct and monitor Work and attend site meetings.

1.7 EXISTING-  
CONTROL COMPONENTS

- .1 Utilize existing control wiring and piping as indicated.
  - .2 Re-use field control devices that are usable in their original configuration.
    - .1 Do not modify original design of existing devices without written permission from Departmental Representative.
    - .2 Provide for new, properly designed device where re-usability of components is uncertain.
  - .3 Inspect and test existing devices intended for re-use within 30 days of award of contract, and prior to installation of new devices.
  - .4 Non-functioning items:
    - .1 Provide with report specification sheets or written functional requirements to support findings.
    - .2 Departmental Representative will repair or replace existing items judged defective yet deemed necessary for EMCS.
  - .5 Submit written request for permission to disconnect controls and to obtain equipment downtime before proceeding with Work.
  - .6 Assume responsibility for controls to be incorporated into EMCS after written receipt of approval from Departmental Representative.
    - .1 Be responsible for items repaired or replaced by Departmental Representative.
    - .2 Be responsible for repair costs due to negligence or abuse of equipment.
    - .3 Responsibility for existing devices terminates upon final acceptance of EMCS.
-

1.7 EXISTING-CONTROL COMPONENTS  
(Cont'd) .7 Remove existing controls not re-used or not required. Place in approved storage for disposition as directed.

PART 2 - PRODUCTS

2.1 EQUIPMENT .1 Complete list of equipment and materials to be used on project and forming part of bid documents by adding manufacturer's name, model number and details of materials, and submit for approval.

2.2 ADAPTORS .1 Provide adaptors between metric and imperial components.

PART 3 - EXECUTION

3.1 MANUFACTURER'S RECOMMENDATIONS .1 Installation: to manufacturer's recommendations.

PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS .1 Section 25 05 01 - EMCS: General Requirements.
- 1.2 REFERENCE STANDARDS .1 American National Standards Institute (ANSI)  
.1 ANSI/ASME B16.22-2018, Wrought Copper and Copper Alloy Solder Joint Pressures Fittings.  
.2 ANSI C2-2017, National Electrical Safety Code.  
.3 ANSI/NFPA 70-2017, National Electrical Code.  
.2 CSA Group (CSA)  
.1 CSA C22.1-18,  
.2 CAN/CSA-C22.3 No. 7-15, Underground Systems.  
.3 CAN/CSA C22.2 No. 45.1-07(R2017), Electrical Rigid Metal Conduit.  
.4 CAN/CSA C22.2 No. 56-17, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.  
.5 CAN/CSA C22.2 No. 83-M1985(R2017), Electrical Metallic Tubing.  
.6 CAN/CSA-C22.3 No. 1-15, Overhead Systems.
- 1.3 SYSTEM DESCRIPTION .1 Electrical:  
.1 Hard wiring between field control devices and EMCS field panels.
- 1.4 PERSONNEL QUALIFICATIONS .1 Qualified supervisory personnel to:  
.1 Continuously direct and monitor all work.  
.2 Attend site meetings.
- 1.5 EXISTING CONDITIONS .1 Repair all surfaces damaged during execution of work.  
.2 Turn over to Departmental Representative existing materials removed from work not identified for re-use.

PART 2 - PRODUCTS

- 2.1 WIRING .1 As per requirements of Division 26.



2.1 WIRING  
(Cont'd)

- .2 For 70V and above copper conductor with chemically cross-linked thermosetting polyethylene insulation rated RW90 and 600V. Colour code to CSA 22.1.
- .3 For wiring under 70 volts use FT6 rated wiring where wiring is not run in conduit. All other cases use FT4 wiring.
- .4 Sizes:
  - .1 120V Power supply: to match or exceed breaker, size #12 minimum.
  - .2 Wiring for safeties/interlocks for starters, motor control centres, to be stranded, #14 minimum.
  - .3 Field wiring to digital device: #18 AWG.
  - .4 Analog input and output: shielded #18 minimum solid copper. Wiring must be continuous without joints.
  - .5 More than 4 conductors: #22 minimum solid copper.
- .5 Terminations:
  - .1 Terminate wires with screw terminal type connectors suitable for wire size, and number of terminations.

2.2 CONDUIT

- .1 As per requirements of Division 26.
  - .2 Electrical metallic tubing to CAN/CSA C22.2 No. 83. Flexible and liquid tight flexible metal conduit to CAN/CSA C22.2 No. 56. Rigid steel threaded conduit to CAN/CSA C22.2 No. 45.1.
  - .3 Junction and pull boxes: welded steel.
    - .1 Surface mounting cast FS: screw-on flat covers.
    - .2 Flush mounting: covers with 25 mm minimum extension all round.
  - .4 Cabinets: sheet steel, for surface mounting, with hinged door, latch lock, 2 keys, complete with perforated metal mounting backboard. Panels to be keyed alike for similar functions and or entire contract as approved.
  - .5 Outlet boxes: 100 mm minimum, square.
  - .6 Conduit boxes, fittings:
    - .1 Bushings and connectors: with nylon insulated throats.
    - .2 With push pennies to prevent entry of foreign materials.
  - .7 Fittings for rigid conduit:
-

- 2.2 CONDUIT  
(Cont'd)
- .7 (Cont'd)
- .1 Couplings and fittings: threaded type steel.
  - .2 Double locknuts and insulated bushings: use on sheet metal boxes.
  - .3 Use factory "ells" where 90 degree bends required for 25 mm and larger conduits.
- .8 Fittings for thin wall conduit:
- .1 Connectors and couplings: steel, set screw type.
- 2.3 WIRING DEVICES,  
COVER PLATES
- .1 Conform to CSA.
- .2 Receptacles:
- .1 Duplex: CSA type 5-15R.
  - .2 Single: CSA type 5-15R.
  - .3 Cover plates and blank plates: finish to match other plates in area.
- 2.4 SUPPORTS FOR  
CONDUIT,  
FASTENINGS,  
EQUIPMENT
- .1 Solid masonry, tile and plastic surfaces: lead anchors or nylon shields.
- .1 Hollow masonry walls, suspended drywall ceilings: toggle bolts.
- .2 Exposed conduits or cables:
- .1 50 mm diameter and smaller: one-hole steel straps.
  - .2 Larger than 50 mm diameter: two-hole steel straps.
- .3 Suspended support systems:
- .1 Individual cable or conduit runs: support with 6 mm diameter threaded rods and support clips.
  - .2 Two or more suspended cables or conduits: support channels supported by 6 mm diameter threaded rod hangers.

### PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Install equipment, components so that manufacturer's and CSA labels are visible and legible after commissioning is complete.
- 3.2 ELECTRICAL  
GENERAL
- .1 Do complete installation in accordance with requirements of:
-

3.2 ELECTRICAL  
GENERAL  
(Cont'd)

- .1 (Cont'd)
  - .1 Division 26, this specification.
  - .2 CSA 22.1 Canadian Electrical Code.
  - .3 ANSI/NFPA 70.
  - .4 ANSI C2.
- .2 Fully enclose or properly guard electrical wiring, terminal blocks, high voltage above 70 V contacts and mark to prevent accidental injury.
- .3 Conform to manufacturer's recommendations for storage, handling and installation.
- .4 Check factory connections and joints. Tighten where necessary to ensure continuity.
- .5 Install electrical equipment between 1000 and 2000 mm above finished floor wherever possible and adjacent to related equipment.
- .6 Protect exposed live equipment such as panel, mains, outlet wiring during construction for personnel safety.
- .7 Shield and mark live parts "LIVE 120 VOLTS" or other appropriate voltage.
- .8 Install conduits, and sleeves prior to pouring of concrete.
- .9 Holes through exterior wall and roofs: flash and make weatherproof.
- .10 Make necessary arrangements for cutting of chases, drilling holes and other structural work required to install electrical conduit, cable, pull boxes, outlet boxes.
- .11 Install cables, conduits and fittings which are to be embedded or plastered over, neatly and closely to building structure to minimize furring.

3.3 CONDUIT SYSTEM

- .1 Communication wiring shall be installed in conduit. Provide complete conduit system to link Building Controllers to BECC. Conduit sizes to suit wiring requirements and to allow for future expansion capabilities specified for systems. Maximum conduit fill not to exceed 40%. Design drawings do not show conduit layout.

3.3 CONDUIT SYSTEM  
(Cont'd)

- .2 Install conduits parallel or perpendicular to building lines, to conserve headroom and to minimize interference.
  - .3 Do not run exposed conduits in normally occupied spaces unless otherwise indicated or unless impossible to do otherwise. Obtain approval from Departmental Representative before starting such work. Provide complete conduit system to link field panels and devices with main control centre. Conduit size to match conductors plus future expansion capabilities as specified.
  - .4 Locate conduits at least 150 mm from parallel steam or hot water pipes and at least 50 mm at crossovers.
  - .5 Bend conduit so that diameter is reduced by less than 1/10th original diameter.
  - .6 Field thread on rigid conduit to be of sufficient length to draw conduits up tight.
  - .7 Limit conduit length between pull boxes to less than 30 m.
  - .8 Use conduit outlet boxes for conduit up to 32 mm diameter and pull boxes for larger sizes.
  - .9 Fastenings and supports for conduits, cables, and equipment:
    - .1 Provide metal brackets, frames, hangers, clamps and related types of support structures as indicated and as required to support cable and conduit runs.
    - .2 Provide adequate support for raceways and cables, sloped vertically to equipment.
    - .3 Use supports or equipment installed by other trades for conduit, cable and raceway supports only after written approval from Departmental Representative.
  - .10 Install polypropylene fish cord in empty conduits for future use.
  - .11 Where conduits become blocked, remove and replace blocked sections.
  - .12 Pass conduits through structural members only after receipt of Departmental Representative's written approval.
  - .13 Conduits may be run in flanged portion of structural steel.
-

3.3 CONDUIT SYSTEM  
(Cont'd)

- .14 Group conduits wherever possible on suspended or surface channels.
- .15 Pull boxes:
  - .1 Install in inconspicuous but accessible locations.
  - .2 Support boxes independently of connecting conduits.
  - .3 Fill boxes with paper or foam to prevent entry of construction material.
  - .4 Provide correct size of openings. Reducing washers not permitted.
  - .5 Mark location of pull boxes on record drawings.
  - .6 Identify AC power junction boxes, by panel and circuit breaker.

3.4 WIRING

- .1 Install multiple wiring in ducts simultaneously.
  - .2 Do not pull spliced wiring inside conduits or ducts.
  - .3 Use CSA certified lubricants of type compatible with insulation to reduce pulling tension.
  - .4 Tests: use only qualified personnel. Demonstrate that:
    - .1 Circuits are continuous, free from shorts, unspecified grounds.
    - .2 Resistance to ground of all circuits is greater than 50 Megohms.
  - .5 Provide Departmental Representative with test results showing locations, circuits, results of tests.
  - .6 Remove insulation carefully from ends of conductors and install to manufacturer's recommendations. Accommodate all strands in lugs. Where insulation is stripped in excess, neatly tape so that only lug remains exposed.
  - .7 Wiring in main junction boxes and pull boxes to terminate on terminal blocks only, clearly and permanently identified. Junctions or splices not permitted for sensing or control signal covering wiring.
  - .8 Do not allow wiring to come into direct physical contact with compression screw.
  - .9 Install ALL strands of conductor in lugs of components. Strip insulation only to extent necessary for installation.
-

3.5 TESTS

- .1 General:
  - .1 Give 14 days written notice of intention to test.
  - .2 Conduct in presence of Departmental Representative and authority having jurisdiction.
  - .3 Conceal work only after tests satisfactorily completed.
  - .4 Report results of tests to Departmental Representative in writing.
  - .5 Preliminary tests:
    - .1 Conduct as directed to verify compliance with specified requirements.
    - .2 Make needed changes, adjustments, replacements.
    - .3 Insulation resistance tests:
      - .1 Megger all circuits, feeders, equipment for 120 - 600V with 1000V instrument. Resistance to ground to be more than required by Code before energizing.
      - .2 Test insulation between conductors and ground, efficiency of grounding system to satisfaction of Departmental Representative and authority having jurisdiction.

PART 1 - GENERAL

- 1.1 SUMMARY .1 Section Includes:  
.1 Control devices integral to the Building Energy Monitoring and Control System (EMCS): sensors.  
.2 Related Sections:  
.1 Section 25 05 01 - EMCS: General Requirements.
- 1.2 REFERENCE STANDARDS .1 ASTM International (ASTM)  
.1 ASTM B 148-97(18), Standard Specification for Aluminum-Bronze Sand Castings.  
.2 National Electrical Manufacturer's Association (NEMA).  
.1 NEMA 250-14, Enclosures for Electrical Equipment (1000 Volts Maximum).  
.3 CSA Group CSA Group  
.1 CSA-C22.1-18, Canadian Electrical Code, Part 1 (19th Edition), Safety Standard for Electrical Installations.
- 1.3 DEFINITIONS .1 Acronyms and Definitions: refer to Section 25 05 01 - EMCS: General Requirements.
- 1.4 ACTION AND INFORMATIONAL SUBMITTALS .1 Submit shop drawings and manufacturer's installation instructions.  
.2 Manufacturer's Instructions:  
.1 Submit manufacturer's installation instructions for specified equipment and devices.
- 1.5 EXISTING CONDITIONS .1 Cutting and Patching: in accordance with Section 01 73 00 - Execution Requirements supplemented as specified herein.  
.2 Repair surfaces damaged during execution of Work.  
.3 Turn over to Departmental Representative existing materials removed from Work not identified for re-use.
-

PART 2 - PRODUCTS

2.1 GENERAL

- .1 Control devices of each category to be of same type and manufacturer.
- .2 External trim materials to be corrosion resistant. Internal parts to be assembled in watertight assembly.
- .3 Operating conditions: 0 - 32 degrees C with 10 - 90% RH (non-condensing) unless otherwise specified.
- .4 Terminations: use standard conduit box with slot screwdriver compression connector block unless otherwise specified.
- .5 Transmitters and sensors to be unaffected by external transmitters including walkie talkies.
- .6 Account for hysteresis, relaxation time, maximum and minimum limits in applications of sensors and controls.

2.2 TEMPERATURE  
SENSORS

- .1 Room temperature sensors.
  - .1 Wall mounting, in slotted type covers having brushed stainless steel finish, with guard as indicated.
  - .2 Element 10-50 mm long RTD with ceramic tube or equivalent protection or thermistor, 10,000 ohm, accuracy of plus or minus 0.2 degrees C.

2.3  
ELECTROMECHANICAL  
RELAYS

- .1 Requirements:
  - .1 Double voltage, DPDT, plugin type with termination base.
  - .2 Coils: rated for 120V AC or 24V DC. Other voltage: provide transformer
  - .3 Contacts: rated at 5 amps at 120V AC.
  - .4 Relay to have visual status indication.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install equipment, components so that manufacturer's and CSA labels are visible and legible after commissioning is complete.



3.1 INSTALLATION  
(Cont'd)

- .2 Install field control devices in accordance with manufacturers recommended methods, procedures and instructions.
- .3 Temperature transmitters, humidity transmitters, current-to-pneumatic transducers, solenoid air valves, controllers, relays: install in NEMA I enclosure or as required for specific applications. Provide for electrolytic isolation in cases when dissimilar metals make contact.
- .4 Support field-mounted panels, transmitters and sensors on pipe stands or channel brackets.
- .5 Fire stopping: provide space for fire stopping in accordance with Section 07 84 00 - Fire stopping. Maintain the fire-resistance rating integrity of the fire separation.
- .6 Electrical:
  - .1 Complete installation in accordance with Section 26 05 01 - Common Work Results for Electrical.
  - .2 Refer to mechanical control schematics shown on drawings. Trace existing control wiring installation and provide updated wiring schematics including additions, deletions to control circuits for review by Departmental Representative before beginning Work.
  - .3 Terminate wires with screw terminal type connectors suitable for wire size, and number of terminations.
  - .4 Install communication wiring in conduit.
    - .1 Provide complete conduit system to link Building Controllers, field panels and OWS(s).
    - .2 Conduit sizes to suit wiring requirements and to allow for future expansion capabilities specified for systems.
    - .3 Maximum conduit fill not to exceed 40%.
    - .4 Design drawings do not show conduit layout.
  - .5 Do not run exposed conduits in normally occupied spaces unless otherwise indicated or unless impossible to do otherwise. Departmental Representative to review before starting Work. Wiring in mechanical rooms, wiring in service rooms and exposed wiring must be in conduit.

3.2 TESTING AND  
COMMISSIONING

- .1 Calibrate and test field devices for accuracy and performance.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International).
  - .1 CSA C22.1-18, Canadian Electrical Code, Part 1 (24th Edition), Safety Standard for Electrical Installations.
  - .2 CAN/CSA-C22.3 No. 1-15, Overhead Systems.
  - .3 CAN3-C235-83 (R2015), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
  - .4 CSA Z462-12, Workplace Electrical Safety.

1.2 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235-83 (R2015).
- .2 Language operating requirements: provide identification nameplates and labels for control items in English and French unless noted otherwise.

1.3 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings:
  - .1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
  - .2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
  - .3 Indicate on drawings clearances for operation, maintenance and replacement of operating equipment.
  - .4 Submit necessary number of copies of drawings to inspection authorities.
  - .5 If changes are required, notify Departmental Representative of these changes.
- .3 Quality Control: in accordance with Section 01 45 00 - Quality Control.
  - .1 Provide CSA certified equipment and material.
  - .2 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to site.
  - .3 Factory assemble control panels and component assemblies.
  - .4 Use new equipment and materials unless otherwise specified.

1.3 SUBMITTALS  
(Cont'd)

- .3 (Cont'd)
  - .5 Submit test results of installed electrical systems and instrumentation.
  - .6 Permits and fees: in accordance with General Conditions of Contract.
  - .7 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
  - .8 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Departmental Representative.
- .4 Manufacturer's Field Reports: submit to Departmental Representative manufacturer's written report, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.4 QUALITY  
ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Qualifications: electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
  - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
  - .2 The work of this division is to be carried out by a contractor who holds a valid electrical contractors license as issued by the Province of Newfoundland and Labrador.
- .3 Site Meetings:
  - .1 Site Meetings: as part of Manufacturer's Field Services described in Part 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, as required.
- .4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 DELIVERY,  
STORAGE AND  
HANDLING

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.

