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**LEGEND**

* Specifications prepared by Consultants other than G. Bruce Stratton Architects have been prefixed with an asterisk. These Specifications are not included under, nor governed by G. Bruce Stratton Architects' seal.

**Consultant's Abbreviations:**

| | | |
|---|---|---|
| GBS | G. Bruce Stratton Architects | Architectural |
| GPY | GPY + Associates | Mechanical |
| S+A | Smith and Andersen | Electrical and Communication |

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to this Section.

### 1.2. SPECIFICATION FORMAT

1.2.1. Specifications are addressed to the Contractor. Specifications are not intended as detailed description of installation methods but serve to indicate particular requirements in completing the Work.

1.2.2. Where the Contract Documents do not provide sufficient information for complete installation of item, then as supplement, comply with manufacturer's written instructions for quality of work.

1.2.3. Portions of the Specifications are written in short form. Therefore, it shall be understood that where item of the Work is stated in heading followed by material, equipment, component, or operation, words "shall be", "shall consist of" or similar words or phrases are implied which denote supply, fabricate and supply, install, provide or commission of such materials, equipment or operations for component of the Work designated by heading.

1.2.4. Where items in the Contract Documents are referred to in singular, provide as many as required to complete the Work. Words used in one gender only shall mean females as well as males and conversely.

1.2.5. Drawings, Lists or Schedules of Items are intended to show scope and arrangement of the Work. For location of item described refer to such Drawings, Lists or Schedules unless location stipulated in the Specifications.

### 1.3. DEFINITIONS

Refer to the Definitions set out in the Contract Documents between the Owner and Contractor as amended by the Owner.

### 1.4. DISCREPANCIES/CONFLICTS/OMISSIONS

1.4.1. If discrepancies or conflicts in, or omissions from the Drawings, the Specifications or other Contract Documents are suspected, or if there is doubt as to meaning or intent thereof, notify the Consultant at once. Where there is conflict between the Contract Documents, the most stringent requirement shall prevail.

1.4.2. The Drawings, Specifications and other Contract Documents are intended to be in compliance with federal, provincial and municipal laws, by-laws, regulations and other requirements of authorities having jurisdiction. Perform work in conformity with such requirements. If discrepancies, conflicts or omissions are suspected, notify the Consultant at once.

1.4.3. Comply with the Consultant's written instructions or explanations.

1.4.4. Promptly and not later than within 10 Working Days of becoming aware of circumstances which may require a change in the Work or other directions, give written notice to the Consultant outlining such circumstances and request written directions. Do no work in affected area, or that would prevent the Consultant from properly assessing situation or evaluating change, without its prior written approval. The Consultant will act promptly to give the Contractor directions so the Work is not unreasonably delayed.

**1.5. DESCRIPTION OF THE WORK**

1.5.1. The Work of this Contract includes furnishing labour, materials, equipment, services and other related expenses to complete the Work specified under the Contract Documents.

1.5.2. Term "NIC" means Work of this Project which is not being performed or provided under this Contract; term means "Not In this Contract" or "Not a Part of the Work to be Performed or Provided by Contractor".

1.5.3. "NIC" work may be specified or indicated on the Drawings as an aid to the Contractor in scheduling amount of time and materials necessary for completion of the Contract.

**1.6. SCHEDULING**

1.6.1. Base sequence and scheduling of construction on maintaining continuous operation and access to the Work during construction.

1.6.2. Phase construction as described in this Section. Notify the Owner in writing 7 Days prior to beginning work in an occupied area. The Owner will accommodate request within 7 Days of the notification. Co-ordination with the Owner at the Place of the Work is crucial. Submit a progress schedule before commencement of the Work. Coordinate any suggested changes to schedule with the Owner. Ensure schedule includes adequate time for Product delivery and Shop Drawing preparation, review and resubmission.

1.6.3. Allow for un-scheduled interruption to schedule of the Work and suspend parts of the Work affected to permit the Owner to relocate furniture and equipment from the Place of the Work, into finished spaces. The Owner will coordinate this interruption.

**1.7. COMPLETION DEADLINES**

1.7.1. Phase and schedule the Work to meet deadlines originally committed to by the Contractor.

**1.8. INCLEMENT WEATHER AND COLD WEATHER WORK**

1.8.1. Take precautions during inclement weather and provide adequate protection.

1.8.2. Continue the Work, including winter months, if applicable, until the Work is completed and accepted by the Consultant.

1.8.3. Inclement weather or extra work caused thereby shall not be considered valid reason for additional payment or delay in satisfactory conclusion of the Work.

**1.9. OWNER OCCUPANCY**

1.9.1. The Owner reserves right to occupy and use portions of premises, whether the Work is partially or entirely completed, or whether completed on schedule or not, provided such occupancy does not interfere with the Contractor's continuing Work.

1.9.2. Partial occupancy or installation of equipment by the Owner does not imply acceptance of the Work in whole, or in part, nor shall it imply acknowledgment that terms of the Contract are fulfilled.

**1.10. PLACE OF THE WORK**

1.10.1. Confine extent of construction activities to area indicated on the Drawings as the Place of the Work and/or within area defined by property lines. Confine all equipment, materials, debris, offices, storage sheds and storage areas to within the boundaries of the scope of the Work unless additional spaces are approved by the Owner.

1.10.2. The Contractor has complete and exclusive use of the Place of the Work for performance of the Work. Assume responsibility for premises assigned, for performance of the Work.

1.10.3. Should the Contractor require that boundaries of the Place of the Work be temporarily extended, obtain approval of the Consultant.

1.10.4. Certain restrictions are specified as to use by the Contractor of various portions of the Place of the Work. Become familiar with these restrictions and establish work plan to accommodate these restrictions. No claims for extra costs due to such restrictions will be considered by the Owner.

1.10.5. Assume responsibility for care, custody and control of property which is assigned for performance of the Work. Assume responsibility for and Make Good damage to existing property attributable to performance of the Work.

**1.11. DEMOLITION, SECURITY AND ACCESS**

1.11.1. Coordinate demolition times, security requirements and access with the Owner.

**1.12. EXISTING AREAS AND WORK OF OTHER CONTRACTORS**

1.12.1. Commencement of parts of the Work in existing areas and in areas provided by Other Contractors, will be deemed to signify the Contractor's acknowledgment and acceptance of those parts of the Work.

1.12.2. Immediately report defects, which affect quality and performance of the Work, in writing to the Consultant.

1.12.3. Existing premises will remain occupied during the Work. Execute the Work to cause minimum interference with activities in existing premises and maintain maximum safety to occupants. Take reasonable measures to minimize and control noise, dirt and dust during the Work.

1.12.4. Before entering existing premises to carry out the Work or to obstruct or take out of use any area of existing premises, or to cause any other interference, request meeting with the Consultant in order to reach agreement as to time and length of time you may interfere, possess, obstruct or remove from use any such area or services.

1.12.5. Maintain temporary entrances to work area including enclosed hoardings as required. Maintain access to existing service entrance(s) at all times, including ready access for fuel oil trucks and delivery vehicles.

**1.13. SIGNS, ADVERTISING AND PUBLICATIONS**

1.13.1. Do not erect or display devices, signs or advertisements of labour, materials or services provided to the Work. Signs relative to fire, danger and safety are exempted from this requirement.

1.13.2. Do not consent to advertising of the Work, of any kind, without the Owner's and the Consultant's written approval. Do not consent to mention of the Work in any advertising or articles in any publication relating to the Work without approval of copy and written permission from the Owner and the Consultant.

**1.14. PROCEDURE AND SUPPLY OF CRITICAL MATERIALS**

1.14.1. Supply Products in ample time to be installed into the Work together with templates, measurements and other information required for placement.

**1.15. RESTRICTIONS**

1.15.1. The Work shall be confined to the Site limits indicated on the Drawings and/or within area defined by property lines. Work on the municipal property shall be carried out under regulations of respective municipality and Authorities Having Jurisdiction including without any limitations any associated fees, permits, insurance or bonding required.

1.15.2. Bring following restrictions to attention of workers on the Work and enforce them:

1.15.2.1. Restrict construction personnel to the Place of the Work and necessary access routes to it. Restrict non-construction personnel from the Site, except for the Contractor-authorized visitors.

**1.16. SECURITY REGULATIONS**

1.16.1. Execute the Work in accordance with following security requirements and regulations.

1.16.2. Ensure only necessary tools and equipment are brought to each work area where access by public is possible. Keep constant check on these items and, at end of each work shift, bring all tools and equipment to storage room as directed.

1.16.3. Construction work is NOT permitted weekdays between 8:00am – 4:30pm. Contractors are only permitted to work Monday to Friday 4:30pm – 8:00am and on weekends.

1.16.4. The Owner will provide security escort for the Work in locations it deems necessary.

1.16.5. The Owner may issue suitable keys to the Contractor, where possible. The Contractor shall sign receipt for keys issued and shall be responsible for admittance of its authorized personnel only to areas for which keys provide access. Return keys to the Owner immediately upon request.

1.16.6. Direct enquiries regarding security regulations to the Owner, who will advise the Contractor of any additional requirements.

1.16.7. Execute the Work taking into consideration movement of occupants.

**1.18. EXISTING SITE SERVICES**

1.18.1. Before commencing the Work, establish location and extent of existing services in area of the Work and notify the Consultant of findings.

1.18.2. If disruption of services which affects operation of existing building is necessary, give a minimum of 5 Working Days' notice to the Consultant and the Owner. Provide temporary services and obtain prior acceptance from the Consultant and the Owner with regard to timing and methods for providing temporary services.