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- 1.5 DELIVERY,  
STORAGE AND  
HANDLING  
(Cont'd)
- .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- 1.6 SYSTEM STARTUP
- .1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 Provide onsite services for as many visits as necessary to put equipment in operation, verify all electrical components, and ensure that operating personnel are conversant with aspects of its care and operation.
- 1.7 OPERATING  
INSTRUCTIONS
- .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.

PART 2 - PRODUCTS

- 2.1 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 is not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.
-

2.1 MATERIALS AND  
EQUIPMENT  
(Cont'd)

- .3 Factory assemble control panels and component assemblies.
- .4 Equipment to be rated for service to which it is applied; including voltage class, continuous current rating, interrupting rating, and environmental condition.

2.2 ELECTRIC  
MOTORS, EQUIPMENT  
AND CONTROLS

- .1 Verify installation and co-ordination responsibilities related to equipment and controls, as indicated.
- .2 Control wiring and conduit: conduit, wiring and connections below 50 V which are related to control systems specified in mechanical sections and as shown on mechanical drawings. Shall comply with requirements of Division 26 for standard of quality.

2.3 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of inspection authorities .
- .2 Decal signs, minimum size 175 x 250 mm.

2.4 OPERATION AND  
MAINTENANCE MANUAL

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual to be approved by, and final copies deposited with Departmental Representative before final inspection.
- .3 Operation data to include:
  - .1 Description and operation of each system.
  - .2 Operating instructions for each system.
- .4 Maintenance data shall include:
  - .1 Servicing, maintenance, operation and trouble shooting instructions for each system and item of equipment.
  - .2 Data to include schedule of tasks frequency and tools required.

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 Identify electrical equipment with nameplates and labels as follows:
  - .1 Nameplates: lamicoid 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 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.
- .8 Transformers: indicate capacity, primary and secondary voltages.

2.7 WIRING  
IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

2.7 WIRING  
IDENTIFICATION  
(Cont'd)

- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1-18.
- .4 Use colour coded wires in communications 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
Communication	Green	
Fire Alarm	Red	
Emergency	Red	Blue

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 indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1-15 except where specified otherwise.

3.1 INSTALLATION  
(Cont'd)

- .3 All equipment and exposed non-current carrying metal, conduits and parts to be permanently and effectively grounded to meet requirements of the CEC Section 10 and as indicated on drawings and as specified in Section 26 05 28: Grounding - Secondary. Standards set either by drawings or specifications which are above those covered by the CEC Section 10 are not to be reduced under any circumstances.
- .4 Prior to working on any electrical equipment, the upstream overcurrent protective device feeding the device shall be shut off, locked, and tagged in accordance with the requirements of CSA Z462, "Workplace Electrical Safety".

3.2 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.
- .2 Ensure that manufacturer's registration plates are properly affixed to all apparatus showing the size, name of equipment, serial number and all information usually provided, including voltage, cycle, phase and the name and address of the manufacturer.
- .3 Do not paint over registration plates or approval labels. Leave openings through insulation for viewing the plates. Contractors or sub-contractors nameplate are not acceptable.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 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 locations of outlets at no extra cost or credit, providing distance does not exceed 300 mm, and information is given before installation.





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3.7 FIELD QUALITY CONTROL  
(Cont'd)

- .1 (Cont'd)
  - .3 Provide upon completion of work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards and dry-core transformers 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 Heating and its control.
  - .5 Systems: Fire alarm, telephone and data.
  - .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 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

3.8 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

3.9 EXISTING CONDITIONS

- .1 Contractor to visit site before tender to determine details of existing conditions. No extra will be allowed for items that a proper field visit would have shown as necessary.
  - .2 Make connections to existing conditions at times approved by Owner. Request written approval of time when connections can be made.
  - .3 Be responsible for damage to existing systems and equipment.
-

3.10 ELECTRICAL  
DRAWINGS

- .1 The design drawings are partly diagrammatic and intended to convey that scope of work and indicated the general arrangement of systems and components. They should not be constructed as, or otherwise understood to be, fabrication drawings.
- .2 The drawings are not intended to show structural details or architectural features.
- .3 Do not determine locations of equipment and materials by measurement from drawings.

3.11 ACCESS DOORS

- .1 Supply access doors for concealed electrical equipment to allow operation, inspection, adjusting and servicing.
- .2 Use flush mounted 600 x 600 mm for body entry and 300 x 300 mm for hand entry unless otherwise noted. Doors to open 180 degrees, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
  - .1 Use stainless steel with brushed satin or polished finish in special areas such as tiled or marble surfaces and as directed by Departmental Representative.
  - .2 In remaining areas, use prime coated steel.
  - .3 Use ULC rated access doors in fire rated walls and ceilings.
- .4 Installation:
  - .1 Locate so that concealed items are accessible.
  - .2 Locate so that hand or body entry (as applicable) is achieved.
  - .3 Installation is specified in applicable sections.

3.12 CUTTING AND  
PATCHING

- .1 Install work in such a manner and at such time as will require a minimum of cutting and patching of the building structure.
- .2 Holes in exposed locations, in or through existing floors, shall be drilled and smoothed by sanding, Use of jackhammer will not be permitted. Holes shall only be cored in locations specifically approved by the Departmental Representative.
- .3 Holes through masonry walls to accommodate sleeves shall be made with an iron pipe masonry core saw.

3.12 CUTTING AND  
PATCHING  
(Cont'd)

- .4 Do not core or cut concrete floors without special permission from the Departmental Representative.

3.13 MAINTENANCE  
MATERIALS AND  
SPECIAL TOOLS

- .1 Furnish spare parts as outlined in the appropriate specification section.
- .2 Provide special tools to service equipment as recommended by manufacturer and as outlined in appropriate specification section.

3.14 DISCREPANCIES  
AND ERRORS

- .1 The contractor shall check all drawings furnished to him immediately upon their receipt and shall promptly notify the Departmental Representative of any discrepancies or errors. The contractor shall compare all drawings and verify the figures before laying out the work and shall be responsible for any errors which might have been avoided thereby.
- .2 The contractor shall, before fabricating or installing any materials or equipment, carefully check all drawings to ensure that such materials or equipment can be installed without conflicting with the structural elements of the building, or with the work of other trades. Where, in his opinion, the work cannot be installed as shown on the Departmental Representative's drawings, the contractor shall not proceed with the work affected thereby until the necessary revisions have been made or specific instructions issued by the Departmental Representative. The Owner shall not be responsible for any extra costs incurred by the contractor as a result of his failure to comply with this requirement of the specifications.
- .3 Should the contractor, at any time, discover any discrepancies or errors in the drawings or specifications, or any lack of dimensions or other information, he shall report the same at once to the Departmental Representative for correction or instructions, and shall not proceed with the work affected hereby until such correction has been made or the necessary instructions issued by the Departmental Representative.

3.15 APPROVAL OF  
ALTERNATES

- .1 "Acceptable Alternates" means that products of the manufacturers given are the only acceptable products to be used on the project.

3.15 APPROVAL OF  
ALTERNATES  
(Cont'd)

- .2 "Standard of Acceptance" means that the product named meets with the specifications in all regards and that the products of other acceptable manufacturers must have the same features and capacities.
- .3 Where reference is made to a materials standard and no acceptable material or manufacturer is listed, products are acceptable provided they are certified as meeting the reference standards.
- .4 Manufacturers, their agents or contractors supplying alternative products to be considered for acceptance shall submit written applications to the Departmental Representative.
- .5 Acceptance of alternates does not absolve Electrical Division from making all necessary adjustments to the work of other trades incurred by selection of alternative equipment or materials. Such adjustments are to be made at no additional cost to the Owner.

PART 1 - GENERAL

- 1.1 SUMMARY .1 This Section includes requirements for selective demolition and removal of electrical power, communications and safety components including removal of conduit, junction boxes, and wiring to source and incidentals required to complete work described in this Section and shown on drawings.
- 1.2 RELATED REQUIREMENTS .1 Section 02 41 16 - Structure Demolition
- 1.3 REFERENCE STANDARDS .1 Canadian Standards Association (CSA)  
.1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures.
- 1.4 DEFINITIONS .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes , cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
-

1.4 DEFINITIONS  
(Cont'd)

- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Action Submittals: Provide in accordance with Section 01 33 00 - Submittal Procedures before starting work of this Section:
- .1 Construction Waste Management Plan (CWM Plan): Submit plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .2 Landfill Records: Indicate receipt and acceptance of selective demolition waste and hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.
- .2 Scheduling: Account for Owner's continued occupancy requirements during selective demolition.

1.7 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with:
- .1 Provincial/Territorial Workers' Compensation Boards/Commissions
  - .2 Provincial/Territorial Occupational Health and Safety Standards and Programs

1.8 SITE CONDITIONS

- .1 Existing Conditions: Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination before tendering.
- .2 Existing Hazardous Substances: Owner performed a hazardous substances assessment and it is not expected that hazardous substances will be encountered in Work.

1.8 SITE CONDITIONS  
(Cont'd)

- .3 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in Work; immediately notify Representative if materials suspected of containing hazardous substances are encountered and perform following activities:
- .1 Refer to Section 01 41 00 - Regulatory Requirements for directives associated with specific material types.
  - .2 Hazardous substances will be as defined in Hazardous Products Act.
  - .3 Stop work in area of suspected hazardous substances.
  - .4 Take preventative measures to limit users' and workers' exposure, provide barriers and other safety devices and do not disturb.
  - .5 Hazardous substances will be removed by Representative under a separate contract or as a change to Work.
  - .6 Proceed only after written instructions have been received from Representative.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- .1 Electrical Repair Materials: Use only new materials, CSA or ULC labelled as appropriate and matching components remaining after work associated with components identified for removal or demolition are completed.
- .2 Firestopping Repair Materials: Use firestopping materials compatible with existing firestopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.

2.2 SALVAGE AND DEBRIS MATERIALS

- .1 Material Ownership: Demolished materials become Contractor's property and will be removed from Project site; except for items indicated as being reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property.
- .2 Salvaged Materials: Carefully remove materials designated for salvage and store in a manner to prevent damage or devaluation of materials in accordance with Section 02 42 16 and as follows:
  - .1 Leave electrical distribution panels in place; panel can be used for temporary construction power for this and subsequent contracts.



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- 2.2 SALVAGE AND DEBRIS MATERIALS (Cont'd)
- .2 (Cont'd)
  - .2 Leave main telephone terminal backboard in place; panel can be used for temporary construction telephone system for this and subsequent contracts.

PART 3 - EXECUTION

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

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

- 3.3 EXECUTION
- .1 Demolition and Removal: Coordinate requirements of this Section with information contained in Section 02 41 16 and as follows:
-

3.3 EXECUTION  
(Cont'd)

- .1 (Cont'd)
- .1 Disconnect electrical circuits; maintain electrical service and distribution panels as is, ready for subsequent Work.
  - .2 Remove existing luminaires, electrical devices and equipment including associated conduits, boxes, wiring, and similar items unless specifically noted otherwise.
  - .3 Disconnect and remove existing fire alarm system including associated conduits, boxes, wiring, and similar items unless specifically noted otherwise.
  - .4 Disconnect and remove communication systems including associated conduits, boxes, cabling, and similar items unless specifically noted otherwise.
  - .5 Disconnect and remove telephone outlets, associated conduit, cabling and sub terminal backboards and related accessories; maintain telephone service and main terminal backboard as is.
  - .6 Perform demolition work in a neat and workmanlike manner:
    - .1 Remove tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
    - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
  - .7 Remove existing conduits, boxes, cabling and wiring associated with removed luminaires, electrical devices and equipment.
  - .8 Grind off conduits and make flush with surface of concrete where conduits are cast into concrete; seal open ends of conduit with silicone sealant and leave in place.
  - .9 Seal open ends of conduit with silicone sealant and leave in place where they are inaccessible or cannot be removed without damaging adjacent construction.
  - .10 Firestop any penetrations created from removed equipment or conduit in fire rated assemblies.

3.4 CLOSEOUT  
ACTIVITIES

- .1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre) except where explicitly noted otherwise for materials being salvaged for re use in new construction in accordance with Section 02 42 16.

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.
    - .2 CSA C22.2 No.65-13 (2016), Wire Connectors.
  - .2 Canadian Electrical Cede (CEC).

PART 2 - PRODUCTS

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

- 2.2 ARMOURED CABLE CONNECTORS
- .1 For all conditions, use aluminum body connector, watertight design with non-magnetic stainless steel grounding ring.
  - .2 Where connector is used in NPS threadless opening, use rubber gasket between the outside of the enclosure and the fitting shoulder. Locknut shall be non-magnetic material.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Remove insulation carefully from ends of conductors and:

3.1 INSTALLATION  
(Cont'd)

.1

(Cont'd)

.1 Install mechanical pressure type connectors and tighten screws. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

.2 Install fixture type connectors and tighten. Replace insulating cap.

.3 Install bushing stud connectors in accordance with manufacturers requirements.

.4 Make all joints required in branch wiring #8 AWG and smaller utilizing twist-on pressure type connectors and tighten screws. Use appropriate compression tool recommended by manufacturer. Installation must meet secureness tests in accordance with CSA C22.2 no. 65.

.5 Make branch wiring joints larger than #8 AWG utilizing color-keyed, crimp type compression connectors (two hole, long barrel, tin-plated copper) complete with manufacturer approved compression tools. Apply a first layer of compound type tape followed by additional layers of vinyl tape. Bolt compression connectors together and torqued in accordance with manufacturer's recommendation. Heat shrink can also be used.

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 26 05 01 - Common Work Results - Electrical.
  - .2 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.
  - .3 Section 26 05 29 - Hangers and Supports for Electrical Systems.
  - .4 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

- 1.2 REFERENCES
- .1 CSA C22.2 No.0.3-09 (R2014) Test Methods for Electrical Wires and Cables.
  - .2 Canadian Electrical Code (CEC).

- 1.3 PRODUCT DATA
- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS

- 2.1 BUILDING WIRES
- .1 Conductors: stranded. Minimum size: 12 AWG.
  - .2 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material rated RW90.
  - .3 Copper conductors: size as indicated, with thermoplastic insulation type TW rated at 600 V for bonding conductors only.

- 2.2 CONTROL CABLES
- .1 Type LVT: 2 soft annealed copper conductors, sized as indicated, with thermoplastic insulation, outer covering of thermoplastic jacket.
  - .2 Control circuit wiring 50V and less: Cat6A with Black jacket. FT6 rated for any cabling run in free air.
  - .3 Special control cables as per drawings.
-

- 2.3 ARMOURED CABLES
- .1 Conductors: insulated, copper, size as indicated.
  - .2 Type: AC90.
  - .3 Armour: interlocking type fabricated from aluminum strip.
  - .4 Type: ACWU90 flame retardant jacket over armour, meeting the requirements of Vertical Tray Fire Test of CSA22.2, No. 0.3 with maximum flame travel of 1.2 m.
  - .5 Connectors: standard as required, complete with double split rings.

- 2.4 FIRE ALARM CABLES
- .1 Type FAS 105 to CSA C22.2 No. 208, PVC insulation size and quantity of conductors as indicated. Red PVC outer jacket.

PART 3 - EXECUTION

- 3.1 WIRING METHOD
- .1 Use RW90 copper conductors in EMT conduit for all power wiring unless indicated otherwise. AC90 is permitted for final connection to lighting fixture drops with maximum length of 2m, secured at 600mm spacing.

- 3.2 GENERAL CABLE INSTALLATION
- .1 Terminate cables in accordance with Section 26 05 20.
  - .2 Cable Colour Coding: to Section 26 05 01.
  - .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.

- 3.3 INSTALLATION OF BUILDING WIRES
- .1 Install in conduit systems in accordance with Section 26 05 34.
-

- 3.4 INSTALLATION OF CONTROL CABLES
- .1 Install control cables in conduit.
  - .2 Ground control cable shield.
- 3.5 INSTALLATION OF ARMOURED CABLES
- .1 Group cables wherever possible.
  - .2 Install in accordance with Section 26 05 29 - Hangers and Supports for Electrical Systems.
- 3.6 INSTALLATION OF FIRE ALARM CABLES
- .1 Install in conduit systems in accordance with Section 26 05 34.
- 3.7 FIELD QUALITY CONTROL
- .1 Perform tests in accordance with Section 26 05 01 -
  - .2 Perform tests using method appropriate to site
  - .3 Perform tests before energizing electrical system.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE).
  - .2 Canadian Standards Association, (CSA International).
  - .3 Canadian Electrical Code (CEC), Section 10 - Grounding and Bonding.

PART 2 - PRODUCTS

- 2.1 EQUIPMENT
- .1 System and circuit, equipment, grounding conductors, bare stranded copper, soft annealed, size as indicated.
  - .2 Insulated grounding conductors: green, soft-drawn, stranded copper of minimum 98% conductivity, un-tinned, type TW. Conductors to be FT4 rated when installed in free air.
  - .3 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 INSTALLATION  
GENERAL
- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories as indicated to conform to the requirements of the local authority having jurisdiction. 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.



3.1 INSTALLATIONGENERAL

(Cont'd)

- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Soldered joints not permitted.
- .6 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.
- .7 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.
- .8 Bond single conductor, metallic armoured cables to cabinet at supply end and load end.

3.2 SYSTEM AND  
CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections to neutral of primary 600V system, secondary 208V system.

3.3 GROUNDING BUS

- .1 Ground items of electrical equipment in electrical room to existing ground bus.

3.4 COMMUNICATION  
SYSTEMS

- .1 Install grounding connections for telephone, sound, fire alarm and intercommunication systems as required by the equipment manufacturer.
- .2 All metal conduits and other metal parts pertaining to communications systems shall be grounded.

3.5 EQUIPMENT  
GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: Service equipment, control panels and distribution panels, duct and pipe systems, conduit systems, and frames of motors.

3.6 FIELD QUALITY  
CONTROL

- .1 Perform tests in accordance with Section 26 05 01.
  - .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.
-

- 3.6 FIELD QUALITY CONTROL    .3    Perform tests before energizing electrical system.  
\_\_\_\_\_(Cont'd)                    .4    Disconnect ground fault indicator during tests.

PART 1 - GENERAL

1.1 NOT USED .1 Not Used.

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted or suspended. Finish: galvanized steel c/w accessories as required. Stainless steel channels where indicated on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION .1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with nylon shields.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceiling. 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.

.4 Strap AC-90 cable at box location plus every 900 m.

.7 Suspended support systems.

.1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.

3.1 INSTALLATION  
(Cont'd)

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- .7 (Cont'd)
- .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use channels at code spacing.
- .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.

PART 1 - GENERAL

- 1.1 RELATED SECTIONS
- .1 Section 26 05 29 - Hangers and Supports for Electrical.
  - .2 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- 1.2 REFERENCES
- .1 CSA C22.1-2015, Canadian Electrical Code, Part 1.
- 1.3 SUBMITTALS
- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

PART 2 - PRODUCTS

- 2.1 OUTLET AND CONDUIT BOXES GENERAL
- .1 Size boxes in accordance with CSA C22.1-2015.
  - .2 102 mm square or larger outlet boxes as required for special devices.
  - .3 Gang boxes where wiring devices are grouped.
  - .4 Blank cover plates for boxes without wiring devices.
  - .5 347V outlet boxes for 347V switching devices.
  - .6 Combination boxes with barriers where outlets for more than one system are grouped.
  - .7 Rough in boxes for special equipment or devices shall be in accordance with the manufacturer's approved shop drawings.
- 2.2 GALVANIZED STEEL OUTLET BOXES
- .1 One-piece electro-galvanized construction.
  - .2 Single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
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2.2 GALVANIZED  
STEEL OUTLET BOXES  
(Cont'd)

- .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.
- .5 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.

2.3 MASONRY BOXES

- .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounting 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 Metallic cast FS or FD boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

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 32 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.
- .5 Double split rings for AC-90 terminations.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
-

3.1 INSTALLATION  
(Cont'd)

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- .1 (Cont'd)
  - .1 Boxes placed on/or between steel studs shall be supported by Caddy TSGB supports or other acceptable product. Where only one box requires support, it may be directly attached to the metal stud only if this places the box in the correct position. Boxes shall be located to suit stud locations. The governing rules for box location shall be room function and room to room sound transmission.
  - .2 Boxes in T-Bar Ceilings shall be supported by heavy duty hangers and box mounting clips.
  - .3 Boxes in exterior walls shall be installed with due consideration given to the special wall construction. Provide extension rings or boxes with suitable depths.
- .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 and armoured cable connections. Reducing washers are not allowed.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

PART 1 - GENERAL

1.1 RELATED  
SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International).  
.1 CAN/CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.  
.2 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.  
.3 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.

1.3 SUBMITTALS

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

PART 2 - PRODUCTS

2.1 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .2 Flexible metal conduit: to CSA C22.2 No. 56, aluminum, liquid-tight flexible metal.

2.2 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.



- 2.2 CONDUIT FASTENINGS (Cont'd)
- .2 Beam clamps to secure conduits to exposed steel work.
  - .3 Channel type supports for two or more conduits at code spacing.
  - .4 Threaded rods, 6 mm diameter, to support suspended channels.

- 2.3 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, 45, or 22.5 degree bends for 25 mm and larger conduits.
  - .3 Steel Connectors and couplings for EMT.
    - .1 Die-cast fittings are not acceptable.
    - .2 All connectors to be c/w insulated throats.

- 2.4 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 all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate any part of the installed system components of the CSA/UL certification of these components.
  - .2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
  - .3 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
  - .4 Use EMT conduit for all wiring except where specified otherwise.

3.2 INSTALLATION  
(Cont'd)

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- .5 Wiring for branch circuits powered from the emergency power system shall be run in separate conduit from the other systems.
  - .6 Use flexible metal conduit for final connection to motors and other vibrating equipment in dry areas.
  - .7 Use liquid-tight flexible metal conduit and liquid-tight fittings for all indoor runs in damp or wet locations.
  - .8 Minimum conduit size: 21 mm.
  - .9 Bend conduit cold:
    - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
  - .10 Mechanically bend steel conduit over 21 mm diameter. Conduits 35mm or larger are to be bent using a hydraulic bender or use factory bends. Conduits found to be bent using methods other than above will be removed.
  - .11 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
  - .12 Install fish cord in empty conduits.
  - .13 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
  - .14 Dry conduits out before installing wire.
  - .15 Conduits which penetrate through fire walls are to be sealed using approved fire stop material. Conduits which penetrate through non fire rated walls into other parts of the building are to be caulked.
  - .16 Conduits entering sprinkler proof switchgear, panelboards, and other sprinkler proof enclosures shall use only compression style connectors and have all joints within 10 meters of the enclosure sealed with silicone sealant to prevent the intrusion of water in the event of sprinkler action.
  - .17 Coordinate all conduit routings with the mechanical trades. Do not run conduits or zone conduits at elevations which may interfere with ventilation or other trades.
-

3.3 SURFACE  
CONDUITS

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- .1 Run parallel or perpendicular to building lines.
- .2 Run conduits in flanged portion of structural steel.
- .3 Group conduits wherever possible on suspended channels.
- .4 Do not pass conduits through structural members except as indicated.
- .5 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

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- .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.

PART 1 - GENERAL

- 1.1 RELATED SECTIONS .1 Section 01 33 00 - Submittal Procedures.
- 1.2 REFERENCES .1 Canadian Standards Association (CSA International).  
.1 CSA-C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.  
.2 CSA-C22.2 No.42.1-00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).  
.3 CSA-C22.2 No.55-M1986(R2008), Special Use Switches.  
.4 CSA-C22.2 No.111-10, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).
- 1.3 SHOP DRAWINGS AND PRODUCT DATA .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4 MAINTENANCE AND OPERATION .1 Submit maintenance and operations data for incorporation into manual in accordance with Section 01 78 00.

PART 2 - PRODUCTS

- 2.1 SWITCHES .1 Specification Grade 20 A, 120 V or 347V, single pole, double pole, three-way, four-way switches to: CSA-C22.2 No.55 and CSA-C22.2 No.111.
- .2 Manually-operated general purpose ac switches with following features:  
.1 Terminal holes approved for No. 10 AWG wire.  
.2 Silver alloy contacts.  
.3 Urea or melamine moulding for parts subject to carbon tracking.  
.4 Suitable for back and side wiring.  
.5 White toggle.  
.6 Commercial Specification Grade.
- .3 Toggle operated fully rated for tungsten filament and LED fixtures, and up to 80% of rated capacity of motor loads.

- 2.1 SWITCHES  
(Cont'd)
- .4 Switches of one manufacturer throughout project.
- 2.2 RECEPTACLES
- .1 All receptacles shall be commercial specification grade minimum.
- .2 General purpose duplex receptacles, specification grade CSA type 5-15R, 125V, 15A, U-ground, tamper resistant with the following features:
- .1 White urea molded 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 riveted grounding contacts.
  - .6 Internal shutters for hot and neutral contacts to prevent insertion of foreign objects
- .3 Duplex Ground Fault Interrupting (GFI) Receptacle Specification Grade, CSA type 5-15R, 125V, 15A, U-Ground with the following features:
- .1 White urea molded housing.
  - .2 Suitable for No. 10 AWG wiring.
  - .3 Double wipe contacts and rivetted grounding contacts.
  - .4 Specification grade.
  - .5 Trip level: 4 to 6 mA. Trip time: 0.25 sec.
  - .6 Meets UL 498 and UL 943 for Class A GFCI's. CSA certified.
- 2.3 OCCUPANCY  
SENSORS
- .1 Ceiling Sensor: Dual ultrasonic/passive infrared technology for surface mounting on ceiling.
- .1 120 VAC power input and control output. 0-800 W load @ 120 VAC.
  - .2 Works in lighting conditions of 107.6 to 3,229.2 Lux.
  - .3 Adjustable time delay up to 30 minutes.
  - .4 Acceptable Material: Legrand Wattstopper DT-355, Lithonia Litronic, or approved equal.
- .2 Wall Sensor: Dual ultrasonic/passive infrared technology for surface mounting on wall.
- .1 120 VAC power input and control output. 0-800 W load @ 120 VAC.
  - .2 Works in lighting conditions of 21 to 2,152 Lux.
  - .3 Adjustable time delay up to 30 minutes.
-

2.3 OCCUPANCY SENSORS (Cont'd)  
(Cont'd)

.2 (Cont'd)  
.4 Acceptable material: Legrand Wattstopper DSW-301, or approved equal.

2.4 COVER PLATES

.1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.

.2 Cover plates from one manufacturer throughout project.

.3 Stainless steel, 1 mm thick cover plates for wiring devices mounted in flush-mounted outlet box.

### PART 3 - EXECUTION

3.1 INSTALLATION

.1 Switches:  
.1 Install single throw switches with handle in "UP" position when switch closed.  
.2 Install switches in gang type outlet box when more than one switch is required in one location.  
.3 Mount toggle switches at height in accordance with Section 26 05 01.

.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 01.  
.3 Where split receptacle has one portion switched, mount vertically and switch upper portion.

.3 Occupancy Sensors:  
.1 Provide all labour, setup and other services as necessary for proper installation and operation of devices.  
.2 Provide all required auxiliary devices, power packs and wiring to connect controls to luminaries.  
.3 Connect to lighting circuits.  
.4 Provide dedicated separate conduits for lighting control wiring.

.4 Cover plates:  
.1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.  
.2 Install suitable common cover plates where wiring devices are grouped.

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3.1 INSTALLATION  
(Cont'd)

.4 (Cont'd)

.3 Do not use cover plates meant for flush outlet boxes on surface mounted boxes.

PART 1 - GENERAL

1.1 RELATED  
REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control
- .3 Section 01 61 00 - Common Product Requirements.
- .4 Section 01 74 19 - Waste Management and Disposal.

1.2 REFERENCES

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

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review and approval by Departmental Representative.
  - .3 Photometric data to include: VCP Table where applicable spacing criterion.
- .3 Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.



1.3 SUBMITTALS(Cont'd)

- .3 (Cont'd)
  - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and relamping schedule.
  - .4 Luminaires described in the LIGHTING FIXTURES SCHEDULE identify quality, performance criteria and other parameters, as indicated for this project., and as such, named fixture samples as requested by the Departmental Representative.
  - .5 Fixtures from other manufacturer's may be acceptable, provided:
    - .1 Appearance and lighting performance are similar.
    - .2 Quality is equal or better.
    - .3 The fixture is provided with modifications and accessories to provide a complete product in keeping with the intent of the project.
    - .4 Approval is obtained in writing from the Departmental Representative to the supplier/manufacturer five (5) days prior to bid depository tender closing.
  - .6 Provide Shop Drawings on all fixtures.

1.4 QUALITY ASSURANCE

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

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
  - .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .4 Divert unused metal materials from landfill to metal recycling facility.
  - .5 Disposal and recycling of fluorescent lamps as per local regulations.
  - .6 Disposal of old PCB filled ballasts.
-

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PART 2 - PRODUCTS

- 2.1 FIXTURES .1 See lighting schedule.
- 2.2 FINISHES .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

PART 3 - EXECUTION

- 3.1 INSTALLATION .1 Locate and install luminaires as indicated.  
.2 Provide adequate support to suit ceiling system.  
.3 For suspended ceiling applications, support luminaires independent from ceiling and in accordance with local inspection requirements.
- 3.2 WIRING .1 Connect luminaires to lighting circuits.
- 3.3 LUMINAIRE SUPPORTS .1 For suspended ceiling installations support luminaires from ceiling grid in accordance with local inspection requirements.
- 3.4 LUMINAIRE ALIGNMENT .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.  
.2 Align luminaires mounted individually parallel or perpendicular to building grid lines.  
.3 Align luminaires as indicated on drawings.
- 3.5 CLEANING .1 Clean in accordance with Section 01 74 10 - Cleaning.  
.1 Remove surplus materials, excess materials, rubbish, tools and equipment.
-

3.5 CLEANING

(Cont'd)

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

PART 1 - GENERAL

- 1.1 PRODUCT DATA .1 Submit product data in accordance with Section 01 33 00.
- .2 Data to indicate unit specifications and components, mounting method, source of power and special attachments.
- 1.2 OPERATION AND MAINTENANCE DATA .1 Submit operation and maintenance data for incorporation in the Manual specified in Section 01 78 00.

PART 2 - PRODUCTS

- 2.1 WARRANTY .1 Provide all emergency lighting units complete with a minimum ten (10) year life warranty.
- 2.2 BATTERY UNIT .1 Supply voltage: 120VAC.
- .2 Output voltage: 12Vdc.
- .3 Operating time: four (4) hours continuous operation, based on full DC load.
- .4 Battery: sealed, maintenance free, ten (10) year life warranty.
- .5 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.
- .6 Solid state transfer circuit.
- .7 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.
- .8 Signal lights: L.E.D. solid state, for 'AC Power ON' and 'High Charge'.
- .9 Lamp heads: integral on unit, 345 horizontal and 180 vertical adjustment.
- .10 Lamp type: LED Type 4W (MR-16).
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2.2 BATTERY UNIT  
(Cont'd)

- .10 (Cont'd)
- .1 Cabinet: suitable for direct mounting to wall and complete with knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .2 Finish: white.
- .3 Auxiliary equipment:
  - .1 Test switch.
  - .2 Self Diagnostic circuitry.

2.3 REMOTE HEAD

- .1 Supply voltage: 12 V dc from the battery pack as indicated on the Drawings.
- .2 Lamp heads: Lamp heads and stem shall be injection molded, impact resistant, flame retardant thermoplastic. Lampheads shall be fully adjustable for aiming lamps. Lamp type: two (2) LED Type 4W lamps (MR-16).
- .3 Mounting: mounts directly onto standard octagon Junction box.
- .4 Housing: 125mm round canopy with two (2) lamp heads, white in colour.

2.4 WIRING OF  
REMOTE HEADS

- .1 Conduit: As specified in Section 26 05 34 - Conduits, Conduit Fastenings and Fittings.
- .2 Conductors: minimum #12 AWG RW90 in conduit.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install unit equipment and remote mounted fixtures as indicated.
- .2 Direct heads as indicated.
- .3 Make connections.
- .4 Test and verify operation of units upon loss and restoration of normal ac power. Verify 30 min. battery life upon loss of power.

PART 1 - GENERAL

- 1.1 RELATED WORK .1 Refer to mechanical drawings for required control sequences and interconnections.
- 1.2 PRODUCT DATA .1 Submit product data in accordance with Section 01 33 00.
- .2 Submit product data sheets for unit heaters. Include:
- .1 Product characteristics.
  - .2 Performance criteria.
  - .3 Mounting methods.
  - .4 Physical size.
  - .5 kW rating, voltage, phase.
  - .6 Cabinet material thicknesses.
  - .7 Limitations.
  - .8 Colour and finish.
- .3 Submit product data sheets for unit heaters. Include product characteristics, performance criteria, physical size, limitations and finish.
- 1.3 CLOSEOUT SUBMITTALS .1 Provide operation and maintenance data for unit heaters for incorporation into manual specified in Section 01 78 00.

PART 2 - PRODUCTS

- 2.1 RADIANT HEAT PANELS .1 Utilize alloy resistance wire element, electrically insulated, rated to 250 degrees C, uniformly distributed over panel face.
- .2 Utilize reflective foil to adhere heating elements to panels.
- .3 51 mm-thick, 4 PSF density high temperature mineral wool insulation.
- .4 22 gauge precoat galvanized steel frame.
- .5 Front panel finish: High-temperature baked-on powder coating, white.

- 2.1 RADIANT HEAT PANELS  
(Cont'd)
- .6 Watt density range of 65 to 95 watts per square foot at rated voltage.
  - .7 Electrical junction box attached to back of panel, with cover and internal pigtail wires.
  - .8 Hanger support clips at each panel corner.
  - .9 Size and electrical characteristics: 610mm x 1220 mm, 120 VAC: 750 Watts.
  - .10 Flexible conduit and connectors and silicone sealed seams.
  - .11 Mounting System: Tegular reveal edge for 15/16 inch suspension grid.
  - .12 Complete with low voltage relay kits.
- 2.2 CONTROLS
- .1 Wall mounted digital thermostats: 24 VAC rating as indicated.
  - .2 Provide control relay with 24 VAC coil control transformer in each heater or each heating section where multiple heaters are assembled together.
- PART 3 - EXECUTION
- 3.1 INSTALLATION
- .1 Install thermostats in locations indicated.
  - .2 Provide clearance from combustible material; equipment or service lines per manufacturer's recommendations.
  - .3 Make power and control connections. There shall be no exposed conduit or wire in finished areas.
  - .4 Mount heaters level.
  - .5 Remove knockouts and insert insulating bushings between each unit where units are mounted in rows.
- 3.2 FIELD QUALITY CONTROL
- .1 Perform tests in accordance with Section 26 05 01.
  - .2 Successfully demonstrate heaters and controls operate correctly.

PART 1 - GENERAL

- 1.1 RELATED SECTIONS .1 Section 01 33 00 - Submittal Procedures.
- 1.2 REFERENCES .1 Government of Canada.  
.1 NBC-2015, National Building Code of Canada.  
.2 Underwriter's Laboratories of Canada (ULC).  
.1 CAN/ULC-S524-06, Installation of Fire Alarm Systems.  
.2 CAN/ULC-S526-2015, Visual Signal Appliances, Fire Alarm.  
.3 CAN/ULC-S536, Inspection and Testing of Fire Alarm Systems.  
.4 CAN/ULC-S537-2013, Verification of Fire Alarm Systems.
- 1.3 REQUIREMENTS OF REGULATORY AGENCIES .1 System:  
.1 To meet requirements of Provincial Fire Commissioner.  
.2 System components: listed by ULC and comply with applicable provisions of National Building Code, and meet requirements of local authority having jurisdiction.
- 1.4 SHOP DRAWINGS .1 Submit shop drawings in accordance with Section 01 33 00.  
.2 Include:  
.1 Details for devices.  
.2 Submit shop drawings for all components outlined in this specification section.
- 1.5 CLOSEOUT SUBMITTALS .1 Provide operation and maintenance data for fire alarm system for incorporation into manual specified in Section 01 78 00.  
.2 Include:  
.1 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
-



1.6 EXTRA MATERIALS .1 Provide maintenance materials in accordance with Section 01 78 00.

1.7 MAINTENANCE .1 Provide one (1) year's free maintenance.

## PART 2 - PRODUCTS

2.1 MATERIALS .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.

.2 Visual signal devices: to CAN/ULC-S526.