1.18.3. Submit schedule to and obtain approval from the Consultant for each proposed shut-down of active service or facility. Adhere to approved schedule and provide notice to affected parties. Disconnect and relocate public utilities encountered in connection with the Work with minimum disturbance to occupants, their activities, pedestrian, vehicular traffic, public and private property. Issue notices, arrange for or provide services involving:

1.18.4.1. water pipes.

1.18.4.2. sanitary and storm sewers.

1.18.4.3. telephone conduits and cables.

1.18.4.4. electrical conduits and cables.

1.18.4.5. other similar items.

1.18.4. Should any piping, cables, or similar services be encountered during work of this Contract that are not known from the Owner's and utility companies' records, notify the Consultant and do not proceed with removal or cutting until directed in writing.

**1.19. SITE WORK**

1.19.1. Restore existing paving, sidewalks, curbs and landscaping damaged during construction. Provide paving, walks, curbs and landscaping to match existing conditions where not otherwise shown.

1.19.2. Provide sod to replace damaged grass and maintain it until it has rooted properly.

**1.20. NO SMOKING POLICY**

1.20.1. Cooperate, respect and comply with Smoke Free Workplace policy requirements of the Place of the Work. This policy applies to everyone who visits and works on this Project.

**1.21. ACOUSTIC PARTITIONS/CEILINGS**

1.21.1. Partitions and/or ceilings with sound attenuation insulation are designated as “Acoustic Partitions and Ceilings”. Provide sound rated partitions and ceilings in locations indicated to meet required minimum Sound Transmission Class (STC) ratings. If not stated otherwise, STC rating is 47.

1.21.2. Coordinate work of various Subcontractors to avoid “short circuiting” of the STC rating for “Acoustic Partitions and Ceilings”. Carefully locate and treat ducts, grilles, diffusers, electrical outlets, boxes and other similar mechanical and electrical devices. Where electrical boxes are situated back-to-back serving each side of the partitions, locate them at least 250 mm (10") apart laterally and if interconnected, use flexible connections.

1.2.1.3. Ensure to seal around cutouts for lights, cabinets, pipes, ducts, electrical boxes and other similar items. Avoid back-to-back penetrations of the diaphragm, flanking paths and door/ borrowed light openings. Refer to Section 09 21 16 – Gypsum Board for additional requirements

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including the Articles of Agreement, the General Conditions and Supplementary Conditions.

1.1.2. Comply with Division 1 requirements and documents referred to in this Section.

### 1.2. REFERENCES

1.2.1. Abbreviations and Acronyms:

1.2.1.1. CCO: Contemplated Change Order.

1.2.1.2. CD: Change Directive.

1.2.1.3. CO: Change Order.

1.2.1.4. HST: Harmonized Sales Tax.

### 1.3. CASH ALLOWANCES

1.3.1. The purpose of the Cash Allowances, if any, in the Bid Form is to cover the cost of extra work approved by the Region at its sole discretion, if required.

1.3.2 If the Region requests that a Cash Allowance be expended, the Contractor shall consult with the Consultant and/or Region in the selection of the Products, services and/or vendors required to carry out the work under the Cash Allowance, and shall obtain the Region's written approval for the selection of Products, services and/or vendor(s) in relation to the Cash Allowance.

1.3.3 If required by the Region, the Contractor shall obtain bids from a minimum of three vendors in relation to a Cash Allowance item, and submit the bids received to the Region and/or Consultant for written approval.

1.3.4 The Contractor shall submit, with the application for payment, an invoice showing the date of purchase, the vendor from which the purchase was made, the date of delivery of the Product or service, and the price, including delivery to the Site and all applicable taxes.

1.3.5 Cash Allowance payments will only be made with the written authorization of the Region, and shall not include any markups whatsoever. The Contractor shall have no claim on any unused portion of any Cash Allowance item.

1.3.6. Extend to the Owner refunds, trade and quantity discounts which may be received in purchasing under Cash Allowances, except cash discounts for prompt payment.

1.3.7. In submitting final adjustments of Cash Allowances, include duplicate, summary statements and copies of receipted invoices substantiating purchases under Cash Allowances.

1.3.8. Cash Allowance No. 1: Inspection and Testing,

1.3.8.1. Include the sum of: $20,000.00

1.3.9. Cash Allowance No. 2: Altos Partition Modifications,

1.3.9.1. Include the sum of: $30,000.00

1.3.10. Cash Allowance No. 3: Supply and Installation of finish door hardware.

1.3.10.1. Include the sum of: $50,000.00

1.3.11. Cash Allowance No. 4: Fire stopping not identified on the architectural and mechanical drawings discovered during demolition.

1.3.11.1 $ 30,000.00

1.3.12. Cash Allowance No.5: Wood infill panels and floor expansion joint cover plates.

1.3.12.1 $35,000.00

**1.4 NOT USED**

**1.5. CASH FLOW SCHEDULE**

1.5.1. Prior to commencement of the Work, submit a detailed cash flow projection schedule indicating anticipated billings on a month-by-month basis for duration of the Work, including timing of holdback release.

1.5.2. Update cash flow schedule monthly, recording cumulative as well as monthly totals.

**1.6. PROGRESS BILLING BREAKDOWN**

1.6.1. Prior to commencement of the Work, submit a detailed progress billing breakdown and obtain approval of the Consultant.

1.6.2. Progress billing breakdown shall include itemized values, (each excluding HST), applied against each of following:

1.6.2.1. mobilization and start-up.

1.6.2.2. general site expenses.

1.6.2.3. Cash Allowance amount.

1.6.2.4. each Section of Specifications (Divisions 2 - 49 inclusive).

1.6.2.5. as-built Drawings broken down by Architectural, Structural, Mechanical and Electrical disciplines.

1.6.2.6. Project closeout, comprising separate sums for:

1.6.2.6.1. manuals.

1.6.2.6.2. maintenance materials.

1.6.2.6.3. commissioning and training/demonstration for Owner's staff.

**1.7. CHANGES IN THE WORK DUE TO A SUPPLEMENTAL INSTRUCTION**

1.7.1. Supplemental Instruction does not normally include any change in the Contract Price nor in the Contract Time. The Contractor shall formally notify the Consultant in writing within 10 Days that Supplemental Instruction requires an amendment in the Contract Price and/or the Contract Time. If satisfied, the Consultant will issue a CCO for processing, or if notification has not been received within 10 Days, it is understood that there are no anticipated changes in the Contract Price and the Contract Time.

**1.8. CONTRACT MODIFICATION PROCEDURES**

1.8.1. Conform to GC 14 - Changes in the Work in the General Conditions of the Contract.

1.8.2. Promptly and not later than 10 Working Days after becoming aware of circumstances which may require a change in the Work or other directions, give written notice to the Consultant outlining such circumstances and requesting proposed change. Do no work in affected area, or that would prevent the Consultant from properly evaluating circumstances and proposed change, without obtaining written approval. The Consultant will act promptly to give the Contractor directions so Work is not unreasonably delayed.

1.8.3. Advise the Consultant in writing of any contradictions, discrepancies, omissions or errors discovered or revealed. Do not proceed before obtaining clarifications and directions from the Consultant in writing. Failure to follow this shall result in the Contractor assuming full responsibility for resulting circumstances and costs.

**1.9. CHANGE ORDER AND CHANGE DIRECTIVE**

1.9.1. Conform to GC 15 – Change Order and GC 16 – Change Directive in the General Conditions of the Contract.

1.9.2. Any variation in the Contract involving a change in total amount of the Contract Price or in Contract Schedule shall be initiated through the Consultant in form of a CCO describing work proposed under variation and requesting a quotation from Contractor.

1.9.3. Three copies of CCOs or CDs will be issued to Contractor. Additional copies of these documents, including referenced Drawings and Schedules, shall be provided by the Contractor.

1.9.4. Immediately inform all relevant Subcontractors and Suppliers of the proposed change.

1.9.5. Upon receipt of a CCO by the Contractor and where specifically directed by the Consultant, suspend all work affected by the proposed change until a CO is issued, or until CCO is cancelled.

1.9.6. Upon receipt of a CD, begin the work described therein as soon as possible and prepare a quotation for the work.

1.9.7. Return 1 copy of the CCO or CD with a quotation for the work.

1.9.8. Include all work described in the CCO and all other work caused, however incidental it may be, by the proposed change. Once the CO is issued by the Owner, no further claims for extra costs or time extensions will be accepted.

1.9.9. If quotation received is unacceptable, the Consultant will reject quotation and request revised quotation from the Contractor.

1.9.10. When the Consultant deems quotation acceptable, it will prepare a CO.

1.9.11. Value of Changes in the Work shall be determined and processed in accordance with the General Conditions of the Contract.

**1.10. APPLICATION FOR PROGRESS PAYMENTS AND PROGRESS PAYMENTS**

1.10.1. Conform to GC 18 – Certificates and Payments and GC 19 – Taxes and Duties in the General Conditions of the Contract.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. REFERENCES

1.2.1. Abbreviations and Acronyms:

1.2.1.1. MSDS: Material Safety Data Sheets.

1.2.1.2. OHSA: Occupational Health and Safety Act.

1.2.1.3. WHMIS: Workplace Hazardous Materials Information System.

### 1.3. PROJECT COORDINATION

1.31. Study the Contract Documents to determine extent of Work required by each Specification section and upon which Work of other sections depend and coordinate scope and extent of Work to be performed by each trade. Neither organization of the Specifications into Divisions and 3-part section format nor arrangements of the Drawings, schedules and Drawings shall affect in any way the Contractor's control in, or diminish its responsibility for, dividing the Work or establishing each Subcontractor's scope of Work. Claims for additional compensation arising from disputes between Subcontractors due to lack of coordination by the Contractor will not be considered.