2.2 VISUAL SIGNAL DEVICES .1 Fire alarm strobes to match existing devices installed in building.

.2 Waterproof where indicated.

2.3 SIGNALLING DEVICES .1 Temporal bell and strobe.  
.1 Semi-flush mounted, adjustable Candella output and adjustable audio output.  
.2 Alarm output synchronizing module(s) as required for synchronized tone and strobe throughout facility.

2.4 END-OF-LINE DEVICES .1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel.

## PART 3 - EXECUTION

3.1 INSTALLATION .1 Install devices in accordance with CAN/ULC-S524.

.2 Install strobes and connect to existing signalling circuits.

.3 Install end-of-line devices at end of signalling circuits if required.

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3.1 INSTALLATION  
(Cont'd)

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- .4 Splices are not permitted.
- .5 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.
- .6 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .7 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.
- .8 Reprogram fire alarm system to incorporate new devices. update all graphics throughout building as required.

3.2 FIELD QUALITY  
CONTROL

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- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical and CAN/ULC-S537. Include in the tender price for a minimum of one (1) visit for the manufacturer's representative to the site to accommodate verification of devices in each phase of the work as shown on the drawings.
- .2 Fire alarm system:
  - .1 Test each device to ensure proper operation.
  - .2 Check annunciator panels to ensure zones are shown correctly.
  - .3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of systems.
- .3 Verification agency to provide verification certification to Departmental Representative upon completion of testing.

## COVID-19 Construction Site Protocol

To help prevent the spread of COVID-19, NRC requires contractors who are managing construction sites within our buildings or on our grounds to include a COVID-19 Construction Site Protocol as part of their Site Specific Health and Safety Plan. Below you will find the expected actions and requirements that should be included in this protocol. For further information and guidance on prevention of the spreading of the COVID-19 virus on construction sites, please refer to the Canadian Construction Association website (<https://www.cca-acc.com/>).

**All NRC contractors and service providers have a responsibility to report to the NRC departmental representative any confirmed COVID-19 in the workplace.**

**NRC Contractors must provide their COVID-19 Plan as part of their site specific safety plan**

### HYGIENE PRACTICES:

- Clean your hands with soap and water for 20 seconds – before you eat, at the end of the workday, during the work shift whenever possible, and when you get home from work.
- Practice physical distancing of two metres (six feet).
- Do not shake hands; avoid physical contact.
- Do not share food, drinks, cigarettes, and personal hand tools.
- Do not touch your face, eyes, nose, and/or mouth with unwashed hands (i.e. when smoking, drinking water, eating, etc.).
- Follow good respiratory etiquette by covering your mouth and nose with a tissue or the crease of your elbow when you sneeze or cough.
- Regularly clean and disinfect commonly touched surfaces and tools.

### PROJECT MEETINGS AND ONSITE PRACTICES:

- Maintain a sign-in sheet to record attendance on site each day (sign-in, sign-out)
- Communicate to personnel a muster point with the Departmental Representative in case of building evacuation.
- Limit the number of persons in meetings (kick off meetings, health and safety talks, etc.)
- Ensure there is at least 2 metres one chair spacing between workers. This may require hosting video conferences or teleconferences more often. Where practical, move meetings outdoors and reinforce social distancing.
- Disinfect used pens, tables, chairs, after each meeting.
- Post signage at multiple locations on site.
- During subcontractor orientation meetings, discuss:
  - Muster point location in case of evacuation as determined by the supervisor and the Departmental Representative.
  - Physical distancing of two metres (six feet) at all times.
  - Hygiene and location of hand washing and hand sanitization stations.
  - What the company is doing at the site to promote a safe workplace and remind them that their health is important to you.
  - Where the safety posters are located.

- The importance of reporting to their supervisor if they are feeling unwell and leaving the project.

## HEALTH VERIFICATION OF PERSONNEL:

- Question all site visitors on the current status of their health. At the start of shifts, the supervisor is to confirm the health status of contractor personnel through discussions and notify the Departmental Representative of any issues.
- Document the conversation. This could be as simple as recording answers to the following questions:
  - Have you traveled internationally in the past 14 days?
  - Have you been in contact with someone who has traveled internationally in the past 14 days?
  - In the past 14 days, have you come into close contact (within two metres) with someone who has received a laboratory-confirmed COVID-19 diagnosis?
  - Do you feel ill in any way – sore throat, coughing, fever,runny nose, muscle ache,headache and difficulty breathing ?
- The supervisor, each day, is to ask for updates from workers who have left the site for self-isolation. Document any changes.
- At the end of shifts, the contractor shall confirm the health status of personnel through discussion with the sub-contractor supervisors and notify the Departmental Representative of any issues.

## RESPONSE TO SUSPECTED OR CONFIRMED COVID-19 CASES:

- Should an employee develop symptoms of respiratory illness (fever, cough or difficulty breathing), **they should isolate themselves from others as quickly as possible.**
- The employee's direct supervisor should send the employee home (avoiding the use of public transportation) and ask them to follow the advice of the local public health authorities.
- The following actions must immediately be taken by the supervisor if a positive COVID-19 case has been confirmed with an employee::
  - Report the occurrence immediately to the RPPM Departmental Representative on site.
  - Report the occurrence to their management team or appropriate authority representing the contractor of service provider.
  - Report to the local Public Health Authorities.
- The NRC is requiring all Contractors and Service Providers to take this consistent approach when dealing with suspected or confirmed cases of COVID-19 in the workplace.

**PLEASE NOTE:** This will now become an appendix of the Site Specific Health and Safety plan that the National Research Council requires prior to the start of projects.



**TP1 Amount Payable – General**

1.1 Subject to any other provisions of the contract, Her Majesty shall pay the Contractor, at the times and in the manner hereinafter set out, the amount by which

1.1.1 the aggregate of the amounts described in TP2 exceeds

1.1.2 the aggregate of the amounts described in TP3

and the Contractor shall accept that amount as payment in full satisfaction for everything furnished and done by him in respect of the work to which the payment relates.

**TP2 Amounts Payable to the Contractor**

2.1 The amounts referred to in TP1.1.1 are the aggregate of

2.1.1 the amounts referred to in the Articles of Agreement, and

2.1.2 the amounts, if any, that are payable to the Contractor pursuant to the General Conditions.

**TP3 Amounts Payable to Her Majesty**

3.1 The amounts referred to in TP1.1.2 are the aggregate of the amounts, in any, that the Contractor is liable to pay Her Majesty pursuant to the contract.

3.2 When making any payments to the Contractor, the failure of Her Majesty to deduct an amount referred to in TP3.1 from an amount referred to in TP2 shall not constitute a waiver of the right to do so, or an admission of lack of entitlement to do so in any subsequent payment to the Contractor.

**TP4 Time of Payment**

4.1 In these Terms of Payment

4.1.1 The “payment period” means a period of 30 consecutive days or such other longer period as is agreed between the Contractor and the Departmental Representative.

4.1.2 An amount is “due and payable” when it is due and payable by Her Majesty to the Contractor according to TP4.4, TP4.7 or TP4.10.

4.1.3 An amount is overdue when it is unpaid on the first day following the day upon which it is due and payable.

4.1.4 The “date of payment” means the date of the negotiable instrument of an amount due and payable by the Receiver General for Canada and given for payment.

4.1.5 The “Bank Rate” means the discount rate of interest set by the Bank of Canada in effect at the opening of business on the date of payment.



- 4.2 The Contractor shall, on the expiration of a payment period, deliver to the Departmental Representative in respect of that payment period a written progress claim that fully describes any part of the work that has been completed, and any material that was delivered to the work site but not incorporated into the work during that payment period.
- 4.3 The Departmental Representative shall, not later than ten days after receipt by him of a progress claim referred to in TP4.2,
- 4.3.1 inspect the part of the work and the material described in the progress claim; and
- 4.3.2 issue a progress report, a copy of which the Departmental Representative will give to the Contractor, that indicates the value of the part of the work and the material described in the progress claim that, in the opinion of the Departmental Representative,
- 4.3.2.1 is in accordance with the contract, and
- 4.3.2.2 was not included in any other progress report relating to the contract.
- 4.4 Subject to TP1 and TP4.5 Her Majesty shall, not later than 30 days after receipt by the Departmental Representative of a progress claim referred to in TP4.2, pay the Contractor
- 4.4.1 an amount that is equal to 95% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has been furnished by the Contractor, or
- 4.4.2 an amount that is equal to 90% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has not been furnished by the Contractor.
- 4.5 It is a condition precedent to Her Majesty's obligation under TP4.4 that the Contractor has made and delivered to the Departmental Representative,
- 4.5.1 a statutory declaration described in TP4.6 in respect of a progress claim referred to in TP4.2,
- 4.5.2 in the case of the Contractor's first progress claim, a construction schedule in accordance with the relevant sections of the Specifications, and
- 4.5.3 if the requirement for a schedule is specified, an update of the said schedule at the times identified in the relevant sections of the Specifications.
- 4.6 A statutory declaration referred to in TP4.5 shall contain a deposition by the Contractor that
- 4.6.1 up to the date of the Contractor's progress claim, the Contractor has complied with all his lawful obligations with respect to the Labour Conditions; and
- 4.6.2 up to the date of the Contractor's immediately preceding progress claim, all lawful obligations of the Contractor to subcontractors and suppliers of material in respect of the



work under the contract have been fully discharged.

- 4.7 Subject to TP1 and TP4.8, Her Majesty shall, not later than 30 days after the date of issue of an Interim Certificate of Completion referred to in GC44.2, pay the Contractor the amount referred to in TP1 less the aggregate of
- 4.7.1 the sum of all payments that were made pursuant to TP4.4;
  - 4.7.2 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty or rectifying defects described in the Interim Certificate of Completion; and
  - 4.7.3 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty of completing the parts of the work described in the Interim Certificate of Completion other than the defects referred to in TP4.7.2.
- 4.8 It is a condition precedent to Her Majesty's obligation under TP4.7 that the Contractor has made and delivered to the Departmental Representative,
- 4.8.1 a statutory declaration described in TP4.9 in respect of an Interim Certificate of Completion referred to in GC44.2, and
  - 4.8.2 if so specified in the relevant sections of the Specifications, and update of the construction schedule referred to in TP4.5.2 and the updated schedule shall, in addition to the specified requirements, clearly show a detailed timetable that is acceptable to the Departmental Representative for the completion of any unfinished work and the correction of all defects.
- 4.9 A statutory declaration referred to in TP4.8 shall contain a deposition by the contractor that up to the date of the Interim Certificate of Completion the Contractor has
- 4.9.1 complied with all of the Contractor's lawful obligations with respect to the Labour Conditions;
  - 4.9.2 discharged all of the Contractor's lawful obligations to the subcontractors and suppliers of material in respect of the work under the contract; and
  - 4.9.3 discharged the Contractor's lawful obligations referred to in GC14.6.
- 4.10 Subject to TP1 and TP4.11, Her Majesty shall, not later than 60 days after the date of issue of a Final Certificate of Completion referred to in GC44.1, pay the Contractor the amount referred to in TP1 less the aggregate of
- 4.10.1 the sum of all payments that were made pursuant to TP4.4; and
  - 4.10.2 the sum of all payments that were made pursuant to TP4.7.
- 4.11 It is a condition precedent to Her Majesty's obligation under TP4.10 that the Contractor has made and delivered a statutory declaration described in TP4.12 to the Departmental Representative.



- 4.12 A statutory declaration referred to in TP4.11 shall, in addition to the depositions described in TP4.9, contain a deposition by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contractor that arose out of the performance of the contract have been discharged and satisfied.

**TP5 Progress Report and Payment Thereunder Not Binding on Her Majesty**

- 5.1 Neither a progress report referred to in TP4.3 nor any payment made by Her Majesty pursuant to these Terms of Payment shall be construed as an admission by Her Majesty that the work, material or any part thereof is complete, is satisfactory or is in accordance with the contract.

**TP6 Delay in Making Payment**

- 6.1 Notwithstanding GC7 any delay by Her Majesty in making any payment when it is due pursuant to these Terms of Payment shall not be a breach of the contract by Her Majesty.

- 6.2 Her Majesty shall pay, without demand from the Contractor, simple interest at the Bank Rate plus 1 -1/4 per centum on any amount which is overdue pursuant to TP4.1.3, and the interest shall apply from and include the day such amount became overdue until the day prior to the date of payment except that

- 6.2.1 interest shall not be payable or paid unless the amount referred to in TP6.2 has been overdue for more than 15 days following

6.2.1.1 the date the said amount became due and payable, or

6.2.1.2 the receipt by the Departmental Representative of the Statutory Declaration referred to in TP4.5, TP4.8 or TP4.11,

whichever is the later, and

- 6.6.2 interest shall not be payable or paid on overdue advance payments if any.

**TP7 Right of Set-off**

- 7.1 Without limiting any right of set-off or deduction given or implied by law or elsewhere in the contract, Her Majesty may set off any amount payable to Her Majesty by the Contractor under this contract or under any current contract against any amount payable to the Contractor under this contract.

- 7.2 For the purposes of TP7.1, "current contract" means a contract between Her Majesty and the Contractor

7.2.1 under which the Contractor has an undischarged obligation to perform or supply work, labour or material, or

7.2.2 in respect of which Her Majesty has, since the date of which the Articles of Agreement were made, exercised any right to take the work that is the subject of the contract out of the Contractor's hands.





**TP8 Payment in Event of Termination**

- 8.1 If the contract is terminated pursuant to GC41, Her Majesty shall pay the Contractor any amount that is lawfully due and payable to the Contractor as soon as is practicable under the circumstances.

**TP9 Interest on Settled Claims**

- 9.1 Her Majesty shall pay to the Contractor simple interest on the amount of a settled claim at an average Bank Rate plus 1 ¼ per centum from the date the settled claim was outstanding until the day prior to the date of payment.
- 9.2 For the purposes of TP9.1,
- 9.2.1 a claim is deemed to have been settled when an agreement in writing is signed by the Departmental Representative and the Contractor setting out the amount of the claim to be paid by Her Majesty and the items or work for which the said amount is to be paid.
- 9.2.2 an "average Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the end of each calendar month averaged over the period the settled claim was outstanding.
- 9.2.3 a settled claim is deemed to be outstanding from the day immediately following the date the said claim would have been due and payable under the contract had it not been disputed.
- 9.3 For the purposes of TP9 a claim means a disputed amount subject to negotiation between Her Majesty and the Contractor under the contract.



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GC53	27	Contractor Status



## **GC1 Interpretation**

### **1.1 In the contract**

- 1.1.1 where reference is made to a part of the contract by means of numbers preceded by letters, the reference shall be construed to be a reference to the particular part of the contract that is identified by that combination of letters and numbers and to any other part of the contract referred to therein;
- 1.1.2 “contract” means the contract document referred to in the Articles of Agreement;
- 1.1.3 “contract security” means any security given by the Contractor to Her Majesty in accordance with the contract;
- 1.1.4 “Departmental Representative” means the officer or employee of Her Majesty who is designated pursuant to the Articles of Agreement and includes a person specially authorized by him to perform, on his behalf, any of his functions under the contract and is so designated in writing to the Contractor;
- 1.1.5 “material” includes all commodities, articles and things required to be furnished by or for the Contractor under the contract for incorporation into the work;
- 1.1.6 “Minister” includes a person acting for, or if the office is vacant, in place of the Minister and his successors in the office, and his or their lawful deputy and any of his or their representatives appointed for the purposes of the contract;
- 1.1.7 “person” includes, unless the context otherwise requires, a partnership, proprietorship, firm, joint venture, consortium and a corporation;
- 1.1.8 “plant” includes all animals, tools, implements, machinery, vehicles, buildings, structures, equipment and commodities, articles and things other than material, that are necessary for the due performance of the contract;
- 1.1.9 “subcontractor” means a person to whom the Contractor has, subject to GC4, subcontracted the whole or any part of the work;
- 1.1.10 “superintendent” means the employee of the Contractor who is designated by the Contractor to act pursuant to GC19;
- 1.1.11 “work includes, subject only to any express stipulation in the contract to the contrary, everything that is necessary to be done, furnished or delivered by the Contractor to perform the contract.

1.2 The headings in the contract documents, other than in the Plans and Specifications, form no part of the contract but are inserted for convenience of reference only.

1.3 In interpreting the contract, in the event of discrepancies or conflicts between anything in the Plans and Specifications and the General Conditions, the General Conditions govern.



- 1.4 In interpreting the Plans and Specifications, in the event of discrepancies or conflicts between
- 1.4.1 the Plans and Specifications, the Specifications govern;
  - 1.4.2 the Plans, the Plans drawn with the largest scale govern; and
  - 1.4.3 figured dimensions and scaled dimensions, the figured dimensions govern.

**GC2 Successors and Assigns**

- 2.1 The contract shall inure to the benefit of and be binding upon the parties hereto and their lawful heirs, executors, administrators, successors and assigns.

**GC3 Assignment of Contract**

- 3.1 The contract may not be assigned by the Contractor, either in whole or in part, without the written consent of the Minister.

**GC4 Subcontracting by Contractor**

- 4.1 Subject to this General Condition, the Contractor may subcontract any part of the work.
- 4.2 The Contractor shall notify the Departmental Representative in writing of his intention to subcontract.
- 4.3 A notification referred to in GC4.2 shall identify the part of the work, and the subcontractor with whom it is intended to subcontract.
- 4.4 The Departmental Representative may object to the intended subcontracting by notifying the Contractor in writing within six days of receipt by the Departmental Representative of a notification referred to in GC4.2.
- 4.5 If the Departmental Representative objects to a subcontracting pursuant to GC4.4, the Contractor shall not enter into the intended subcontract.
- 4.6 The contractor shall not, without the written consent of the Departmental Representative, change a subcontractor who has been engaged by him in accordance with this General Condition.
- 4.7 Every subcontract entered into by the Contractor shall adopt all of the terms and conditions of this contract that are of general application.
- 4.8 Neither a subcontracting nor the Departmental Representative's consent to a subcontracting by the Contractor shall be construed to relieve the Contractor from any obligation under the contract or to impose any liability upon Her Majesty.

**GC5 Amendments**



- 5.1 No amendment or change in any of the provisions of the contract shall have any force or effect until it is reduced to writing.

**GC6 No Implied Obligations**

- 6.1 No implied terms or obligations of any kind by or on behalf of Her Majesty shall arise from anything in the contract and the express covenants and agreements therein contained and made by Her Majesty are the only covenants and agreements upon which any rights against Her Majesty are to be founded.
- 6.2 The contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work that were made prior to the date of the contract.

**GC7 Time of Essence**

- 7.1 Time is of the essence of the contract.

**GC8 Indemnification by Contractor**

- 8.1 The Contractor shall indemnify and save Her Majesty harmless from and against all claims, demand, losses, costs, damages, actions, suits, or proceedings by whomever made, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by or attributable to the activities of the Contractor, his servants, agents, subcontractors and sub-subcontractors in performing the work including an infringement or an alleged infringement of a patent of invention or any other kind of intellectual property.
- 8.2 For the purpose of GC8.1, "activities" includes any act improperly carried out, any omission to carry out an act and any delay in carrying out an act.

**GC9 Indemnification by Her Majesty**

- 9.1 Her Majesty shall, subject to the Crown Liability Act, the Patent Act, and any other law that affects Her Majesty's rights, powers, privileges or obligations, indemnify and save the Contractor harmless from and against all claims, demands, losses, costs, damage, actions, suits or proceedings arising out of his activities under the contract that are directly attributable to
- 9.1.1 lack of or a defect in Her Majesty's title to the work site whether real or alleged; or
- 9.1.2 an infringement or an alleged infringement by the Contractor of any patent of invention or any other kind of intellectual property occurring while the Contractor was performing any act for the purposes of the contract employing a model, plan or design or any other thing related to the work that was supplied by Her Majesty to the Contractor.

**GC10 Members of House of Commons Not to Benefit**



- 10.1 As required by the Parliament of Canada Act, it is an express condition of the contract that no member of the House of Commons shall be admitted to any share of part of the contract or to any benefit arising therefrom.

### **GC11 Notices**

- 11.1 Any notice, consent, order, decision, direction or other communication, other than a notice referred to in GC11.4, that may be given to the Contractor pursuant to the contract may be given in any manner.
- 11.2 Any notice, consent, order, decision, direction or other communication required to be given in writing, to any party pursuant to the contract shall, subject to GC11.4, be deemed to have been effectively given
- 11.2.1 to the Contractor, if delivered personally to the Contractor or the Contractor's superintendent, or forwarded by mail, telex or facsimile to the Contractor at the address set out in A4.1, or
- 11.2.2 to Her Majesty, if delivered personally to the Departmental Representative, or forwarded by mail, telex or facsimile to the Departmental Representative at the address set out in A1.2.1.
- 11.3 Any such notice, consent, order, decision, direction or other communication given in accordance with GC11.2 shall be deemed to have been received by either party
- 11.3.1 if delivered personally, on the day that it was delivered,
- 11.3.2 if forwarded by mail, on the earlier of the day it was received and the sixth day after it was mailed, and
- 11.3.3 if forwarded by telex or facsimile, 24 hours after it was transmitted.
- 11.4 A notice given under GC38.1.1, GC40 and GC41, if delivered personally, shall be delivered to the Contractor if the Contractor is doing business as sole proprietor or, if the Contractor is a partnership or corporation, to an officer thereof.

### **GC12 Material, Plant and Real Property Supplied by Her Majesty**

- 12.1 Subject to GC12.2, the Contractor is liable to Her Majesty for any loss of or damage to material, plant or real property that is supplied or placed in the care, custody and control of the Contractor by Her Majesty for use in connection with the contract, whether or not that loss or damage is attributable to causes beyond the Contractor's control.
- 12.2 The Contractor is not liable to Her Majesty for any loss or damage to material, plant or real property referred to in GC12.1 if that loss or damage results from and is directly attributable to reasonable wear and tear.
- 12.3 The Contractor shall not use any material, plant or real property referred to in GC12.1 except for



the purpose of performing this contract.

- 12.4 When the Contractor fails to make good any loss or damage for which he is liable under GC12.1 within a reasonable time after being required to do so by the Departmental Representative, the Departmental Representative may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to Her Majesty for the cost thereof and shall, on demand, pay to Her Majesty an amount equal to that cost.
- 12.5 The Contractor shall keep such records of all material, plant and real property referred to in GC12.1 as the Departmental Representative from time to time requires and shall satisfy the Departmental Representative, when requested, that such material, plant and real property are at the place and in the condition which they ought to be.

### **GC13 Material, Plant and Real Property Become Property of Her Majesty**

- 13.1 Subject to GC14.7 all material and plant and the interest of the Contractor in all real property, licenses, powers and privileges purchased, used or consumed by the Contractor for the contract shall, after the time of their purchase, use or consumption be the property of Her Majesty for the purposes of the work and they shall continue to be the property of Her Majesty.
- 13.1.1 in the case of material, until the Departmental Representative indicates that he is satisfied that it will not be required for the work, and
- 13.1.2 in the case of plant, real property, licenses, powers and privileges, until the Departmental Representative indicates that he is satisfied that the interest vested in Her Majesty therein is no longer required for the purposes of the work.
- 13.2 Material or plant that is the property of Her Majesty by virtue of GC13.1 shall not be taken away from the work site or used or disposed of except for the purposes of the work without the written consent of the Departmental Representative.
- 13.3 Her Majesty is not liable for loss of or damage from any cause to the material or plant referred to in GC13.1 and the Contractor is liable for such loss or damage notwithstanding that the material or plant is the property of Her Majesty.

### **GC14 Permits and Taxes Payable**

- 14.1 The Contractor shall, within 30 days after the date of the contract, tender to a municipal authority an amount equal to all fees and charges that would be lawfully payable to that municipal authority in respect of building permits as if the work were being performed for a person other than Her Majesty.
- 14.2 Within 10 days of making a tender pursuant to GC14.1, the Contractor shall notify the Departmental Representative of his action and of the amount tendered and whether or not the municipal authority has accepted that amount.
- 14.3 If the municipal authority does not accept the amount tendered pursuant to GC14.1 the Contractor shall pay that amount to Her Majesty within 6 days after the time stipulated in GC14.2.



- 14.4 For the purposes of GC14.1 to GC14.3 “municipal authority” means any authority that would have jurisdiction respecting permission to perform the work if the owner were not Her Majesty.
- 14.5 Notwithstanding the residency of the Contractor, the Contractor shall pay any applicable tax arising from or related to the performance of the work under the contract.
- 14.6 In accordance with the Statutory Declaration referred to in TP4.9, a Contractor who has neither residence nor place of business in the province in which work under the contract is being performed shall provide Her Majesty with proof of registration with the provincial sales tax authorities in the said province.
- 14.7 For the purpose of the payment of any applicable tax or the furnishing of security for the payment of any applicable tax arising from or related to the performance of the work under the contract, the Contractor shall, notwithstanding the fact that all material, plant and interest of the Contractor in all real property, licenses, powers and privileges, have become the property of Her Majesty after the time of purchase, be liable, as a user or consumer, for the payment or for the furnishing of security for the payment of any applicable tax payable, at the time of the use or consumption of that material, plant or interest of the Contractor in accordance with the relevant legislation.

#### **GC15 Performance of Work under Direction of Departmental Representative**

- 15.1 The Contractor shall
- 15.1.1 permit the Departmental Representative to have access to the work and its site at all times during the performance of the contract;
  - 15.1.2 furnish the Departmental Representative with such information respecting the performance of the contract as he may require; and
  - 15.1.3 give the Departmental Representative every possible assistance to enable the Departmental Representative to carry out his duty to see that the work is performed in accordance with the contract and to carry out any other duties and exercise any powers specially imposed or conferred on the Departmental Representative under the contract.

#### **CG16 Cooperation with Other Contractors**

- 16.1 Where, in the opinion of the Departmental Representative, it is necessary that other contractors or workers with or without plant and material, be sent onto the work or its site, the Contractor shall, to the satisfaction of the Departmental Representative, allow them access and cooperate with them in the carrying out of their duties and obligation.
- 16.2 If
- 16.2.1 the sending onto the work or its site of other contractors or workers pursuant to GC16.1 could not have been reasonably foreseen or anticipated by the Contractor when entering into the contract, and





16.2.2 the Contractor incurs, in the opinion of the Departmental Representative, extra expense in complying with GC16.1, and

16.2.3 The Contractor has given the Departmental Representative written notice of his claim for the extra expense referred to in GC16.2.2 within 30 days of the date that the other contractors or workers were sent onto the work or its site,

Her Majesty shall pay the Contractor the cost, calculated in accordance with GC48 to GC50, of the extra labour, plant and material that was necessarily incurred.

### **GC17 Examination of Work**

17.1 If, at any time after the commencement of the work but prior to the expiry of the warranty or guarantee period, the Departmental Representative has reason to believe that the work or any part thereof has not been performed in accordance with the contract, the Departmental Representative may have that work examined by an expert of his choice.

17.2 If, as a result of an examination of the work referred to in GC17.1, it is established that the work was not performed in accordance with the contract, then, in addition to and without limiting or otherwise affecting any of Her Majesty's rights and remedies under the contract either at law or in equity, the Contractor shall pay Her Majesty, on demand, all reasonable costs and expenses that were incurred by Her Majesty in having that examination performed.

### **GC18 Clearing of Site**

18.1 The Contractor shall maintain the work and its site in a tidy condition and free from the accumulation of waste material and debris, in accordance with any directions of the Departmental Representative.

18.2 Before the issue of an interim certificate referred to in GC44.2, the Contractor shall remove all the plant and material not required for the performance of the remaining work, and all waste material and other debris, and shall cause the work and its site to be clean and suitable for occupancy by Her Majesty's servants, unless otherwise stipulated in the contract.

18.3 Before the issue of a final certificate referred to in GC44.1, the Contractor, shall remove from the work and its site all of the surplus plant and material and any waste material and other debris.

18.4 The Contractor's obligations described in GC18.1 to GC18.3 do not extend to waste material and other debris caused by Her Majesty's servants or contractors and workers referred to in GC16.1.

### **GC19 Contractor's Superintendent**

19.1 The Contractor shall, forthwith upon the award of the contract, designate a superintendent.

19.2 The Contractor shall forthwith notify the Departmental Representative of the name, address and telephone number of a superintendent designate pursuant to GC19.1.



- 19.3 A superintendent designated pursuant to GC19.1 shall be in full charge of the operations of the Contractor in the performance of the work and is authorized to accept any notice, consent, order, direction, decision or other communication on behalf of the Contractor that may be given to the superintendent under the contract.
- 19.4 The Contractor shall, until the work has been completed, keep a competent superintendent at the work site during working hours.
- 19.5 The Contractor shall, upon the request of the Departmental Representative, remove any superintendent who, in the opinion of the Departmental Representative, is incompetent or has been conducting himself improperly and shall forthwith designate another superintendent who is acceptable to the Departmental Representative.
- 19.6 Subject to GC19.5, the Contractor shall not substitute a superintendent without the written consent of the Departmental Representative.
- 19.7 A breach by the Contractor of GC19.6 entitles the Departmental Representative to refuse to issue any certificate referred to in GC44 until the superintendent has returned to the work site or another superintendent who is acceptable to the Departmental Representative has been substituted.

#### **GC20 National Security**

- 20.1 If the Minister is of the opinion that the work is of a class or kind that involves the national security, he may order the Contractor
- 20.1.1 to provide him with any information concerning persons employed or to be employed by him for purposes of the contract; and
  - 20.1.2 to remove any person from the work and its site if, in the opinion of the Minister, that person may be a risk to the national security.
- 20.2 The Contractor shall, in all contracts with persons who are to be employed in the performance of the contract, make provision for his performance of any obligation that may be imposed upon him under GC19 to GC21.
- 20.3 The Contractor shall comply with an order of the Minister under GC20.1

#### **GC21 Unsuitable Workers**

- 21.1 The Contractor shall, upon the request of the Departmental Representative, remove any person employed by him for purposes of the contract who, in the opinion of the Departmental Representative, is incompetent or has conducted himself improperly, and the Contractor shall not permit a person who has been removed to return to the work site.

#### **GC22 Increased or Decreased Costs**



- 22.1 The amount set out in the Articles of Agreement shall not be increased or decreased by reason of any increase or decrease in the cost of the work that is brought about by an increase or decrease in the cost of labour, plant or material or any wage adjustment arising pursuant to the Labour Conditions.
- 22.2 Notwithstanding GC22.1 and GC35, an amount set out in the Articles of Agreement shall be adjusted in the manner provided in GC22.3, if any change in a tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property
- 22.2.1 occurs after the date of the submission by the Contractor of his tender for the contract,
- 22.2.2 applies to material, and
- 22.2.3 affects the cost to the Contractor of that material.
- 22.3 If a change referred to in GC22.2 occurs, the appropriate amount set out in the Articles of Agreement shall be increased or decreased by an amount equal to the amount that is established by an examination of the relevant records of the Contractor referred to in GC51 to be the increase or decrease in the cost incurred that is directly attributable to that change.
- 22.4 For the purpose of GC22.2, where a tax is changed after the date of submission of the tender but public notice of the change has been given by the Minister of Finance before that date, the change shall be deemed to have occurred before the date of submission of the tender.

### **GC23 Canadian Labour and Material**

- 23.1 The Contractor shall use Canadian labour and material in the performance of the work to the full extent to which they are procurable, consistent with proper economy and expeditious carrying out of the work.
- 23.2 Subject to GC23.1, the Contractor shall, in the performance of the work, employ labour from the locality where the work is being performed to the extent to which it is available, and shall use the offices of the Canada Employment Centres for the recruitment of workers wherever practicable.
- 23.3 Subject to GC23.1 and GC23.2, the Contractor shall, in the performance of the work, employ a reasonable proportion of persons who have been on active service with the armed forces of Canada and have been honourably discharged therefrom.

### **GC24 Protection of Work and Documents**

- 24.1 The Contractor shall guard or otherwise protect the work and its site, and protect the contract, specifications, plans, drawings, information, material, plant and real property, whether or not they are supplied by Her Majesty to the Contractor, against loss or damage from any cause, and he shall not use, issue, disclose or dispose of them without the written consent of the Minister, except as may be essential for the performance of the work.



- 24.2 If any document or information given or disclosed to the Contractor is assigned a security rating by the person who gave or disclosed it, the Contractor shall take all measures directed by the Departmental Representative to be taken to ensure the maintenance of the degree of security that is ascribed to that rating.
- 24.3 The Contractor shall provide all facilities necessary for the purpose of maintaining security, and shall assist any person authorized by the Minister to inspect or to take security measures in respect of the work and its site.
- 24.4 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure compliance with or to remedy a breach of GC24.1 to GC24.3.

### **GC25 Public Ceremonies and Signs**

- 25.1 The Contractor shall not permit any public ceremony in connection with the work without the prior consent of the Minister.
- 25.2 The Contractor shall not erect or permit the erection of any sign or advertising on the work or its site without the prior consent of the Departmental Representative.

### **GC26 Precautions against Damage, Infringement of Rights, Fire, and Other Hazards**

- 26.1 The Contractor shall, at his own expense, do whatever is necessary to ensure that
- 26.1.1 no person, property, right, easement or privilege is injured, damaged or infringed by reasons of the Contractor's activities in performing the contract;
  - 26.1.2 pedestrian and other traffic on any public or private road or waterway is not unduly impeded, interrupted or endangered by the performance or existence of the work or plant;
  - 26.1.3 fire hazards in or about the work or its site are eliminated and, subject to any direction that may be given by the Departmental Representative, any fire is promptly extinguished;
  - 26.1.4 the health and safety of all persons employed in the performance of the work is not endangered by the method or means of its performance;
  - 26.1.5 adequate medical services are available to all persons employed on the work or its site at all times during the performance of the work;
  - 26.1.6 adequate sanitation measures are taken in respect of the work and its site; and
  - 26.1.7 all stakes, buoys and marks placed on the work or its site by or under the authority of the Departmental Representative are protected and are not removed, defaced, altered or destroyed.
- 26.2 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure



compliance with or to remedy a breach of GC26.1.

- 26.3 The Contractor shall, at his own expense, comply with a direction of the Departmental Representative made under GC26.2.

#### **GC27 Insurance**

- 27.1 The Contractor shall, at his own expense, obtain and maintain insurance contracts in respect of the work and shall provide evidence thereof to the Departmental Representative in accordance with the requirements of the Insurance Conditions "E".

- 27.2 The insurance contracts referred to in GC27.1 shall

27.2.1 be in a form, of the nature, in the amounts, for the periods and containing the terms and conditions specified in Insurance Conditions "E", and

27.2.2 provide for the payment of claims under such insurance contracts in accordance with GC28.

#### **GC28 Insurance Proceeds**

- 28.1 In the case of a claim payable under a Builders Risk/Installation (All Risks) insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid directly to Her Majesty, and

28.1.1 the monies so paid shall be held by Her Majesty for the purposes of the contract, or

28.1.2 if Her Majesty elects, shall be retained by Her Majesty, in which event they vest in Her Majesty absolutely.

- 28.2 In the case of a claim payable under a General Liability insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid by the insurer directly to the claimant.

- 28.3 If an election is made pursuant to GC28.1, the Minister may cause an audit to be made of the accounts of the Contractor and of Her Majesty in respect of the part of the work that was lost, damaged or destroyed for the purpose of establishing the difference, if any, between

28.3.1 the aggregate of the amount of the loss or damage suffered or sustained by Her Majesty, including any cost incurred in respect of the clearing and cleaning of the work and its site and any other amount that is payable by the Contractor to Her Majesty under the contract, minus any monies retained pursuant to GC28.12, and

28.3.2 the aggregate of the amounts payable by Her Majesty to the Contractor pursuant to the contract up to the date of the loss or damage.