1.3.2. Coordinate Work of each section as required for satisfactory and expeditious completion of the Work. Take field dimensions required. Take into account existing installations to assure best arrangements of components in available space. Consult before commencing the Work in critical locations. Fabricate and erect the Work to suit field dimensions and field conditions.

1.3.3. Provide forms, templates, anchors, sleeves, inserts and accessories or other components required to be fixed to or inserted in the Work. As applicable, set them in place or instruct related Specification sections as to their location.

1.3.4. Pay cost of extra Work if necessary to maintain the agreed upon schedule.

1.3.5. Coordinate Work of all Subcontractors including construction sequence, schedule and interfacing of all Work. Coordinate Work as required to incorporate metric modular components. Coordinate Work of each Subcontractor as required for satisfactory and expeditious completion of the Work. Ensure components to be built in are supplied in time with setting Drawings and other related information. Fabricate and erect the Work to suit field dimensions and field conditions.

1.3.6. Ensure the Contract Documents are fully coordinated with respect to architectural, structural, mechanical, electrical and other specialty requirements.

1.3.7. Cooperate and coordinate with the Consultant for moving the Owner's equipment into building when the Work or substantial part thereof is ready for use for purpose intended.

### 1.4. DOCUMENTS ON SITE

1.4.1. Maintain in good condition and order on site 1 copy of Addenda, proposed changes in the Work, Change Orders, test reports, manufacturer's installation and application instructions, progress photographs, as- built Drawings, approved progress schedules, minutes of site meetings, and other modifications to the Contract Documents.

**1.5. OWNER, CONSULTANT AND CONTRACTOR (OCC) MEETINGS**

1.5.1. Purpose: To review policy, financial status and schedule.

1.5.2. Period: Every 2 weeks on a mutually acceptable schedule.

1.5.3. Attendees:

1.5.3.1. Owner.

1.5.3.2. Consultant(s).

1.5.3.3. Contractor.

1.5.4. Chair: Consultant.

1.5.5. The Consultant shall prepare minutes recording decisions, comments, instructions required and a report on Schedule. The Consultant will distribute minutes to each participant within 5 Working Days.

**1.6. SITE COORDINATION AND PROGRESS MEETINGS**

1.6.1. Refer also to GC 3.1 of General Conditions of the Contract.

1.6.2. Conduct site meetings at regular intervals (every 2 weeks), to identify and resolve construction coordination items, record minutes including significant proceedings and decisions and identify "action by" parties; and reproduce and distribute to meeting participants, copies of minutes within 3 Working Days after each meeting. The Consultant also reserves right to call additional special emergency site meetings on short notice without any cost to the Owner.

1.6.3. Attendees:

1.6.3.1. The Contractor's project manager and site superintendent.

1.6.3.2. Mechanical and electrical Subcontractors.

1.6.3.3. Subcontractors invited by Contractor.

1.6.3.4. The Owner and/or the Consultant(s).

1.6.4. Chair: Contractor.

1.6.5. Include following:

1.6.5.1. Prepare agenda for meetings.

1.6.5.2. Distribute written notice of each meeting minimum 7 Days in advance of meeting date, stating time and place, to persons whose presence is required.

1.6.5.3. Make physical arrangements for meetings.

1.6.5.4. Record minutes and attendees; include significant proceedings and decisions.

1.6.5.5. Reproduce and distribute copies of minutes after each meeting to parties attending meeting, to parties affected by decisions made at meeting and to the Consultant.

1.6.5.6. Ensure representatives of the Contractor, the Contractor's consultants, Subcontractors and Suppliers attending meetings are qualified and authorized to act on behalf of entity each represents.

1.6.5.7. Ensure relative information is available to allow meetings to be conducted efficiently.

1.6.5.8. Consultant may attend meetings to ascertain whether the Work is consistent with the Contract Documents.

1.6.5.9. Construction Progress Schedule may be reviewed to ensure rapid and efficient completion of Work in accordance with the requirements of the Contract Documents. Keep Consultant informed of progress, of delays and of potential delays during all stages of Work.

1.6.5.10. Review, approval or correction of minutes of previous meeting.

1.6.5.11. Review of Work progress since previous meeting.

1.6.5.12. Field observations, problems, conflicts.

1.6.5.13. Problems which impede Construction Progress Schedule.

1.6.5.14. Review of off-Site fabrication, delivery schedules.

1.6.5.15. Review of submittals schedules.

1.6.5.16. Corrective measures and procedures to regain projected schedules.

1.6.5.17. Quality standards.

1.6.5.18. Pending changes and substitutions.

1.6.5.19. Other business.

**1.7. START-UP MEETING**

1.7.1. Presided over by the Consultant, after award of the Contract.

1.7.2. Attendees:

1.7.2.1. Consultant(s).

1.7.2.2. Contractor.

1.7.2.3. Contractor's superintendent.

1.7.2.4. Subcontractors (mechanical, electrical).

1.7.2.5. Major equipment Suppliers.

1.7.2.6. Others as appropriate.

1.7.3. Minimum Agenda:

1.7.3.1. List of major Subcontractors and Suppliers.

1.7.3.2. Tentative construction progress schedules.

1.7.3.3. Start date; submission of schedules; long term delivery items.

1.7.3.4. Insurance Certificates, Cash Flow Schedule, Construction Schedule, Shop Drawing submission schedule, bonds including Value Added Taxes, Trade Breakdown including value for Close Out, Workplace and Safety & Insurance Board Clearance Certificate, Project Sign.

1.7.3.5. Critical work sequencing.

1.7.3.6. Major equipment and Product deliveries and priorities.

1.7.3.7. Designation of responsible personnel.

1.7.3.8. Building Permit status.

1.7.3.9. Procedures for maintaining record documents.

1.7.3.10. Use of Premises: Office, keys, work and storage areas; Owner's requirements (storage delivery, path of construction activities, vehicle, by foot, carts, exterior and interior, elevator use, washrooms, bin location).

1.7.3.11. Construction facilities, controls, temporary hoarding, dust partitions, parking, hours, noisy work, interruption of services, smoking, cell phone usage and construction aids.

1.7.3.12. Construction scheduling (particularly drying time for concrete slabs).

1.7.3.13. Temporary utilities.

1.7.3.14. Safety and first-aid procedures.

1.7.3.15. Security procedures.

1.7.3.16. Housekeeping procedures.

**1.8. PRE-INSTALLATION TRADE MEETINGS**

1.8.1. If a Subcontractor requires a meeting prior to starting Work, arrange for such meeting of all parties associated with the Subcontractor trade as designated in the Contract Documents or as requested by the Consultant. Presided over by the Contractor, include the Consultant who may attend, include Subcontractor performing the Work involved, testing company's representative and the Contractor's consultants of applicable discipline. Review the Contract Documents for the Work for which the Subcontractor is responsible and determine complete understanding of requirements and responsibilities relative to the Work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, project staffing, restrictions on areas of concrete placement and other matters affecting construction, to permit compliance with intent of trade under consideration.

**1.9. SCHEDULE OF THE WORK**

1.9.1. Submit a detailed bar chart [critical path] construction schedule with activities itemized to enable the Contractor and the Consultant to monitor progress of the Work.

1.9.2. Schedule shall indicate without limitations dates for:

1.9.2.1. erection and dismantling of temporary facilities.

1.9.2.2. submission of Shop Drawings for various divisions of the Work.

1.9.2.3. submission of mechanical and electrical trades coordination and interference Drawings.

1.9.2.4. submission of samples and sample installations.

1.9.2.5. commencement and completion of each major division of the Work, including Work to be done by Subcontractors.

1.9.2.6. critical Work sequencing.

1.9.2.7. drying time for concrete slabs to allow for placement of moisture sensitive floor coverings.

1.9.2.8. major equipment deliveries and priorities.

1.9.2.9. final completion date.

1.9.3. Update and resubmit schedule on a monthly basis.

**1.10. SHORT TERM SCHEDULE**

1.10.1. On a bi-weekly basis, provide the Owner with a 2 week short term schedule based on above schedule, indicating important construction activities as the Owner and Consultant may see suitable for the Contract requirements.

**1.11. PROGRESS PHOTOGRAPHS**

1.11.1. Submit progress photographs in digital and hard copy formats, taken by a professional photographer, from date of commencement of the Work until the date of Substantial Performance of the Contract.

1.11.2. Submit colour, glossy, 200 mm x 250 mm (8" x 10") photographs in a clear sheet protector suitable for storage in a binder with a white patch in bottom, right corner indicating name of the Contract, compass direction of exposure, subject title, date and time of exposure.

1.11.3. Prior to commencement of the Work, submit 10 photographs of the Place of the Work and 6 photographs along the lines forming the perimeter of the Place of the Work.

1.11.4. During Work, submit 12 photographs reproduced in duplicate, each month, taken from different vantage points to illustrate progress of the Work, both exterior and interior.

1.11.5. Submit 36 interior photographs when the Work has been certified by the Consultant as substantially performed.

**1.12. PERSONNEL APPOINTMENT**

1.12.1. Appoint a senior member of staff, with full authority to commit the Contractor to methods and schedules for construction, to participate actively in administration and maintenance of detailed construction schedule. Provide necessary information on progress of the Work to enable a status report to be produced every 2 weeks.

**1.13. GENERAL REVIEW**

1.13.1. The Consultant shall conduct periodic field review to review the Work for general conformance with Contract Documents, code and Authorities Having Jurisdiction.

1.13.2. Review includes review of Shop Drawings, review of field work and review of reports produced by various inspection and testing agencies.

1.13.3. Record each review in manner suitable for submission to the Consultant at completion of the Contract along with inspection and testing reports at site meetings every second week.

**1.14. PRODUCT SUBSTITUTION PROPOSALS**

1.14.1. After award of the Contract, Product substitution proposals will be reviewed in accordance with this Section. The Owner reserve the right to reject proposed substitutions for operational, economic, aesthetic or technical reasons.

1.14.2. Submit following for each Product substitution proposal:

1.14.2.1. Shop Drawings, including full details.

1.14.2.2. samples.

1.14.2.3. difference in price, if any, in form of certified quotations of both selected and proposed substitutions.

1.14.3. Submit the Contractor's written acceptance of use of substituted Products and certification substituted Products:

1.14.3.1. will not exceed space requirements allocated for originally specified Products or, if they do,

the Contractor is including with substitution submission, design drawings, to accommodate substituted Product.

1.14.3.2. are compatible with and inert to adjacent materials.

1.14.3.3. will not affect project schedule due to delays in delivery and installation.

1.14.3.4. have been priced to include design adjustments required to accommodate substituted Products, indicate the Owner's acceptance in writing via a Change Order.

1.14.4. Proposed substitutions require the Consultant's review and acceptance in writing and, if there is a difference in price, extra or credit requires the Owner's acceptance.

**1.15. CERTIFICATES AND TRANSCRIPTS**

1.15.1. Immediately after receiving notification of award of the Contract, submit Workplace Safety & Insurance Certificate status, transcription of insurances and other certificates and transcripts required by the Contract Documents or the Consultant.

**1.16. CONTRACTOR'S PERSONNEL AND SUBCONTRACTORS**

1.16.1. Submit complete list of the Contractor's Subcontractors with addresses, phone numbers and personnel along with the Contractor's list of personnel.

**1.17. SUBMITTAL PROCEDURES**

1.17.1. Submit to the Consultant, and to Authorities Having Jurisdiction as required, documents to be submitted for review. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of the Contract Time or extra costs and no claim for extension of the Contract Time or increase to the Contract Price by reason of such default will be allowed. Final approval of Authorities Having Jurisdiction, where required, shall be obtained prior to submitting Shop Drawing or other documentation to the Consultant.

1.17.2. Prior to submission to the Consultant, the Contractor shall review submittals. Submittals not stamped, signed, dated and identified as to specific Contract will be returned without being examined and shall be considered rejected. Verify field measurements and ensure affected adjacent work are coordinated. Confirm and correlate information pertaining to fabrication processes, quantities, techniques of construction and installation and similar information.

**1.18. SHOP DRAWINGS**

1.18.1. Shop Drawing Schedule: Submit a Shop Drawing schedule.

1.18.2. Fabrication: Do not fabricate until Shop Drawings are indicated as "REVIEWED" or "REVIEWED AS NOTED" by the Consultant.

1.18.3. The Consultant's Shop Drawing Review:

1.18.3.1. The Consultant's review of Shop Drawings is for sole purpose of ascertaining conformance with general design concept.

1.18.3.2. The Consultant's review does not provide approval of items which remain the Contractor's responsibility.

1.18.3.3. Without limitation, among other things, the Contractor remains responsible for:

1.18.3.3.1. detail design inherent in Shop Drawings.

1.18.3.3.2. errors and omissions in Shop Drawings.

1.18.3.3.3. meeting requirements of the Contract Documents.

1.18.3.3.4. confirmed and correlated Site dimensions.

1.18.3.3.5. information that pertains solely to fabrication processes, techniques of construction and installation.

1.18.3.3.6. co-ordination of work of all Subcontractors.

1.18.4. Shop Drawing Requirements:

1.18.4.1. Indicate following minimum requirements as applicable:

1.18.4.1.1. plans, sections and details.

1.18.4.1.2. verified Site dimensions.

1.18.4.1.3. materials thicknesses and finishes.

1.18.4.1.4. methods of setting and sealing.

1.18.4.1.5. methods of securing, fastening and anchoring including field connections.

1.18.4.1.6. signed and sealed Shop Drawings and calculations where specifically required herein.

1.18.4.2. Do not make Product substitutions on Shop Drawings without the Consultant's written acceptance in accordance with Product substitution proposal process or they will be rejected. Replace unaccepted Product substitutions and complete the Work in accordance with the Contract Documents.

1.18.4.3. Determine which Shop Drawings the local Building Department will require for its approval and submit 2 final copies of each Shop Drawing to local Building Department. Obtain approval and pay associated charges and fees.

1.18.5. Shop Drawing Procedures:

1.18.5.1. The Consultant will provide a Shop Drawing stamp to the Contractor for use on the Work. Shop Drawing stamp remains the Consultant's property and must be returned at conclusion of the Work.

1.18.5.2. Execute following prior to submitting Shop Drawings to the Consultant:

1.18.5.2.1. review, check and mark-up Shop Drawings with comments and revisions and re-direct back to Subcontractor (“REVISE AND RESUBMIT”, etc.) in the first instance if required prior to forwarding to the Consultant.

1.18.5.2.2. stamp each Shop Drawing with Consultant's Shop Drawing stamp.

1.18.5.2.3. insert applicable Specification section reference, e.g., "10 28 00" for Section 10 28 00, Washroom Accessories.

1.18.5.2.4. insert next consecutive Shop Drawing number within that section, e.g., "002" for second Drawing within Section 10 28 00.

1.18.5.2.5. insert the Contractor's review date and signature of the Contractor's reviewer.

1.18.5.3. Submit following for the Consultant's review:

1.18.5.3.1. 1 print of each stamped Shop Drawing, to be returned to the Contractor.

1.18.5.3.2. 3 prints of each stamped Shop Drawing, not returned to the Contractor.

1.18.5.3.3. If catalogue cuts acceptable to the Consultant, submit as many copies of catalogue cuts for review as agreed to. Only 1 set to be returned to the Contractor.

1.18.5.4. Reproductions of the Consultant's Contract Documents are not acceptable as Shop Drawings.

1.18.5.5. Shop Drawings not conforming to above criteria will be automatically returned without review. Any resulting delays will be the Contractor's responsibility.

1.18.5.6. Shop Drawings submitted without specified Professional Engineer design and stamp will be automatically returned without review. Any resulting delays will be the Contractor's responsibility.

1.18.5.7. Do not resubmit Shop Drawings indicated as "REVIEWED" and "REVIEWED AS NOTED".

1.18.5.8. Resubmit Shop Drawings indicated as "REVISE AND RESUBMIT" with required changes and comments addressed. Insert letter "R" after Shop Drawing number on resubmitted Shop Drawings, re-date and re-sign. Identify revisions from earlier submissions graphically on revised Shop Drawings.

1.18.5.9. The Consultant requires 14 Days for review of Shop Drawing from time of the Consultant's receipt to time of the Consultant's return to the Contractor. The Contractor will establish a steady flow of Shop Drawings for review and avoid accumulation of an excessive quantity of Shop Drawings in a single submission.

1.18.5.10. Provide Shop Drawings required by the Contract Documents.

## 1.19. INTERFERENCE DRAWINGS

1.19.1. Prepare Drawings indicating relationship of new and existing and/or unforeseen conditions at congested areas prior to commencement of work in area.

1.19.2. For congested locations, before commencing installation, prepare Drawings showing relationship of ductwork, conduit, piping, sprinklers, ceiling supports and framing, communication and specialized equipment located within ceiling and shaft spaces.

1.19.3. Indicate locations of visible items such as air handling outlets, light fixtures, smoke detectors, sprinkler heads, communication grilles and access panels occurring at these locations.

1.19.4. Ensure interference Drawings are initialed by a responsible person of each Subcontractor involved along with the Contractor's signature and submitted to the Consultant for review and record purposes.

## 1.20. SAMPLES

1.20.1. Prior to fabrication or supply of Products, submit samples for the Consultant's review. Remove and discard Products whose samples have not been reviewed and accepted by the Consultant.

1.20.2. Deliver samples to the Consultant as directed with charges prepaid and allow for 1 of the samples to be kept by the Consultant.

1.20.3. Unless otherwise specified, submit samples in duplicate.

1.20.4. Identify each sample with:

1.20.4.1. Contract name and Contract number.

1.20.4.2. date of sample submission.

1.20.4.3. component name using the Specification's terminology.

1.20.4.4. material (including alloy).

1.20.4.5. finish including colour, sheen, texture.

1.20.4.6. dimensions including thickness.

1.20.5. Exhibit each of the following for each sample:

1.20.5.1. materials.

1.20.5.2. finishes:

1.20.5.2.1. material.

1.20.5.2.2. colour including maximum colour range within each specified colour.

1.20.5.2.3. sheen, tone.

1.20.5.2.4. texture.

1.20.5.2.5. range of blemishes and other markings.

1.20.6. Alter, refinish or provide additional samples until they are reviewed and accepted by the Consultant.

1.20.7. Fabricate samples using same tools and techniques to be employed in actual installation of the Work.

1.20.8. Provide Products in the Work which are identical to accepted samples.

1.20.9. Provide samples required by the Contract Documents.

**1.21. ACCESS PANELS AND ACCESS DOORS**

1.21.1. Before commencing installation of mechanical and electrical work, prepare, together with mechanical and electrical Subcontractors, on a set of the Drawings provided for that purpose, a complete lay-out of all access panels and access doors which will be required. Submit these lay-outs for review by the Consultant as specified for Shop Drawings and show exact sizes and locations of access panels and doors. Revisions may be required to lay-out before final review by the Consultant. Allow the Consultant to revise layout or quantity of access doors and panels by relocating related building services a maximum of 2000 mm (6' - 7") at no extra cost to the Owner. Should relocation exceed this measurement then the Contract Price may be adjusted in accordance with provisions for changes in the Contract Documents.