- 28.4 A difference that is established pursuant to GC28.3 shall be paid forthwith by the party who is determined by the audit to be the debtor to the party who is determined by the audit to be the



creditor.

- 28.5 When payment of a deficiency has been made pursuant to GC28.4, all rights and obligations of Her Majesty and the Contractor under the contract shall, with respect only to the part of the work that was the subject of the audit referred to in GC28.3, be deemed to have been expended and discharged.
- 28.6 If an election is not made pursuant to GC28.1.2 the Contractor shall, subject to GC28.7, clear and clean the work and its site and restore and replace the part of the work that was lost, damaged or destroyed at his own expense as if that part of the work had not yet been performed.
- 28.7 When the Contractor clears and cleans the work and its site and restores and replaces the work referred to in GC 28.6, Her Majesty shall pay him out of the monies referred to in GC28.1 so far as they will thereunto extend.
- 28.8 Subject to GC28.7, payment by Her Majesty pursuant to GC28.7 shall be made in accordance with the contract but the amount of each payment shall be 100% of the amount claimed notwithstanding TP4.4.1 and TP4.4.2.

### **GC29 Contract Security**

- 29.1 The Contractor shall obtain and deliver contract security to the Departmental Representative in accordance with the provisions of the Contract Security Conditions.
- 29.2 If the whole or a part of the contract security referred to in GC29.1 is in the form of a security deposit, it shall be held and disposed of in accordance with GC43 and GC45.
- 29.3 If a part of the contract security referred to in GC29.1 is in the form of a labour and material payment bond, the Contractor shall post a copy of that bond on the work site.

### **GC30 Changes in the Work**

- 30.1 Subject to GC5, the Departmental Representative may, at any time before he issues his Final Certificate of Completion,
- 30.1.1 order work or material in addition to that provided for in the Plans and Specifications;  
and
- 30.1.2 delete or change the dimensions, character, quantity, quality, description, location or position of the whole or any part of the work or material provided for in the Plans and Specifications or in any order made pursuant to GC30.1.1,
- if that additional work or material, deletion, or change is, in his opinion, consistent with the general intent of the original contract.
- 30.2 The Contractor shall perform the work in accordance with such orders, deletions and changes that are made by the Departmental Representative pursuant to GC30.1 from time to time as if they had appeared in and been part of the Plans and Specifications.



- 30.3 The Departmental Representative shall determine whether or not anything done or omitted by the Contractor pursuant to an order, deletion or change referred to in GC30.1 increased or decreased the cost of the work to the Contractor.
- 30.4 If the Departmental Representative determines pursuant to GC30.3 that the cost of the work to the Contractor has been increased, Her Majesty shall pay the Contractor the increased cost that the Contractor necessarily incurred for the additional work calculated in accordance with GC49 or GC50.
- 30.5 If the Departmental Representative determines pursuant to GC30.3 that the cost of the work to the Contractor has been decreased, Her Majesty shall reduce the amount payable to the Contractor under the contract by an amount equal to the decrease in the cost caused by the deletion or change referred to in GC30.1.2 and calculated in accordance with GC49.
- 30.6 GC30.3 to GC30.5 are applicable only to a contract or a portion of a contract for which a Fixed Price Arrangement is stipulated in the contract.
- 30.7 An order, deletion or change referred to in GC30.1 shall be in writing, signed by the Departmental Representative and given to the Contractor in accordance with GC11.

### **GC31 Interpretation of Contract by Departmental Representative**

- 31.1 If, at any time before the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, any question arises between the parties about whether anything has been done as required by the contract or about what the Contractor is required by the contract to do, and, in particular but without limiting the generality of the foregoing, about
- 31.1.1 the meaning of anything in the Plans and Specification,
  - 31.1.2 the meaning to be given to the Plans and Specifications in case of any error therein, omission therefrom, or obscurity or discrepancy in their working or intention,
  - 31.1.3 whether or not the quality or quantity of any material or workmanship supplied or proposed to be supplied by the Contractor meets the requirements of the contract,
  - 31.1.4 whether or not the labour, plant or material provided by the Contractor for performing the work and carrying out the contract are adequate to ensure that the work will be performed in accordance with the contract and that the contract will be carried out in accordance with its terms,
  - 31.1.5 what quantity of any kind of work has been completed by the Contractor, or
  - 31.1.6 the timing and scheduling of the various phases of the performance of the work,
- the question shall be decided by the Departmental Representative whose decision shall be final and conclusive in respect of the work.
- 31.2 The Contractor shall perform the work in accordance with any decisions of the Departmental



Representative that are made under GC31.1 and in accordance with any consequential directions given by the Departmental Representative.

### **GC32 Warranty and Rectification of Defects in Work**

- 32.1 Without restricting any warranty or guarantee implied or imposed by law or contained in the contract documents, the Contractor shall, at his own expense,
- 32.1.1 rectify and make good any defect or fault that appears in the work or comes to the attention of the Minister with respect to those parts of the work accepted in connection with the Interim Certificate of Completion referred to GC44.2 within 12 months from the date of the Interim Certificate of Completion;
- 32.1.2 rectify and make good any defect or fault that appears in or comes to the attention of the Minister in connection with those parts of the work described in the Interim Certificate of Completion referred to in GC44.2 within 12 months from the date of the Final Certificate of Completion referred to in GC44.1.
- 32.2 The Departmental Representative may direct the Contractor to rectify and make good any defect or fault referred to in GC32.1 or covered by any other expressed or implied warranty or guarantee.
- 32.3 A direction referred to in GC32.2 shall be in writing, may include a stipulation in respect of the time within which a defect or fault is required to be rectified and made good by the Contractor, and shall be given to the Contractor in accordance with GC11.
- 32.4 The Contractor shall rectify and make good any defect or fault described in a direction given pursuant to GC32.2 within the time stipulated therein.

### **GC33 Non-Compliance by Contractor**

- 33.1 If the Contractor fails to comply with any decision or direction given by the Departmental Representative pursuant to GC18, GC24, GC26, GC31 or GC32, the Departmental Representative may employ such methods as he deems advisable to do that which the Contractor failed to do.
- 33.2 The Contractor shall, on demand, pay Her Majesty an amount that is equal to the aggregate of all cost, expenses and damage incurred or sustained by Her Majesty by reason of the Contractor's failure to comply with any decision or direction referred to in GC33.1, including the cost of any methods employed by the Departmental Representative pursuant to GC33.1.

### **GC34 Protesting Departmental Representative's Decisions**

- 34.1 The Contractor may, within ten days after the communication to him of any decision or direction referred to in GC30.3 or GC33.1, protest that decision or direction.
- 34.2 A protest referred to in GC34.1 shall be in writing, contain full reasons for the protest, be signed





by the Contractor and be given to Her Majesty by delivery to the Departmental Representative.

- 34.3 If the Contractor gives a protest pursuant to GC34.2, any compliance by the Contractor with the decision or direction that was protested shall not be construed as an admission by the Contractor of the correctness of that decision or direction, or prevent the Contractor from taking whatever action he considers appropriate in the circumstances.
- 34.4 The giving of a protest by the Contractor pursuant to GC34.2 shall not relieve him from complying with the decision or direction that is the subject of the protest.
- 34.5 Subject to GC34.6, the Contractor shall take any action referred to in GC34.3 within three months after the date that a Final Certificate of Completion is issued under GC44.1 and not afterwards.
- 34.6 The Contractor shall take any action referred to in GC34.3 resulting from a direction under GC32 within three months after the expiry of a warranty or guarantee period and not afterwards.
- 34.7 Subject to GC34.8, if Her Majesty determines that the Contractor's protest is justified, Her Majesty shall pay the Contractor the cost of the additional labour, plant and material necessarily incurred by the Contractor in carrying out the protested decision or direction.
- 34.8 Costs referred to in GC34.7 shall be calculated in accordance with GC48 to GC50.

### **GC35 Changes in Soil Conditions and Neglect or Delay by Her Majesty**

- 35.1 Subject to GC35.2 no payment, other than a payment that is expressly stipulated in the contract, shall be made by Her Majesty to the Contractor for any extra expense or any loss or damage incurred or sustained by the Contractor.
- 35.2 If the Contractor incurs or sustains any extra expense or any loss or damage that is directly attributable to
- 35.2.1 a substantial difference between the information relating to soil conditions at the work site that is contained in the Plans and Specifications or other documents supplied to the Contractor for his use in preparing his tender or a reasonable assumption of fact based thereon made by the Contractor, and the actual soil conditions encountered by the Contractor at the work site during the performance of the contract, or
- 35.2.2 any neglect or delay that occurs after the date of the contract on the part of Her Majesty in providing any information or in doing any act that the contract either expressly requires Her Majesty to do or that would ordinarily be done by an owner in accordance with the usage of the trade,

he shall, within ten days of the date the actual soil conditions described in GC35.2.1 were encountered or the neglect or delay described in GC35.2.2 occurred, give the Departmental Representative written notice of his intention to claim for that extra expense or that loss or damage.

- 35.3 When the Contractor has given a notice referred to in GC35.2, he shall give the Departmental Representative a written claim for extra expense or loss or damage within 30 days of the date that



a Final Certificate of Completion referred to in GC44.1 is issued and not afterwards.

- 35.4 A written claim referred to in GC35.3 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable the Departmental Representative to determine whether or not the claim is justified and the Contractor shall supply such further and other information for that purpose as the Departmental Representative requires from time to time.
- 35.5 If the Departmental Representative determines that a claim referred to in GC35.3 is justified, Her Majesty shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC47 to GC50.
- 35.6 If, in the opinion of the Departmental Representative, an occurrence described in GC35.2.1 results in a savings of expenditure by the Contractor in performing the contract, the amount set out in the Articles of Agreement shall, subject to GC35.7, be reduced by an amount that is equal to the saving.
- 35.7 The amount of the saving referred to in GC35.6 shall be determined in accordance with GC47 to GC49.
- 35.8 If the Contractor fails to give a notice referred to in GC35.2 and a claim referred to in GC35.3 within the times stipulated, an extra payment shall not be made to him in respect of the occurrence.

### **GC36 Extension of Time**

- 36.1 Subject to GC36.2, the Departmental Representative may, on the application of the Contractor made before the day fixed by the Articles of Agreement for completion of the work or before any other date previously fixed under this General Condition, extend the time for its completion by fixing a new date if, in the opinion of the Departmental Representative, causes beyond the control of the Contractor have delayed its completion.
- 36.2 An application referred to in GC36.1 shall be accompanied by the written consent of the bonding company whose bond forms part of the contract security.

### **GC37 Assessments and Damages for Late Completion**

- 37.1 For the purposes of this General Condition
- 37.1.1 the work shall be deemed to be completed on the date that an Interim Certificate of Completion referred to in GC44.2 is issued, and
- 37.1.2 "period of delay" means the number of days commencing on the day fixed by the Articles of Agreement for completion of the work and ending on the day immediately preceding the day on which the work is completed but does not include any day within a period of extension granted pursuant to GC36.1, and any other day on which, in the opinion of the Departmental Representative, completion of the work was delayed for reasons beyond the control of the Contractor.



- 37.2 If the Contractor does not complete the work by the day fixed for its completion by the Articles of Agreement but completes it thereafter, the Contractor shall pay Her Majesty an amount equal to the aggregate of
- 37.2.1 all salaries, wages and travelling expenses incurred by Her Majesty in respect of persons overseeing the performance of the work during the period of delay;
  - 37.2.2 the cost incurred by Her Majesty as a result of the inability to use the completed work for the period of delay; and
  - 37.2.3 all other expenses and damages incurred or sustained by Her Majesty during the period of delay as a result of the work not being completed by the day fixed for its completion.
- 37.3 The Minister may waive the right of Her Majesty to the whole or any part of the amount payable by the Contractor pursuant to GC37.2 I, in the opinion of the Minister, it is in the public interest to do so.

#### **GC38 Taking the Work Out of the Contractor's Hands**

- 38.1 The Minister may, at his sole discretion, by giving a notice in writing to the Contractor in accordance with GC11, take all or any part of the work out of the Contractor's hands, and may employ such means as he sees fit to have the work completed if the Contractor
- 38.1.1 Has not, within six days of the Minister or the Departmental Representative giving notice to the Contractor in writing in accordance with GC11, remedied any delay in the commencement or any default in the diligent performance of the work to the satisfaction of the Departmental Representative;
  - 38.1.2 has defaulted in the completion of any part of the work within the time fixed for its completion by the contract;
  - 38.1.3 has become insolvent;
  - 38.1.4 has committed an act of bankruptcy;
  - 38.1.5 has abandoned the work;
  - 38.1.6 has made an assignment of the contract without the consent required by GC3.1; or
  - 38.1.7 has otherwise failed to observe or perform any of the provisions of the contract.
- 38.2 If the whole or any part of the work is taken out of the Contractor's hands pursuant to GC38.1,
- 38.2.1 the Contractor's right to any further payment that is due or accruing due under the contract is, subject only to GC38.4, extinguished, and
  - 38.2.2 the Contractor is liable to pay Her Majesty, upon demand, an amount that is equal to the amount of all loss and damage incurred or sustained by Her Majesty in respect of the



Contractor's failure to complete the work.

- 38.3 If the whole or any part of the work that is taken out of the Contractor's hands pursuant to GC38.1 is completed by Her Majesty, the Departmental Representative shall determine the amount, if any, of the holdback or a progress claim that had accrued and was due prior to the date on which the work was taken out of the Contractor's hands and that is not required for the purposes of having the work performed or of compensating Her Majesty for any other loss or damage incurred or sustained by reason of the Contractor's default.
- 38.4 Her Majesty may pay the Contractor the amount determined not to be required pursuant to GC38.3.

**GC39 Effect of Taking the Work Out of the Contractor's Hands**

- 39.1 The taking of the work or any part thereof out of the Contractor's hands pursuant to GC38 does not operate so as to relieve or discharge him from any obligation under the contract or imposed upon him by law except the obligation to complete the performance of that part of the work that was taken out of his hands.
- 39.2 If the work or any part thereof is taken out of the Contractor's hands pursuant to GC38, all plant and material and the interest of the Contractor is all real property, licenses, powers and privileges acquired, used or provided by the Contractor under the contract shall continue to be the property of Her Majesty without compensation to the Contractor.
- 39.3 When the Departmental Representative certifies that any plant, material, or any interest of the Contractor referred to in GC39.2 is no longer required for the purposes of the work, or that it is not in the interest of Her Majesty to retain that plant, material or interest, it shall revert to the Contractor.

**G40 Suspension of Work by Minister**

- 40.1 The Minister may, when in his opinion it is in the public interest to do so, require the Contractor to suspend performance of the work either for a specified or an unspecified period by giving a notice of suspension in writing to the Contractor in accordance with GC11.
- 40.2 When a notice referred to in GC40.1 is received by the Contractor in accordance with GC11, he shall suspend all operations in respect of the work except those that, in the opinion of the Departmental Representative, are necessary for the care and preservation of the work, plant and material.
- 40.3 The Contractor shall not, during a period of suspension, remove any part of the work, plant or material from its site without the consent of the Departmental Representative.
- 40.4 If a period of suspension is 30 days or less, the Contractor shall, upon the expiration of that period, resume the performance of the work and he is entitled to be paid the extra cost, calculated in accordance with GC48 to GC50, of any labour, plant and material necessarily incurred by him as a result of the suspension.



- 40.5 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor agree that the performance of the work will be continued by the Contractor, the Contractor shall resume performance of the work subject to any terms and conditions agreed upon by the Minister and the Contractor.
- 40.6 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor do not agree that performance of the work will be continued by the Contractor or upon the terms and conditions under which the Contractor will continue the work, the notice of suspension shall be deemed to be a notice of termination pursuant to GC41.

#### **GC41 Termination of Contract**

- 41.1 The Minister may terminate the contract at any time by giving a notice of termination in writing to the Contractor in accordance with GC11.
- 41.2 When a notice referred to in GC41.1 is received by the Contractor in accordance with GC11, he shall, subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the contract.
- 41.3 If the contract is terminated pursuant to GC41.1, Her Majesty shall pay the Contractor, subject to GC41.4, an amount equal to
- 41.3.1 the cost to the contractor of all labour, plant and material supplied by him under the contract up to the date of termination in respect of a contract or part thereof for which a Unit Price Arrangement is stipulated in the contract, or
  - 41.3.2 the lesser of
    - 41.3.2.1 an amount, calculated in accordance with the Terms and Payment, that would have been payable to the Contractor had he completed the work, and
    - 41.3.2.2 an amount that is determined to be due to the Contractor pursuant to GC49 in respect of a contract or part thereof for which a Fixed Price Arrangement is stipulated in the contract
- less the aggregate of all amounts that were paid to the Contractor by Her Majesty and all amounts that are due to Her Majesty from the Contractor pursuant to the contract.
- 41.4 If Her Majesty and the Contractor are unable to agree about an amount referred to in GC41.3 that amount shall be determined by the method referred to in GC50.

#### **GC42 Claims Against and Obligations of the Contractor or Subcontractor**

- 42.1 Her Majesty may, in order to discharge lawful obligations of and satisfy claims against the Contractor or a subcontractor arising out of the performance of the contract, pay any amount that is due and payable to the Contractor pursuant to the contract directly to the obligees of and the claimants against the Contractor or the subcontractor but such amount if any, as is paid by Her Majesty, shall not exceed that amount which the Contractor would have been obliged to pay to



such claimant had the provisions of the Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, been applicable to the work. Any such claimant need not comply with the provisions of such legislation setting out the steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which claimant might have had;

42.2 Her Majesty will not make any payment as described in GC42.1 unless and until that claimant shall have delivered to Her Majesty:

42.2.1 a binding and enforceable Judgment or Order of a court of competent jurisdiction setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.2 a final and enforceable award of an arbitrator setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.3 the consent of the Contractor authorizing a payment.

For the purposes of determining the entitlement of a claimant pursuant to GC42.2.1 and GC42.2.2, the notice required by GC42.8 shall be deemed to replace the registration or provision of notice after the performance of work as required by any applicable legislation and no claim shall be deemed to have expired, become void or unenforceable by reason of the claimant not commencing any action within the time prescribed by any applicable legislation.