1.21.2. Finish access panels and doors to match adjacent wall and/or ceiling finish unless otherwise specified or indicated.

**1.22. WHMIS REQUIREMENTS**

1.22.1. Comply with WHMIS in accordance with OHSA requirements.

1.22.2. Before commencement of the Work and during full term of the Contract, provide a list with current MSDS of all hazardous materials proposed for use on the Contract.

1.22.3. In addition to submission of MSDS as required under regulations, submit emission reports where available or off-gassing data to help control possible harmful effects to indoor air quality during construction, occupation and including maintenance period.

1.22.4. Label hazardous materials used and/or supplied on the Contract in accordance with WHMIS requirements.

1.22.5. Provide detailed procedures for safe handling storage and use of hazardous materials. List special precautions and safe clean up and disposal procedures. Conform to the Environmental Protection Act and other requirements of Authorities for disposal and clean up requirements.

1.22.6. Obtain from the Owner, where applicable, a list and MSDS of hazardous materials that may be handled, stored or used by the Owner's employees and/or Other Contractors retained by the Owner at location where the Work of this Contract will be performed.

1.22.7. Ensure those who handle and/or are exposed to or are likely to handle or be exposed to hazardous materials are fully instructed and trained in accordance with WHMIS requirements.

**1.23. COLOURS**

1.23.1. Colour and gloss value to be selected by the Consultant. Obtain direction on colour and gloss value in advance of need. If requested, submit samples for colour and gloss selection. Follow colour schedule provided by the Consultant and use colours and gloss designated.

**1.24. RECORD DRAWINGS AND SPECIFICATIONS**

1.24.1. Keep 1 set of Drawing prints and Specifications on Site for use in maintaining record information. Ensure these Drawings and Specifications are kept on Site at all times available for review by the Owner and/or the Consultant at any given time.

1.24.2. Accurately and neatly record deviations from the Contract Documents, including Addenda, Site Instructions and Change Orders, caused by Site conditions.

1.24.3. Record information concurrently with construction progress. Do not conceal actual work until required information is recorded.

1.24.4. Legibly indicate each item to record actual construction including:

1.24.4.1. Field changes of dimension and details.

1.24.4.2. Details or information not on original Contract Drawings.

1.24.5. Catalogue field review reports and cross reference to relevant trade, building area and component. Submit inspection and testing reports in accordance with requirements of the Specifications. Highlight unsatisfactory inspection and testing results with supplementary instructions issued by the Consultant.

1.24.6. Identify Drawings as "Project Record Copy", maintained and available for inspection on the Site by the Consultant.

1.24.7. Prior to applying for Certificate of Substantial Performance submit record Drawings and Specifications to the Consultant.

**1.25. AS-BUILT DRAWINGS**

1.25.1. Prior to applying for Certification of Substantial Performance, the Consultant will provide the Contractor with electronic set of requested Drawings for as-built purposes.

1.25.2. The Contractor is responsible for:

1.25.2.1. maintaining as-built Drawings during progress of work, in complete sets, at the Place of the Work.

1.25.2.2. including additional changes over and above those included in any Addenda, Site Instructions and Change Orders.

1.25.2.3. including accurate locations, depths, sizes and types of underground utilities and concealed services in the as-built Drawings.

1.25.2.4. having changes recorded in a manner consistent with the original Drawings using minimum AutoCad software.

1.25.2.5. ensuring outline clouds and notations are removed from the Drawings.

1.25.2.6. having 1 set as-built Drawing prints submitted to the Consultant for review before final submission.

1.25.2.7. incorporating any review comments made by the Consultant.

1.25.2.8. resubmitting final reviewed set, in following format:

1.25.2.8.1. 1 set on electronic disk.

1.25.2.8.2. 1 set on reproducible prints (i.e., mylar).

1.25.2.8.3. 1 set of white prints.

1.25.3. Refer to Divisions 21, 22, 23, 26, 27 and 28 for supplementary requirements.

**1.26. OPERATION AND MAINTENANCE INSTRUCTIONS MANUAL**

1.26.1. Upon completion of the Work, submit 3 sets of operation and maintenance instructions manual to the Consultant. Include following:

1.26.1.1. data books and literature.

1.26.1.2. maintenance instructions, specifying warnings of any maintenance practice that may damage or disfigure specified Products.

1.26.1.3. operational information on Products, cleaning and lubrication schedules, filters, overhaul and adjustment schedules and similar maintenance information.

1.26.1.4. recommended maintenance Products.

1.26.2. Submit instructions in plain language to guide the Owner in proper operation and maintenance of building components.

1.26.3. Organize contents into applicable categories of the Work, numbered to match the Specification section numbering system.

1.26.4. Bind contents of operation and maintenance instructions manual in 3-ring, hard-covered, vinyl jacketed binders, label spine "OPERATION AND MAINTENANCE INSTRUCTIONS MANUAL" and include following:

1.26.4.1. title sheet, labelled "OPERATION AND MAINTENANCE INSTRUCTIONS", containing project name and completion date.

1.26.4.2. list of contents.

1.26.4.3. list of names, addresses and telephone numbers of installing Subcontractors and Suppliers for future repair or maintenance.

1.26.4.4. schedule of Finishes (as-built) listing paints, colours and fabrics provided.

1.26.5. Refer to Divisions 21, 22, 23, 26, 27 and 28 for supplementary requirements.

1.26.6. Provide operation and maintenance instructions as required by the Contract Documents.

## 1.27. MISCELLANEOUS SUBMITTALS

1.27.1. Supply submittals required by the Contract Documents (e.g., plans, reports, certifications, results, records, etc.) for the Consultant's review.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this section.

### 1.2. REFERENCES

1.2.1. Reference Standards:

| | | |
|---|---|---|
| 1.2.1.1. | ASTM E329 | -Specification for Agencies Engaged in Construction Inspection and/or Testing |
| 1.2.1.2. | CSA A283-06 | - Qualification Code for Concrete Testing Laboratories |
| 1.2.1.3. | CSA W47.1-03 | - Certification of Companies for Fusion Welding of Steel |
| 1.2.1.4. | CSA W59-03 | - Welded Steel Construction (Metal Arc Welding) |
| 1.2.1.5. | CSA W178.1-08 | - Certification of Welding Inspection Organizations |
| 1.2.1.6. | CSA W178.2-08 | - Certification of Welding Inspectors |
| 1.2.1.7. | CAN/CSA-Z234.1-00 | - Metric Practice Guide |
| 1.2.1.8. | NFPA 101-09 | - Life Safety Code |

### 1.3. REGULATIONS REQUIREMENTS

1.3.1. Comply with the *Building Code Act, 1992*, S.O. 1992, c. 23 as amended, and the Building Code, O. Reg. 332/12, as amended and Regulations and bylaws of other Authorities Having Jurisdiction, including latest amendments thereto; all hereafter referred to as the Code. Where the Code or the Contract Documents do not cover particular requirements which are covered by NBC, as amended, conform to requirements of NBC including its related supplements. Where the Contract Documents exceed the Code requirements, satisfy such additional requirements.

1.3.2. Pre-Start Health and Safety Review: Whether or not this is required by law, under this Contract ensure any Product, tool or process provided as Work of this Contract complies with the requirements of the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1, Regulation 851: Industrial Establishments, R.R.O. 1990, Reg. 851, as amended and certify same to Consultant prior to Substantial Performance of the Contract. For guidance, refer to “Guidelines for Pre- Start Health and Safety Reviews: How to Apply Section 7 of the Regulation for Industrial Establishments” dated April 2001 published by the Government of Ontario. Ensure all exemption documents or Pre-Start Health and Safety Reviews reports are complete and correct prior to handing over to the Owner. Provide 3 sets of originals to the Owner.

1.3.3. Conform to NFPA 101 for exit requirements.

1.3.4. Conform to the Fire Code, O. Reg. 213/07: enacted under *Fire Protection and Prevention Act, 1997*, S.O. 1997, c. 4, as amended.

1.3.5. Where material is designated in the Contract Documents for certain application, unless otherwise specified, that material shall conform to standards designated in OBC and in absence of more restrictive requirement comply with Division B, Part 9 "Housing and Small Buildings" of the Code. Similarly, unless otherwise specified and not required otherwise by OBC, installation methods and standards of workmanship shall also conform to standards of Division B, Part 9. Where specific requirements for a material are not specified for certain use, select from choice offered in Division B, Part 9.

1.3.6. Unless otherwise indicated in the Contract Documents, obtain and pay for all other permits, licenses and certificates of inspection. Ensure permits, licenses and certificates included under specific sections are obtained as specified. Forward copies of all permits to the Consultant before commencing work.

1.3.7. Comply with all requirements of the *Workplace Safety and Insurance Act, 1997*, S.O. 1997, c. 16, Sched. A, including payments due thereunder.

1.3.8. Apply the *Ontario College of Trades and Apprenticeship Act, 2009*, S.O. 2009, c. 22, and regulations thereunder, as amended, to performance of this Contract.

**1.4. IMPERIAL/INTERNATIONAL SYSTEM OF UNITS (SI)**

1.4.1. Submittals containing measurements of any kind in Imperial system of measurement shall be on the Consultant's approval only. Submit all measurements in International System of Units (SI).

1.4.2. Submittals containing measurements of any kind shall have measurements in language of International System of Units (SI) conforming to CAN/CSA-Z234.1.

**1.5. REFERENCES**

1.5.1. Where reference is made to codes, specification standards, manuals, contract forms, installation, application and maintenance instructions, produced by various organizations, conform to edition of standards specified or, if not specified, to latest edition as amended and revised to date of the Contract.

1.5.2. Amendments to reference documents after award of the Contract affecting the Contract Price shall be dealt with in accordance with GC 14, Changes in the Work of the General Conditions of the Contract.

1.5.3. If requested by the Consultant provide copy on Site of such standard(s).

**1.6. ACRONYMS**

1.6.1. Following acronyms are used in the Contract Documents:

| | |
|---|---|
| AA | Aluminum Association (USA) |
| ACI | American Concrete Institute |
| AHA | American Hospital Association |
| AIEE | American Institute of Electrical Engineers |
| AISC | American Institute of Steel Construction |
| ANSI | American National Standards Institute |
| API | American Petroleum Institute |
| ASHE | American Society for Healthcare Engineering |
| ASHRAE | American Society of Heating, Refrigeration and Air-conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| AWI | American Woodwork Institute (USA) |
| AWMAC | Architectural Woodwork Manufacturer's Association of Canada |
| AWWA | American Water Works Association |
| | |
| BCA | Building Commissioning Association |
| BCLMA | British Columbia Lumber Manufacturer's Association |
| BHMA | Building Hardware Manufacturer's Association |
| BMEC | Building Materials Evaluation Commission |

| | |
|---|---|
| CCA | Canadian Construction Association |
| CCDC | Canadian Construction Documents Committee |
| CEC | Canadian Electrical Code (published by CSA) |
| CFR | Code of Federal Regulations |
| CGA | Canadian Gas Association |
| CGSB | Canadian General Standards Board |
| CISC | Canadian Institute of Steel Construction |
| CLA | Canadian Lumbermen's Association |
| CMHC | Canadian Mortgage and Housing Corporation |
| COFI | Council of Forest Industries of British Columbia |
| CPCI | Canadian Prestressed Concrete Institute |
| CPMA | Canadian Paint Manufacturer's Association |
| CRCA | Canadian Roofing Contractors Association |
| CRI | Colour Rendering Index |
| CSA | Canadian Standards Association |
| CSC | Construction Specifications Canada |
| CSDMA | Canadian Sheet Door Manufacturers Association |
| CSPI | Corrugated Steel Pipe Institute |
| CSSBI | Canadian Sheet Steel Building Institute |
| CTC | Canadian Transport Commission |
| CWC | Canadian Wood Council |
| DND | Department of National Defence, Construction Material Board |
| EEMAC | Electrical and Electronic Manufacturers Association of Canada |
| ECP | Environmental Choice Program |
| EIA | Environmental Impact Assessment |
| EPA | Environmental Protection Agency |
| ESA | Electrical Safety Authority |
| FM | Factory Mutual |
| FSC | Forest Stewardship Council |
| GANA | Glass Association of North America |
| IEC | International Electrotechnical Commission |
| IAQ | Indoor Air Quality |
| IEEE | Institute of Electrical and Electronic Engineers |
| IGMAC | Insulated Glass Manufacturers Association of Canada |
| ISO | International Organization for standardization |
| MTO | Ministry of Transportation, Province of Ontario |
| NAAMM | National Association of Architectural Metal Manufacturers |
| NBC | National Building Code of Canada 2015 |
| NBFU | National Board of Fire Underwriters (USA) |
| NEMA | National Electrical Manufacturers Association (USA) |
| NETA | International Electrical Testing Association |
| NFPA | National Fire Protection Association |
| NHLA | National Hardwood Lumber Association (USA) |
| NLGA | National Lumber Grades Authority |
| NRCC | National Research Council Canada |
| NSC | National Standards of Canada |

| | |
|---|---|
| OBC | Ontario Building Code, "The Building Code", O. Reg. 332/12 including amendments thereto |
| OFC | Ontario Fire Code, "The Fire Code", O. Reg. 213/07, including amendments thereto |
| OFM | Ontario Fire Marshall |
| OIRCA | Ontario Industrial Roofing Contractors Association |
| OMCA | Ontario Masonry Contractors' Association |
| OPCA | Ontario Painting Contractors Association |
| OPSS | Ontario Provincial Standards Section |
| PEO | Professional Engineers of Ontario |
| SMACNA | Sheet Metal and Air Conditioning Contractors National Association |
| SJI | Steel Joist Institute |
| SSPC | Steel Structures Painting Council |
| TSSA | Technical Standards & Safety Authority |
| TTMAC | Terrazzo, Tile and Marble Association of Canada |
| ULC | Underwriters Laboratories of Canada |
| UL | Underwriters Laboratories Inc. (USA) |
| WHMIS | Workplace Hazardous Materials Information System |
| WHPS | Warnock Hersey Professional Services |

## 1.7. ABBREVIATIONS

1.7.1. Following abbreviations are used in Contract Documents:

| | |
|---|---|
| < | angle |
| o | degree (angles) |
| µm | micrometre |
| # | number (before numerals) |
| A | ampere |
| AB | air barrier |
| ABS | Acrylonitrile butadiene styrene |
| A/C | air conditioning |
| AC | alternating current |
| ACP | acoustic panel |
| ACT | acoustic ceiling tile |
| AD | access door |
| ADJ | adjustable |
| AFF | Above Finished Floor |
| AFL | access flooring |
| ALUM or AL | aluminum |
| ANOD | anodized |
| AP | access panel |
| APPROX | approximate |
| ARCH | Architectural |
| A/VB | air/vapour barrier |
| AWG | American wire gauge |
| BH | bore hole |

| | |
|---|---|
| BLDG | building |
| BLKG | blocking |
| B.M | bench mark |
| BN | bull nose |
| BOL | bollard |
| B.RLG | bumper railing |
| BUR | built up roof |
| | |
| CABT | cabinet |
| CB | catch basin |
| C.BLK | concrete block |
| CEM | cement |
| CEM.BD | cement board |
| CEM.PL | cement plaster |
| cfs | cubic feet per second |
| CG | corner guard |
| CGL | clear glass |
| CH | coat hook |
| CHK.BD | chalk board |
| CHK.PL | checkered plate |
| CI | cast iron |
| CJ | control joint |
| CL | centreline |
| CLG | ceiling |
| CO | clean out |
| COL | column |
| CONC | concrete |
| CONSTR | construction |
| CONT | continuous |
| CPT or CP | carpet |
| CR | chair rail |
| CSK | countersunk |
| CT | ceramic tile |
| cu ft | cubic feet |
| cu yd | cubic yard |
| CW | curtain wall |
| c/w | complete with |
| | |
| DB | decibel |
| DC | direct current |
| DDC | Direct Digital Control |
| deg C | degree Celsius |
| deg F | degree Fahrenheit |
| DET | detail |
| DF | drinking fountain |
| DFT | dry film thickness |
| DG | double glazed |
| dia | diameter |
| DIN | Deutsches Institute for Normung |
| DN | down |
| DP | dampproof |
| DPC | dampproof course |
| DWG | Drawing |
| | |
| EF | epoxy flooring |

| | |
|---|---|
| EIFS | exterior insulation and finish system |
| EJ | expansion joint |
| EJC | expansion joint cover |
| ELEC | electric |
| ELEV | elevation |
| EMT | electro metallic tubing |
| EMS | Energy Management System |
| ENAM | enamel |
| ENCL | enclosure |
| ENT | entry |
| EP | electrical panel |
| EQUIP | equipment |
| ET | epoxy terrazzo |
| EXIST | existing |
| EXP | exposed |
| EXT | exterior |
| | |
| FA | fire alarm |
| FBD | fibreboard |
| FBR | face brick |
| FC | flexible coating |
| FD | floor drain |
| | |
| FHC | fire hose cabinet |
| FIN | finished |
| FL | floor |
| FOB | free on board |
| FP | fireproofing |
| fpm | feet per minute |
| FS | firestopping |
| (ft)(') | foot |
| FTG | footing |
| FWC | fabric wall covering |
| FWP | fiberglass wall protection |
| | |
| g | gram |
| ga | gauge |
| gal | gallon (Imperial measure) |
| GALV | galvanized |
| GASK | gasket |
| GB | gypsum board |
| GCB | glazed concrete block |
| GFI | ground fault interrupter |
| GFRG | glass fibre reinforced gypsum |
| GL | glass/glazing |
| GL.B | glass block |
| GRAN.A | granular A |
| GRAN.B | granular B |
| GRD | ground |
| GT | glass tile |
| GWG | georgian wired glass |
| | |
| ha | hectare |
| HB | hose bib |
| HC | hollow core |
| HDBD | hardboard |
| HM | hollow metal |

| | |
|---|---|
| HORIZ | horizontal |
| hp | horsepower |
| hr | hour |
| H/RAIL | handrail |
| H.RLG | hand railing |
| HS | hollow steel |
| HSS | hollow structural section |
| HT | height |
| HU | heating unit |
| HVAC | heating, ventilation and air conditioning |
| Hz | hertz |
| id | inside diameter |
| Igpd | gallons per day (Imperial measure) |
| Igph | gallons per hour (Imperial measure) |
| (in.)(") | inch |
| INCL | including |
| INSUL | insulation |
| INT | interior |
| INV | invert |
| IRGB | impact resistant gypsum board |
| J | joule |
| JT | joint |
| KD | knocked down |
| kg | kilogram |
| km | kilometre |
| kN | kilonewton |
| KO | knock out |
| kPa | kilopascal |
| l | litre |
| LAB | laboratory |
| LAV | lavatory |
| lb | pound |
| lb/ft | pound per foot |
| LED | light emitting diode |
| LH | Left Hand |
| LHR | Left Hand Reverse |
| lin ft | linear foot |
| LIN.MET | linear metal ceiling |
| LINO | linoleum |
| LL | lead lined |
| LS | light standard |
| l/s | litre per second |
| LSSJ | long span steel joist |
| LUM | luminous |
| m | metre |
| $m^2$ | square metre |
| $m^3$ | cubic metre |
| MAT'L | material |
| max | maximum |
| MB | marker board |
| MBF | thousand board feet |