42.3 The Contractor shall, by the execution of his contract, be deemed to have consented to submit to binding arbitration at the request of any claimant those questions that need be answered to establish the entitlement of the claimant to payment pursuant to the provisions of GC42.1 and such arbitration shall have as parties to it any subcontractor to whom the claimant supplied material, performed work or rented equipment should such subcontractor wish to be adjoined and the Crown shall not be a party to such arbitration and, subject to any agreement between the Contractor and the claimant to the contrary, the arbitration shall be conducted in accordance with the Provincial or Territorial legislation governing arbitration applicable in the Province or Territory in which the work is located.

42.4 A payment made pursuant to GC42.1 is, to the extent of the payment, a discharge of Her Majesty's liability to the Contractor under the contract and may be deducted from any amount payable to the Contractor under the contract.

42.5 To the extent that the circumstances of the work being performed for Her Majesty permit, the Contractor shall comply with all laws in force in the Province or Territory where the work is being performed relating to payment period, mandatory holdbacks, and creation and enforcement of mechanics' liens, builders' liens or similar legislation or in the Province of Quebec, the law relating to privileges.

42.6 The Contractor shall discharge all his lawful obligations and shall satisfy all lawful claims against him arising out of the performance of the work at least as often as the contract requires Her



Majesty to pay the Contractor.

- 42.7 The Contractor shall, whenever requested to do so by the Departmental Representative, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in GC42.6.
- 42.8 GC42.1 shall only apply to claims and obligations
- 42.8.1 the notification of which has been received by the Departmental Representative in writing before payment is made to the Contractor pursuant to TP4.10 and within 120 days of the date on which the claimant
- 42.8.1.1 should have been paid in full under the claimant's contract with the Contractor or subcontractor where the claim is for money that was lawfully required to be held back from the claimant; or
- 42.8.1.2 performed the last of the services, work or labour, or furnished the last of the material pursuant to the claimant's contract with the Contractor or subcontractor where the claim is not for money referred to in GC42.8.1.1, and
- 42.8.2 the proceedings to determine the right to payment of which, pursuant to GC42.2. shall have commenced within one year from the date that the notice referred to in GC42.8.1 was received by the Departmental Representative, and
- the notification required by GC42.8.1 shall set forth the amount claimed to be owing and the person who by contract is primarily liable.
- 42.9 Her Majesty may, upon receipt of a notice of claim under GC42.8.1, withhold from any amount that is due and payable to the Contractor pursuant to the contract the full amount of the claim or any portion thereof.
- 42.10 The Departmental Representative shall notify the Contractor in writing of receipt of any claim referred to in GC42.8.1 and of the intention of Her Majesty to withhold funds pursuant to GC42.9 and the Contractor may, at any time thereafter and until payment is made to the claimant, be entitled to post, with Her Majesty, security in a form acceptable to Her Majesty in an amount equal to the value of the claim, the notice of which is received by the Departmental Representative and upon receipt of such security Her Majesty shall release to the Contractor any funds which would be otherwise payable to the Contractor, that were withheld pursuant to the provisions of GC42.9 in respect of the claim of any claimant for whom the security stands.

### **GC43 Security Deposit – Forfeiture or Return**

- 43.1 If
- 43.1.1 the work is taken out of the Contractor's hands pursuant to GC38,
- 43.1.2 the contract is terminated pursuant to GC41, or
- 43.1.3 the Contractor is in breach of or in default under the contract,



Her Majesty may convert the security deposit, if any, to Her own use.

- 43.2 If Her Majesty converts the contract security pursuant to GC43.1, the amount realized shall be deemed to be an amount due from Her Majesty to the Contractor under the contract.
- 43.3 Any balance of an amount referred to in GC43.2 that remains after payment of all losses, damage and claims of Her Majesty and others shall be paid by Her Majesty to the Contractor if, in the opinion of the Departmental Representative, it is not required for the purposes of the contract.

#### **GC44 Departmental Representative's Certificates**

44.1 On the date that

44.1.1 the work has been completed, and

44.1.2 the Contractor has complied with the contract and all orders and directions made pursuant thereto,

both to the satisfaction of the Departmental Representative, the Departmental Representative shall issue a Final Certificate of Completion to the Contractor.

44.2 If the Departmental Representative is satisfied that the work is substantially complete he shall, at any time before he issues a certificate referred to in GC44.1, issue an Interim Certificate of Completion to the Contractor, and

44.2.1 for the purposes of GC44.2 the work will be considered to be substantially complete,

44.2.1.1 when the work under the contract or a substantial part thereof is, in the opinion of the Departmental Representative, ready for use by Her Majesty or is being used for the purpose intended; and

44.2.1.2 when the work remaining to be done under the contract is, in the opinion of the Departmental Representative, capable of completion or correction at accost of not more than

44.2.1.2.1 -3% of the first \$500,000, and

44.2.1.2.2 -2% of the next \$500,000, and

44.2.1.2.3 -1% of the balance

of the value of the contract at the time this cost is calculated.

44.3 For the sole purpose of GC44.2.1.2, where the work or a substantial part thereof is ready for use or is being used for the purposes intended and the remainder of the work or a part thereof cannot be completed by the time specified in A2.1, or as amended pursuant to GC36, for reasons beyond the control of the Contractor or where the Departmental Representative and the Contractor agree not to complete a part of the work within the specified time, the cost of that part of the work





which was either beyond the control of the Contractor to complete or the Departmental Representative and the Contractor have agreed not to complete by the time specified shall be deducted from the value of the contract referred to GC44.2.1.2 and the said cost shall not form part of the cost of the work remaining to be done in determining substantial completion.

44.4 An Interim Certificate of Completion referred to in GC44.2 shall describe the parts of the work not completed to the satisfaction of the Departmental Representative and all things that must be done by the Contractor

44.4.1 before a Final Certificate of Completion referred to in GC44.1 will be issued, and

44.4.2 before the 12-month period referred to in GC32.1.2 shall commence for the said parts and all the said things.

44.5 The Departmental Representative may, in addition to the parts of the work described in an Interim Certificate of Completion referred to in GC44.2, require the Contractor to rectify any other parts of the work not completed to his satisfaction and to do any other things that are necessary for the satisfactory completion of the work.

44.6 If the contract or a part thereof is subject to a Unit Price Arrangement, the Departmental Representative shall measure and record the quantities of labour, plant and material, performed, used and supplied by the Contractor in performing the work and shall, at the request of the Contractor, inform him of those measurements.

44.7 The Contractor shall assist and co-operate with the Departmental Representative in the performance of his duties referred to in GC44.6 and shall be entitled to inspect any record made by the Departmental Representative pursuant to GC44.6.

44.8 After the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, he shall, if GC44.6 applies, issue a Final Certificate of Measurement.

44.9 A Final Certificate of Measurement referred to in GC44.8 shall

44.9.1 contain the aggregate of all measurements of quantities referred to in GC44.6, and

44.9.2 be binding upon and conclusive between Her Majesty and the Contractor as to the quantities referred to therein.

#### **GC45 Return of Security Deposit**

45.1 After an Interim Certificate of Completion referred to in GC44.2 has been issued, Her Majesty shall, if the Contractor is not in breach of or in default under the contract, return to the Contractor all or any part of the security deposit that, in the opinion of the Departmental Representative, is not required for the purposes of the contract.

45.2 After a Final Certificate of Completion referred to in GC44.1 has been issued, Her Majesty shall return to the Contractor the remainder of any security deposit unless the contract stipulates otherwise.



- 45.3 If the security deposit was paid into the Consolidated Revenue Fund of Canada, Her Majesty shall pay interest thereon to the Contractor at a rate established from time to time pursuant to section 21(2) of the Financial Administration Act.

#### **GC46 Clarification of Terms in GC47 to GC50**

- 46.1 For the purposes of GC47 to GC50,
- 46.1.1 "Unit Price Table" means the table set out in the Articles of Agreement, and
- 46.1.2 "plant" does not include tools customarily provided by a tradesman in practicing his trade.

#### **GC47 Additions or Amendments to Unit Price Table**

- 47.1 Where a Unit Price Arrangement applies to the contract or a part thereof the Departmental Representative and the Contractor may, by an agreement in writing,
- 47.1.1 add classes of labour or material, and units of measurement, prices per unit and estimated quantities to the Unit Price Table if any labour, plant or material that is to be included in the Final Certificate of Measurement referred to in GC44.8 is not included in any class of labour, plant or material set out in the Unit Price Table; or
- 47.1.2 subject to GC47.2 and GC47.3, amend a price set out in the Unit Price Table for any class of labour, plant or material included therein if the Final Certificate of Measurement referred to in GC44.8 shows or is expected to show that the total quantity of that class of labour, plant or material actually performed, used or supplied by the Contractor in performing the work is
- 47.1.2.1 less than 85% of that estimated total quantity, or
- 47.1.2.2 in excess of 115% of that estimated total quantity.
- 47.2 In no event shall the total cost of an item set out in the Unit Price Table that has been amended pursuant to GC47.1.2.1 exceed the amount that would have been payable to the Contractor had the estimated total quantity actually been performed, used or supplied.
- 47.3 An amendment that is made necessary by GC47.1.2.2 shall apply only to the quantities that are in excess of 115%.
- 47.4 If the Departmental Representative and the Contractor do not agree as contemplated in GC47.1, the Departmental Representative shall determine the class and the unit of measurement of the labour, plant or material and, subject to GC47.2 and GC47.3, the price per unit therefore shall be determined in accordance with GC50.

#### **GC48 Determination of Cost – Unit Price Table**



- 48.1 Whenever, for the purposes of the contract, it is necessary to determine the cost of labour, plant or material, it shall be determined by multiplying the quantity of that labour, plant or material expressed in the unit set out in column 3 of the Unit Price Table by the price of that unit set out in column 5 of the Unit Price Table.

**GC49 Determination of Cost – Negotiation**

- 49.1 If the method described in GC48 cannot be used because the labour, plant or material is of a kind or class that is not set out in the Unit Price Table, the cost of that labour, plant or material for the purposes of the contract shall be the amount agreed upon from time to time by the Contractor and the Departmental Representative.
- 49.2 For the purposes of GC49.1, the Contractor shall submit to the Departmental Representative any necessary cost information requested by the Departmental Representative in respect of the labour, plant and material referred to in GC49.1

**GC50 Determination of Cost – Failing Negotiation**

- 50.1 If the methods described in GC47, GC48 or GC49 fail for any reason to achieve a determination of the cost of labour, plant and material for the purposes referred to therein, that cost shall be equal to the aggregate of
- 50.1.1 all reasonable and proper amounts actually expended or legally payable by the Contractor in respect of the labour, plant and material that falls within one of the classes of expenditure described in GC50.2 that are directly attributable to the performance of the contract,
  - 50.1.2 an allowance for profit and all other expenditures or costs, including overhead, general administration cost, financing and interest charges, and every other cost, charge and expenses, but not including those referred to in GC50.1.1 or GC50.1.3 or a class referred to in GC50.2, in an amount that is equal to 10% of the sum of the expenses referred to in GC50.1.1, and
  - 50.1.3 interest on the cost determined under GC50.1.1 and GC50.1.2, which interest shall be calculated in accordance with TP9,

provide that the total cost of an item set out in the Unit Price Table that is subject to the provisions of GC47.1.2.1 does not exceed the amount that would have been payable to the Contractor had the estimated total quantity of the said item actually be performed, used or supplied.

- 50.2 For purposes of GC50.1.1 the classes of expenditure that may be taken into account in determining the cost of labour, plant and material are,
- 50.2.1 payments to subcontractors;
  - 50.2.2 wages, salaries and travelling expenses of employees of the Contractor while they are actually and properly engaged on the work, other than wages, salaries, bonuses, living



and travelling expenses of personnel of the Contractor generally employed at the head office or at a general office of the Contractor unless they are engaged at the work site with the approval of the Departmental Representative,

- 50.2.3 assessments payable under any statutory authority relating to workmen's compensation, unemployment insurance, pension plan or holidays with pay;
- 50.2.4 rent that is paid for plant or an amount equivalent of the said rent if the plant is owned by the Contractor that is necessary for and used in the performance of the work, if the rent of the equivalent amount is reasonable and use of that plant has been approved by the Departmental Representative;
- 50.2.5 payments for maintaining and operating plant necessary for and used in the performance of the work, and payments for effecting such repairs thereto as, in the opinion of the Departmental Representative, are necessary to the proper performance of the contract other than payments for any repairs to the plant arising out of defects existing before its allocation to the work;
- 50.2.6 payments for material that is necessary for and incorporated in the work, or that is necessary for and consumed in the performance of the contract;
- 50.2.7 payments for preparation, delivery, handling, erection, installation, inspection protection and removal of the plant and material necessary for and used in the performance of the contract; and
- 50.2.8 any other payments made by the Contractor with the approval of the Departmental Representative that are necessary for the performance of the contract.

#### **GC51 Records to be kept by Contractor**

##### **51.1 The Contractor shall**

- 51.1.1 maintain full records of his estimated and actual cost of the work together with all tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto.
- 51.1.2 make all records and material referred to in GC5.1.1 available to audit and inspection by the Minister and the Deputy Receiver General for Canada or by persons acting on behalf of either of both of them, when requested;
- 51.1.3 allow any of the person referred to in GC51.1.2 to make copies of and to take extracts from any of the records and material referred to in GC51.1.1; and
- 51.1.4 furnish any person referred to in GC51.1.2 with any information he may require from time to time in connection with such records and material.

51.2 The records maintained by the Contractor pursuant to GC51.1.1 shall be kept intact by the Contractor until the expiration of two years after the date that a Final Certificate of Completion referred to in GC44.1 was issued or until the expiration of such other period of time as the



Minister may direct.

- 51.3 The Contractor shall cause all subcontractors and all other persons directly or indirectly controlled by or affiliated with the Contractor and all persons directly or indirectly having control of the Contractor to comply with GC51.1 and GC51.2 as if they were the Contractor.

**GC52 Conflict of Interest**

- 52.1 It is a term of this contract that no former public office holder who is not in compliance with the Conflict of Interest and Post-Employment Code for Public Office Holders shall derive a direct benefit from this contract.

**GC53 Contractor Status**

- 53.1 The Contractor shall be engaged under the contract as an independent contractor.
- 53.2 The Contractor and any employee of the said Contractor is not engaged by the contract as an employee, servant or agent of Her Majesty.
- 53.3 For the purposes of GC53.1 and GC53.2 the Contractor shall be solely responsible for any and all payments and deductions required to be made by law including those required for Canada or Quebec Pension Plans, Unemployment Insurance, Worker's Compensation or Income Tax.



## **GENERAL CONDITONS**

- IC 1 Proof of Insurance**
- IC 2 Risk Management**
- IC 3 Payment of Deductible**
- IC 4 Insurance Coverage**

## **GENERAL INSUANCE COVERAGES**

- GCI 1 Insured**
- GIC 2 Period of Insurance**
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## **COMMERCIAL GENERAL LIABILITY**

- CGL 1 Scope of Policy**
- CGL 2 Coverages/Provisions**
- CGL 3 Additional Exposures**
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## **BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS**

- BR 1 Scope of Policy**
- BR 2 Property Insured**
- BR 3 Insurance Proceeds**
- BR 4 Amount of Insurance**
- BR 5 Deductible**
- BR 6 Subrogation**
- BR 7 Exclusion Qualifications**

## **INSURER'S CERTIFICATE OF INSURANCE**



## **General Conditions**

### **IC 1 Proof of Insurance (02/12/03)**

Within thirty (30) days after acceptance of the Contractor's tender, the Contractor shall, unless otherwise directed in writing by the Contracting Officer, deposit with the Contracting Officer an Insurer's Certificate of Insurance in the form displayed in this document and, if requested by the Contracting Officer, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Insurance Coverage Requirements shown hereunder.

### **IC 2 Risk Management (01/10/94)**

The provisions of the Insurance Coverage Requirements contained hereunder are not intended to cover all of the Contractor's obligations under GC8 of the General Conditions "C" of the contract. Any additional risk management measures or additional insurance coverages the Contractor may deem necessary to fulfill its obligations under GC8 shall be at its own discretion and expense.

### **IC 3 Payment of Deductible (01/10/94)**

The payment of monies up to the deductible amount made in satisfaction of a claim shall be borne by the Contractor.

### **IC 4 Insurance Coverage (02/12/03)**

The Contractor has represented that it has in place and effect the appropriate and usual liability insurance coverage as required by these Insurance Conditions and the Contractor has warranted that it shall obtain, in a timely manner and prior to commencement of the Work, the appropriate and usual property insurance coverage as required by these Insurance Conditions and, further, that it shall maintain all required insurance policies in place and effect as required by these Insurance Conditions.



## INSURANCE COVERAGE REQUIREMENTS

### PART I GENERAL INSURANCE COVERAGES (GIC)

#### **GCI 1 Insured (02/12/03)**

Each insurance policy shall insure the Contractor, and shall include, as an Additional Named Insured, Her Majesty the Queen in right of Canada, represented by the National Research Council Canada.

#### **GIC 2 Period of Insurance (02/12/03)**

Unless otherwise directed in writing by the Contracting Officer or otherwise stipulated elsewhere in these Insurance Conditions, the policies required hereunder shall be in force and be maintained from the date of the contract award until the day of issue of the Departmental Representative's Final Certificate of Completion.

#### **GIC 3 Proof of Insurance (01/10/94)**

Within twenty five (25) days after acceptance of the Contractor's tender, the Insurer shall, unless otherwise directed by the Contractor, deposit with the Contractor an Insurer's Certificate of Insurance in the form displayed in the document and, if requested, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the requirements of these Insurance Coverages.

#### **GIC 4 Notification (01/10/94)**

Each Insurance policy shall contain a provision that (30) days prior written notice shall be given by the Insurer to Her Majesty in the event of any material change in or cancellation of coverage. Any such notice received by the Contractor shall be transmitted forthwith to Her Majesty.

### PART II COMMERCIAL GENERAL LIABILITY

#### **CGL 1 Scope of Policy (01/10/94)**

The policy shall be written on a form similar to that known and referred to in the insurance industry as IBC 2100 – Commercial General Liability policy (Occurrence form) and shall provide for limit of liability of not less than \$2,000,000 inclusive for Bodily Injury and Property Damage for any one occurrence or series of occurrences arising out of one cause. Legal or defence cost incurred in respect of a claim or claims shall not operate to decrease the limit of liability.