| | |
|---|---|
| MCC | motor control centre |
| MECH | mechanical |
| MEZZ | mezzanine |
| min | minimum |
| misc | miscellaneous |
| ML | metal lath |
| mm | millimetre |
| MPa | megapascal |
| MRGB | moisture resistant gypsum board |
| MSDS | material safety data sheet |
| N | newton |
| NIC | Not in Contract |
| N.m | newton metre |
| No. | Number |
| NOM | nominal |
| NTS | not to scale |
| O/A | overall |
| oc | on centre |
| od | outside diameter |
| O/H | overhead |
| O&M | Operation and Maintenance |
| OPP | opposite |
| OWSJ | Open Web Steel Joist |
| oz | ounce |
| P | partition |
| Pa | Pascal |
| PA | public address system |
| P.CONC | precast concrete |
| PC | Pre-functional Checklists |
| PERP | perpendicular |
| PL | plate |
| PLAM | plastic laminate |
| PLAS | plaster |
| PLYWD | plywood |
| PM | pressed metal |
| PR | pair |
| PREFAB | prefabricated |
| PREFIN | prefinished |
| PRP | plastic resin paneling |
| PS | pressed steel |
| psi | pounds per square inch |
| PT | paint |
| PVC | polyvinyl chloride |
| QT | quarry tile |
| R | riser |
| RB | resilient base |
| R. CONC | reinforced concrete |
| RD | roof drain |
| REINF | reinforced |
| REQ'D | required |
| rev | revision |
| RH | Right Hand |
| RHR | Right Hand Reverse |
| RM | room |

| | |
|---|---|
| rpm | revolutions per minute |
| RPU | remote processor unit |
| RS | reducing strip |
| RT | rubber tile |
| RWL | rain water leader |
| RWP | rigid wall protection |
| s | second |
| SAN | sanitary |
| SAT | suspended acoustic tile |
| SB | sand blast |
| SC | solid core |
| SG | security glazing |
| SHV | sheet vinyl |
| SIM | similar |
| SLC | sealed concrete |
| SLR | sealer |
| SLT | slate tile |
| SN | stair nosing |
| SPEC | specification |
| SPR | sprinkler |
| SQ | square |
| sq ft | square feet |
| sq mi | square mile |
| sq yd | square yard |
| SR | seamless resin |
| SS | stainless steel |
| STL | steel |
| STRUCT | structural |
| SUSP | suspended |
| t | tonne |
| TB | tack board |
| TBR | to be removed |
| TCP/IP | Transmission Control Protocol/Internet Protocol |
| TEL | telephone |
| TEMP | temporary |
| TERR | terrazzo |
| T&G | tongue & groove |
| TYP | typical |
| U/C | under cut |
| U/G | under ground |
| U.O.N. | unless otherwise noted |
| UPS | uninterruptible power supply |
| U/S | under side |
| USgpm | gallons per minute (United States measure) |
| V | volt |
| VA | volt ampere |
| VAC | volt alternating current |
| VAV | Variable Air Volume |
| VDC | volt direct current |
| VB | vapour barrier |
| VCT | vinyl composite tile |
| VERT | vertical |

| | |
|---|---|
| VEST | vestibule |
| VOC | Volatile Organic Compound |
| Vrms | Voltage Regulator Module |
| VT | vinyl tile |
| vt ft | vertical foot |
| VWC | vinyl wall covering |
| VWP | vinyl wall protection |
| W | watt |
| WB | white board |
| W.CAB | writing cabinet |
| WC | water closet |
| WD | wood |
| WF | wide flange |
| WGL | wired glass |
| WM | wire mesh |
| WP | waterproofing |
| WPM | waterproof membrane |
| WPS | wall protection strip |
| WR | washroom |
| WVP | wood veneer paneling |
| WWF | welded wide flange |
| WWM | welded wire mesh |
| yd | yard |
| Z | zinc |
| ZCS | zinc coated steel |

**1.8. BUILDING SCIENCE PRINCIPLES**

1.8.1. Obtain and read following references:

1.8.1.1. NRCC 13487 - Walls Windows and Roofs for the Canadian Climate

1.8.1.2. Canadian Building Digest 55 - Glazing Design

1.8.1.3. Canadian Building Digest 96 - Use of Sealants

1.8.1.4. Canadian Building Digest 155 - Joint Movement and Sealant Selection

**1.9. QUALITY ASSURANCE**

1.9.1. Study and be aware of principles discussed in above documents in order to understand their significance to the Contract Documents.

1.9.2. Some information in above reference documents may not be applicable to the Work and no recommendations or statement therein is a mandatory requirement of the Contract unless required by the Contract Documents.

**1.10. TOLERANCES**

1.10.1. Unless more stringent tolerances are required by a section of the Specifications or a referenced standard, meet following tolerances for installed work:

1.10.1.1. “plumb” means plumb within 3 mm in 3 m (1/8" in 10' - 0").

1.10.1.2. “level” means level within 3 mm in 3 m (1/8" in 10' - 0").

1.10.1.3. “square” means not in excess of 10 seconds, less or more than 90°.

1.10.1.4. “straight” means within 3 mm in 3 m (1/8" in 10' - 0"), under a 3 m (10' - 0") straightedge.

**1.11. QUALIFICATIONS**

1.11.1. For manufacturer’s, fabricator’s and installer’s qualifications, conform to requirements specified under respective trade section, as applicable. Where applicable, manufacturer’s field services shall be obtained as specified under respective trade section.

**1.12. PROFESSIONAL ENGINEER’S QUALIFICATIONS**

1.12.1. Employ a professional engineer registered to practice in Province of Ontario carrying a minimum $2,000,000.00 professional liability insurance to:

1.12.1.1. design components of the Work of this Project specific to their license to practice.

1.12.1.2. be responsible for determining sizes or other specific requirements within their license to practice in accordance with applicable codes and regulations.

1.12.1.3. be responsible for production and review of Shop Drawings.

1.12.1.4. inspect work of this Section during fabrication and erection/installation.

1.12.1.5. be responsible for stamping and signing each Shop Drawing and associated calculations performed.

1.12.1.6. provide site administration and inspection of this part of the Work.

1.12.1.7. Certification: Submit certification stating performance of engineered work will perform as required.

**1.13. TESTING AGENCY QUALIFICATIONS**

1.13.1. Conduct testing in accordance with requirements of OBC unless advised otherwise in the Contract Documents or by the Consultant in writing. Obtain certification where required by applicable codes and standards.

1.13.2. Ensure testing agency is an independent testing agency with experience and capability to conduct testing indicated, as documented according to ASTM E329.

1.13.3. Qualifications of inspectors: Submit list of inspectors to be employed on this Contract and obtain the Consultant’s approval.

1.13.4. Ensure testing and inspection is performed by qualified inspectors and/or technologist certified by the Professional Engineer or performed directly by the Professional Engineer in conformance with applicable codes and certification programs.

1.13.5. Ensure inspectors are qualified to perform type of inspection or testing required.

1.13.6. Perform concrete testing using a testing company conforming to requirements of CSA A283 as required for this Contract. Inspection report format and distribution requirements will be established by the Consultant.

**1.14. CONTRACTOR’S QUALIFICATIONS**

1.14.1. Prior to commencement of the Work, establish quality control system protocols, rules, related chain of commands and commitment to provide quality work as intended in the Contract Documents for the Work.

1.14.2. Provide position Specification of quality control staff, shop and field supervisors complete with their skills, knowledge, duties and responsibilities.

**1.15. SOURCE QUALITY CONTROL**

1.15.1. Refer to respective Specification sections for source quality control requirements.

**1.16. TESTING AND INSPECTION OF MECHANICAL AND ELECTRICAL SYSTEMS**

1.16.1. Provide testing and inspection of mechanical and electrical systems as defined in the Contract Documents under trade sections of Divisions 21, 22, 23, 26, 27 and 28 respectively.

**1.17. INTERIOR**

1.17.1. Architectural millwork.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. .Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide polished concrete floor finishing including but not limited to following:

1.2.1.1. polished concrete floor finishing system consisting of:

1.2.1.1.1. surface preparation.

1.2.1.1.2. application of clear, colourless, liquid concrete hardener and densifier.

1.2.1.1.3. grinding and polishing floor to desired finish.

1.2.1.1.4. application of water-based concrete enhancer.

1.2.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:

1.2.2.1. Filling and sealing of sawcut joints in concrete slab: Section 03 35 13, Concrete Floor Finishing.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. ADA: Americans with Disabilities Act; www.ada.gov.

1.3.2. Reference Standards:

1.3.2.1. ASTM C1028-07e1 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Stone by the Horizontal Dynamometer Pull-Meter Method

1.3.2.2. ASTM F609-05 - Standard Test Method for Using a Horizontal Pull Slipmeter (HPS)

### 1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Preinstallation Meetings: Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Consultant. Presided over by Contractor, include Consultant who may attend, Subcontractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline. Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.