#### **CGL 2 Coverages/Provisions (01/10/94)**





The policy shall include but not necessarily be limited to the following coverages/provisions.

- 2.1 Liability arising out of or resulting from the ownership, existence, maintenance or use of premises by the Contractor and operations necessary or incidental to the performance of this contract.
- 2.2 "Broad Form" Property Damage including the loss of use of property.
- 2.3 Removal or weakening of support of any building or land whether such support be natural or otherwise.
- 2.4 Elevator liability (including escalators, hoists and similar devices).
- 2.5 Contractor's Protective Liability
- 2.6 Contractual and Assumed Liabilities un this contact.
- 2.7 Completed Operations Liability – The insurance, including all aspects of this Part II of these Insurance Conditions shall continue for a period of at least one (1) year beyond the date of the Departmental Representative's Final Certificate of Completion for the Completed Operations.
- 2.8 Cross Liability – The Clause shall be written as follows:

Cross Liability – The insurance as is afforded by this policy shall apply in respect to any claim or action brought against any one Insured by any other Insured. The coverage shall apply in the same manner and to the same extent as though a separate policy had been issued to each Insured. The inclusion herein of more than one Insured shall not increase the limit of the Insurer's liability.

- 2.9 Severability of Interests – The Clause shall be written as follows:

Severability of Interests – This policy, subject to the limits of liability stated herein, shall apply separately to each Insured in the same manner and to the same extent as if a separate policy had been issued to each. The inclusion herein of more than one insured shall not increase the limit of the Insurer's liability.

### **CGL 3 Additional Exposures (02/12/03)**

The policy shall either include or be endorsed to include the following exposures of hazards if the Work is subject thereto:

- 3.1 Blasting
- 3.2 Pile driving and calsson work
- 3.3 Underpinning
- 3.4 Risks associated with the activities of the Contractor on an active airport



- 3.5 Radioactive contamination resulting from the use of commercial isotopes
- 3.6 Damage to the portion of an existing building beyond that directly associated with an addition, renovation or installation contract.
- 3.7 Marine risks associated with the contraction of piers, wharves and docks.

**CGL 4 Insurance Proceeds  
(01/10/94)**

Insurance Proceeds from this policy are usually payable directly to a Claimant/Third Party.

**CGL 5 Deductible  
(02/12/03)**

This policy shall be issued with a deductible amount of not more than \$10,000 per occurrence applying to Property Damage claims only.

**PART III  
BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS**

**BR 1 Scope of Policy  
(01/10/94)**

The policy shall be written on an "All Risks" basis granting coverages similar to those provided by the forms known and referred to in the insurance industry as "Builder's Risk Comprehensive Form" or "Installation Floater – All Risks".

**BR 2 Property Insured  
(01/10/94)**

The property insured shall include:

- 2.1 The Work and all property, equipment and materials intended to become part of the finished Work at the site of the project while awaiting, during and after installation, erection or construction including testing.
- 2.2 Expenses incurred in the removal from the construction site of debris of the property insured, including demolition of damaged property, de-icing and dewatering, occasioned by loss, destruction or damage to such property and in respect of which insurance is provided by this policy.

**BR 3 Insurance Proceeds  
(01/10/94)**

- 3.1 Insurance proceeds from this policy are payable in accordance with GC28 of the General Conditions "C" of the contract.
- 3.2 This policy shall provide that the proceeds thereof are payable to Her Majesty or as the Minister may direct.



- 3.3 The Contractor shall do such things and execute such documents as are necessary to effect payment of the proceeds.

**BR 4 Amount of Insurance**  
(01/10/94)

The amount of insurance shall not be less than the sum of the contract value plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Her Majesty at the site of the project to be incorporated into and form part of the finished Work.

**BR 5 Deductible**  
(02/12/03)

The Policy shall be issued with a deductible amount of not more than \$10,000.

**BR 6 Subrogation**  
(01/10/94)

The following Clause shall be included in the policy:

"All rights of subrogation or transfer of rights are hereby waived against any corporation, firm, individual or other interest, with respect to which, insurance is provided by this policy".

**BR 7 Exclusion Qualifications**  
(01/10/94)

The policy may be subject to the standard exclusions but the following qualifications shall apply:

- 7.1 Faulty materials, workmanship or design may be excluded only to the extent of the cost of making good thereof and shall not apply to loss or damage resulting therefrom.
- 7.2 Loss or damage caused by contamination by radioactive material may be excluded except for loss or damage resulting from commercial isotopes used for industrial measurements, inspection, quality control radiographic or photographic use.
- 7.3 Use and occupancy of the project or any part of section thereof shall be permitted where such use and occupancy is for the purpose for which the project is intended upon completion.



**INSURER'S CERTIFICATE OF INSURANCE**

(TO BE COMPLETED BY INSURER (NOT BOKER) AND DELIVERD TO NATIONAL RESEARCH COUNCIL CANADA WITH 30 DAYS FOLLOWING ACCEPTANCE OF TENDER)

**CONTRACT**

DESCRIPTION OF WORK	CONTRACT NUMBER	AWARD DATE
LOCATION		

**INSURER**

NAME
ADDRESS

**BROKER**

NAME
ADDRESS

**INSURED**

NAME OF CONTRACTOR
ADDRESS

**ADDITIONAL INSURED**

HER MAJESTY THE QUEEN IN RIGHT OF CANADA AS REPRESENTED BY THE NATIONAL RESEARCH COUNCIL CANADA
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THIS DOCUENT CERTIFIES THAT THE FOLLOWING POLICES OF INSURANCE ARE AT PRESENT IN FORCE COVERING ALL OPERATIONS OF THE INSURE IN CONNECTION WITH THE CONTRACT MADE BETWEEN THE NAMED INSURED AND THE NATIONAL RESEARCH COUNCIL CANADA AND IN ACCORDANCE WITH THE INSURANCE CONDITIONS "E"

POLICY					
TYPE	NUMBER	INCEPTION DATE	EXPIRY DATE	LIMITS OF LIABILITY	DEDUCTIBLE
COMMERCIAL GENERAL LIABILITY					
BUILDERS RISK "AL RISKS"					
INSTALLATION FLOATER "ALL RISKS"					

THE INSURER AGREES TO NOTIFY THE NATIONAL RESEARCH COUNCIL CANADA IN WRITING 30 DAYS PRIOR TO ANY MATERIAL CHANGE IN OR CANCELLATION OF ANY POLICY OR COVERAGE SPECIFICALLY RELATED TO THE CONTRACT

NAME OF INSURER'S OFFICER OR AUTHORIZED EMPLOYEE	SIGNATURE	DATE:
		TELEPHONE NUMBER:

ISSUANCE OF THIS CERTIFIATE SHALL NOT LIMIT OR RESTRICT THE RIGHT OF THE NATIONAL RESEARCH COUNCIL CANADA TO REQUEST AT ANY TIME DUPLICATE COPIES OF SAID INSURANCE POLICIES



**CS1 Obligation to provide Contract Security**

- 1.1 The Contractor shall, at the Contractor's own expense, provide one or more of the forms of contract security prescribed in CS2.
- 1.2 The Contractor shall deliver to the Departmental Representative the contract security referred to in CS1.1 within 14 days after the date that the Contractor receives notice that the Contractor's tender or offer was accepted by Her Majesty.

**CS2 Prescribed Types and Amounts of Contract Security**

- 2.1 The Contractor shall deliver to the Departmental Representative pursuant to CS1
  - 2.1.1 a performance bond and a labour and material payment bond each in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, or
  - 2.1.2 a labour and material payment bond in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, and a security deposit in an amount that is equal to
    - 2.1.2.1 not less than 10% of the contract amount referred to in the Articles of Agreement where that amount does not exceed \$250,000, or
    - 2.1.2.2 \$25,000 plus 5% of the part of the contract amount referred to in the Articles of Agreement that exceeds \$250,000, or
  - 2.1.3 a security deposit in an amount prescribed by CS2.1.2 plus an additional amount that is equal to 10% of the contract amount referred to in the Articles of Agreement.
- 2.2 A performance bond and a labour and material payment bond referred to in CS2.1 shall be in a form and be issued by a bonding or surety company that is approved by Her Majesty.
- 2.3 The amount of a security deposit referred to in CS2.1.2 shall not exceed \$250,000 regardless of the contract amount referred to in the Articles of Agreement.
- 2.4 A security deposit referred to in CS2.1.2 and CS2.1.3 shall be in the form of
  - 2.4.1 a bill of exchange made payable to the Receiver General of Canada and certified by an approved financial institution or drawn by an approved financial institution on itself, or
  - 2.4.2 bonds of or unconditionally guaranteed as to principal and interest by the Government of Canada.
- 2.5 For the purposes of CS2.4
  - 2.5.1 a bill of exchange is an unconditional order in writing signed by the Contractor and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable future time a sum certain of money to, or to the order



of, the Receiver General for Canada, and

- 2.5.2 If a bill of exchange is certified by a financial institution other than a chartered bank then it must be accompanied by a letter or stamped certification confirming that the financial institution is in at least one of the categories referred to in CS2.5.3
- 2.5.3 an approved financial institution is
  - 2.5.3.1 any corporation or institution that is a member of the Canadian Payments Association,
  - 2.5.3.2 a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law,
  - 2.5.3.3 a credit union as defined in paragraph 137(6)(b) of the *Income Tax Act*,
  - 2.5.3.4 a corporation that accepts deposits from the public, if repayment of the deposit is guaranteed by Her Majesty in right of a province, or
  - 2.5.3.5 The Canada Post Corporation.
- 2.5.4 the bonds referred to in CS2.4.2 shall be
  - 2.5.4.1 made payable to bearer, or
  - 2.5.4.2 accompanied by a duly executed instrument of transfer of the bonds to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations, or
  - 2.5.4.3 registered, as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations, and
  - 2.5.4.4 provided on the basis of their market value current at the date of the contract.



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**SECURITY REQUIREMENTS CHECK LIST (SRCL)  
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)**

**PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE**

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	2. Branch or Directorate / Direction générale ou Direction	
3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant	
4. Brief Description of Work / Brève description du travail		
5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées? <input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui		
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques? <input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui		
6. Indicate the type of access required / Indiquer le type d'accès requis		
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c) <input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui		
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé. <input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui		
6. c) Is this a commercial courier or delivery requirement with <b>no</b> overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale <b>sans</b> entreposage de nuit? <input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui		
7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès		
Canada <input type="checkbox"/>	NATO / OTAN <input type="checkbox"/>	Foreign / Étranger <input type="checkbox"/>
7. b) Release restrictions / Restrictions relatives à la diffusion		
No release restrictions Aucune restriction relative à la diffusion <input type="checkbox"/>	All NATO countries Tous les pays de l'OTAN <input type="checkbox"/>	No release restrictions Aucune restriction relative à la diffusion <input type="checkbox"/>
Not releasable À ne pas diffuser <input type="checkbox"/>		
Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :	Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :	Restricted to: / Limité à : <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays :
7. c) Level of information / Niveau d'information		
PROTECTED A PROTÉGÉ A <input type="checkbox"/>	NATO UNCLASSIFIED NATO NON CLASSIFIÉ <input type="checkbox"/>	PROTECTED A PROTÉGÉ A <input type="checkbox"/>
PROTECTED B PROTÉGÉ B <input type="checkbox"/>	NATO RESTRICTED NATO DIFFUSION RESTREINTE <input type="checkbox"/>	PROTECTED B PROTÉGÉ B <input type="checkbox"/>
PROTECTED C PROTÉGÉ C <input type="checkbox"/>	NATO CONFIDENTIAL NATO CONFIDENTIEL <input type="checkbox"/>	PROTECTED C PROTÉGÉ C <input type="checkbox"/>
CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>	NATO SECRET NATO SECRET <input type="checkbox"/>	CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>
SECRET SECRET <input type="checkbox"/>	COSMIC TOP SECRET COSMIC TRÈS SECRET <input type="checkbox"/>	SECRET SECRET <input type="checkbox"/>
TOP SECRET TRÈS SECRET <input type="checkbox"/>		TOP SECRET TRÈS SECRET <input type="checkbox"/>
TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>		TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**PART A (continued) / PARTIE A (suite)**

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?  
 Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?  No / Non  Yes / Oui  
 If Yes, indicate the level of sensitivity:  
 Dans l'affirmative, indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?  
 Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?  No / Non  Yes / Oui  
 Short Title(s) of material / Titre(s) abrégé(s) du matériel :  
 Document Number / Numéro du document :

**PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)**

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

<input type="checkbox"/> RELIABILITY STATUS COTE DE FIABILITÉ	<input type="checkbox"/> CONFIDENTIAL CONFIDENTIEL	<input type="checkbox"/> SECRET SECRET	<input type="checkbox"/> TOP SECRET TRÈS SECRET
<input type="checkbox"/> TOP SECRET-SIGINT TRÈS SECRET - SIGINT	<input type="checkbox"/> NATO CONFIDENTIAL NATO CONFIDENTIEL	<input type="checkbox"/> NATO SECRET NATO SECRET	<input type="checkbox"/> COSMIC TOP SECRET COSMIC TRÈS SECRET
<input type="checkbox"/> SITE ACCESS ACCÈS AUX EMPLACEMENTS			

Special comments:  
 Commentaires spéciaux : \_\_\_\_\_

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.  
 REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work?  
 Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?  No / Non  Yes / Oui  
 If Yes, will unscreened personnel be escorted?  
 Dans l'affirmative, le personnel en question sera-t-il escorté?  No / Non  Yes / Oui

**PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)**

**INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS**

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises?  
 Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?  No / Non  Yes / Oui

11. b) Will the supplier be required to safeguard COMSEC information or assets?  
 Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?  No / Non  Yes / Oui

**PRODUCTION**

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises?  
 Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?  No / Non  Yes / Oui

**INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)**

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data?  
 Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS?  No / Non  Yes / Oui

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency?  
 Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale?  No / Non  Yes / Oui





**PART C - (continued) / PARTIE C - (suite)**

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.

Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.

Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

**SUMMARY CHART / TABLEAU RÉCAPITULATIF**

Category / Catégorie	PROTECTED / PROTÉGÉ			CLASSIFIED / CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET	NATO RESTRICTED / NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL / NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET / COSMIC TRÈS SECRET	PROTECTED / PROTÉGÉ			CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET
											A	B	C			
Information / Assets / Renseignements / Biens / Production																
IT Media / Support TI																
IT Link / Lien électronique																

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?  No /  Yes  
 La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?  Non /  Oui

**If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".**  
**Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.**

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?  No /  Yes  
 La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?  Non /  Oui

**If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).**  
**Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquez qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).**



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**PART D - AUTHORIZATION / PARTIE D - AUTORISATION**

13. Organization Project Authority / Chargé de projet de l'organisme			
Name (print) - Nom (en lettres moulées)		Title - Titre	Signature
			<i>Marty Fudge</i>
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
14. Organization Security Authority / Responsable de la sécurité de l'organisme			
Name (print) - Nom (en lettres moulées)		Title - Titre	Signature
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached? Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?			
			<input type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui
16. Procurement Officer / Agent d'approvisionnement			
Name (print) - Nom (en lettres moulées)		Title - Titre	Signature
Collin Long		Senior Contracting Officer	
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
		Collin.Long@nrc-cnrc.gc.ca	November 23, 2021
17. Contracting Security Authority / Autorité contractante en matière de sécurité			
Name (print) - Nom (en lettres moulées)		Title - Titre	Signature
Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

### COVID-19 vaccination requirement certification

In accordance with the COVID-19 Vaccination Policy for Supplier Personnel [COVID-19 vaccination requirement for supplier personnel - Buyandsell.gc.ca](#), all Bidders must provide with their bid, the COVID-19 Vaccination Requirement Certification attached to this bid solicitation, to be given further consideration in this procurement process. This Certification incorporated into the bid solicitation on its closing date is incorporated into, and forms a binding part of any resulting Contract.

### COVID-19 Vaccination Requirement Certification

I, \_\_\_\_\_ (*first and last name*), as the representative of  
 \_\_\_\_\_ (*name of business*) pursuant to  
 \_\_\_\_\_ (*insert solicitation number*), warrant and certify that all  
 personnel that \_\_\_\_\_ (*name of business*) will provide on the  
 resulting Contract who access federal government workplaces where they may come into contact with  
 public servants will be:

- (a) fully vaccinated against COVID-19 with Health Canada-approved COVID-19 vaccine(s); or
- (b) for personnel that are unable to be vaccinated due to a certified medical contraindication, religion or other prohibited grounds of discrimination under the Canadian Human Rights Act, subject to accommodation and mitigation measures that have been presented to and approved by Canada; until such time that Canada indicates that the vaccination requirements of the COVID-19 Vaccination Policy for Supplier Personnel are no longer in effect.

I certify that all personnel provided by \_\_\_\_\_ (*name of business*) have been notified of the vaccination requirements of the Government of Canada's COVID-19 Vaccination Policy for Supplier Personnel, and that the \_\_\_\_\_ (*name of business*) has certified to their compliance with this requirement.

I certify that the information provided is true as of the date indicated below and will continue to be true for the duration of the Contract. I understand that the certifications provided to Canada are subject to verification at all times. I also understand that Canada will declare a contractor in default, if a certification is found to be untrue, whether made knowingly or unknowingly, during the bid or contract period. Canada reserves the right to ask for additional information to verify the certifications. Failure to comply with any request or requirement imposed by Canada will constitute a default under the Contract.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

### **Optional**

For data purposes only, initial below if your business already has its own mandatory vaccination policy or requirements for employees in place. Initialing below **is not** a substitute for completing the mandatory certification above.

Initials: \_\_\_\_\_

Information you provide on this Certification Form and in accordance with the Government of Canada's COVID-19 Vaccination Policy for Supplier Personnel will be protected, used, stored and disclosed in accordance with the Privacy Act. Please note that you have a right to access and correct any information on your file, and you have a right to file a complaint with the Office of the Privacy Commissioner regarding the handling of your personal information. These rights also apply to all individuals who are deemed to be personnel for the purpose for the Contract and who require access to federal government workplaces where they may come into contact with public servants.