**1.5. SUBMITTALS**

1.5.1. Product Data:

1.5.1.1. Submit manufacturer's literature, data sheets for typical material provided under this Section for Project. Submit 3 copies of detailed instructions for maintaining, preserving and keeping materials clean and safe. Provide adequate notice of maintenance practices or materials detrimental to specified materials.

1.5.1.2. Submit manufacturer's recommended installation instructions which when approved by Consultant will become basis for accepting or rejecting completed Work.

**1.6. QUALITY ASSURANCE**

1.6.1. Qualifications:

1.6.1.1. Installers: Provide work of this Section executed by competent installers with at least ten (10) completed projects of 1000 sq.ft or greater in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.6.2. Mock-Ups: Construct minimum 10 $m^2$ (100 sq ft) mock-up sample at Project location designated by Consultant for acceptance. Once accepted, sample remains part of finished work and used as a quality reference standard for balance of Project.

**1.7. DELIVERY, STORAGE AND HANDLING**

1.7.1. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

1.7.2. Storage and Handling Requirements:

1.7.2.1. Store materials in a clean dry area in accordance with manufacturer's instructions.

1.7.2.2. Keep Products from freezing.

1.7.2.3. Avoid direct contact with this Product as it may cause mild to moderate irritation of eyes and/or skin.

1.7.2.4. Protect materials during handling and application to prevent damage or contamination.

**1.8. SITE CONDITIONS**

1.8.1. Ambient Conditions:

1.8.1.1. Do not apply Product when air, surface, or material temperatures are expected to fall below 4 deg C (40 deg F) within 4 hours of expected application.

1.8.1.2. Do not apply to frozen concrete.

1.8.1.3. Do not use on highly dense or non-porous surfaces.

1.8.1.4. Limit and control damage from excessive dust caused by grinding/polishing procedure.

1.8.1.5. Properly dispose of collected dry dust from polishing.

**1.9. EXTENDED WARRANTY**

1.9.1. Manufacturer Warranty: Extended Warranty of this work to be for a period of 10 years against defects and/or deficiencies over and above the two (2) year warranty required in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner. Defects include but are not limited to; bond failure and extensive sheen fading.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

2.1.1.1. W.R. Meadows of Canada; www.wrmeadows.com

**2.2. MATERIALS**

2.2.1. Concrete Densifier: Finish exceeding ADA recommendations for wet and dry surfaces tested in accordance ASTM C1028 for coefficient of friction, "Liqui-Hard® Concrete Densifier and Chemical Hardener" by W.R. Meadows of Canada.

2.2.2. Concrete Enhancer: Water-based, synthetic polymer concrete floor enhancer, "Bellatrix" by W.R. Meadows of Canada.

2.2.3. Water: Potable water.

**2.3. EQUIPMENT**

2.3.1. Use following grinding/polishing equipment:

2.3.1.1. Three-head counter rotating variable speed floor grinding machine.

2.3.1.2. Dust extraction system and pre-separator.

2.3.1.3. 75 kw MQ power generator or equivalent.

2.3.2. Ensure grinding/polishing equipment possess at least 775 lb of head pressure.

2.3.3. Edge Grinding/Polishing: Use a hand grinder with dust extraction equipment

2.3.4. Diamond Grinding Segments: Metal bonds: 40, 60, 80 and 150 grit.

2.3.5. Diamond Polishing Pads: Resin bonds: 100, 200, 400, 800, 1500, and 3000 grit.

2.3.6. Grinding Pads for Edges: Resin bonds: 40, 60, 80, 100, 200, 400, 800, 1500, and 3000 grit.

2.3.7. Equipment used for densifying and cleaning floor after grinding/polishing procedure has been performed:

2.3.7.1. Tennant ride-on auto-scrubber or equivalent with a head pressure of 150 lb.

2.3.7.2. Follow auto-scrubber's manual for cleaning instructions after densifying and conditioning floor.

2.3.7.3. Do not allow densifier to remain inside auto-scrubber after densifying.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

### 3.2. PREPARATION

3.2.1. Protection of In-Place Conditions: Protect adjacent surfaces not designated to receive treatment.

3.2.2. Surface Preparation:

3.2.2.1. Clean and prepare surfaces to receive treatment in accordance with manufacturer's instructions, ensuring stains, oil, grease, form release agents, dust and dirt are removed prior to application.

3.2.2.2. Ensure concrete is a minimum of 28 Days old.

### 3.3. APPLICATION

3.3.1. Level 1 - Satin Finish: Provide “Induroshine PDS-1” by W.R. Meadows of Canada ensuring applicator follows applicable procedures incorporating grinding plates in following order:

3.3.1.1. Verify floor is clean and dry prior to polishing procedure.

3.3.1.2. Inspects and verifies floor does not have curled joints, large cracks, spalling or lippage. If lippage or curled joints are present, refer to manufacturer for corrective procedures.

3.3.1.3. Using 80 grit metal bond grinding segment, grind floor surface at a rate of 46.5 $m^2$/hr (500 sq ft/hr). Vacuum surface to remove loose particulates.

3.3.1.4. Using 150 grit metal bond grinding segment, grind floor surface at a rate of 55.7 $m^2$/hr (600 sq ft/hr). Vacuum surface to remove loose particulates.

3.3.1.5. Flood surface with concrete densifier and scrub into floor for 45 minutes, ensuring no puddling of densifier occurs.

3.3.1.6. Squeegee off excess material.

3.3.1.7. Wait 24 hours.

3.3.1.8. Verify floor is dry and clear of debris prior to continuation of polishing procedure.

3.3.1.9. Using 100 grit resin bond polishing segment, grind floor surface at a rate of 55.7 $m^2$/hr (600 sq ft/hr). If scratches from previous grit are still apparent, decrease rate of grinding by 9.3 $m^2$ (100 sq ft) until scratches are removed. Vacuum surface to remove loose particulates.

3.3.1.10. Using 200 grit resin bond polishing segment, grind floor surface at a rate of 65 $m^2$/hr (700 sq ft/hr). If scratches from previous grit are still apparent, decrease rate of grinding by 9.3 $m^2$ (100 sq ft) until scratches are removed. Vacuum surface to remove loose particulates.

3.3.1.11. Using 400 grit resin bond polishing segment, grind floor surface at a rate of 65 $m^2$/hr (700 sq ft/hr). If scratches from previous grit are still apparent, decrease rate of grinding by 9.3 $m^2$ (100 sq ft) until scratches are removed. Vacuum surface to remove loose particulates.

3.3.1.12. Using 800 grit resin bond polishing segment, grind floor surface at a rate of 93 $m^2$/hr (1000 sq ft/hr). If scratches from previous grit are still apparent, decrease rate of grinding by 9.3 $m^2$ (100 sq ft) until scratches are removed. Vacuum surface to remove loose particulates.

3.3.1.13. Using auto-scrubber, clean floor thoroughly per manufacturer's instructions with a white non- woven pad. Replace pads approximately every 2790 $m^2$ (30,000 sq ft).

3.3.2. Concrete Enhancer:

3.3.2.1. Allow 24 hours before proceeding with concrete enhancer application.

3.3.2.2. Apply concrete enhancer, undiluted, according to manufacturer's instructions.

3.3.2.3. Spray concrete enhancer using industrial sprayer delivering 0.76 l/s (1/10th gal/min).

3.3.2.4. Pre-wet micro-fiber applicator with concrete enhancer prior to use.

3.3.2.5. Uniformly spread concrete enhancer with a micro-fiber applicator, ensuring Product is not allowed to dry before spreading is complete.

3.3.2.6. Allow concrete enhancer to set up for 2 hours, then burnish with a 3000 grit diamond pad at 2000 RPM.

3.3.2.7. For optimum performance, apply a second coat at a 90° (right) angle to first coat, after first coat is thoroughly dry.

**3.4. SITE QUALITY CONTROL**

3.4.1. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.

**3.5. PROTECTION**

3.5.1. Keep surface dry for a minimum of 48 hours after application.

3.5.2. Allow 72 hours before heavy traffic is allowed.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide rough carpentry including but not limited to following:

1.2.1.1. miscellaneous interior carpentry.

1.2.2. Related Sections: The following description of the Work is included for reference only and shall not be presumed complete:

1.2.2.1. Provision of architectural woodwork: Section 06 40 00, Architectural Woodwork.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. CCA: Chromated Copper Arsenate.

1.3.1.2. COFI: Council of Forest Industries; www.cofi.org.

1.3.1.3. FSC: Forest Stewardship Council; www.fsccanada.org.

1.3.1.4. MSDS: Material Safety Data Sheets.

1.3.1.5. NLGA: National Lumber Grades Authority; www.nlga.org.

1.3.1.6. SCAQMD: South Coast Air Quality Management District; www.agmd.gov.

1.3.1.7. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.8. UL: Underwriters Laboratories Inc.; www.ul.com.

1.3.1.9. VOC: Volatile Organic Compound.

1.3.2. Definitions:

1.3.2.1. Dimension Lumber: Lumber of 50 mm (2") nominal or greater but less than 125 mm (5") nominal in least dimension.

1.3.2.2. Timber: Lumber of 125 mm (5") nominal or greater in least dimension.

1.3.3. Reference Standards:

| | | |
|---|---|---|
| 1.3.3.1. | CSA O80 Series-08 | - Wood Preservation |
| 1.3.3.2. | CSA O121-08 | - Douglas Fir Plywood |
| 1.3.3.3. | CAN/ULC-S102-07 | - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies |

**1.4. QUALITY ASSURANCE**

1.4.1. Certifications:

1.4.1.1. Grading:

1.4.1.1.1. Provide lumber bearing the grading stamps of an agency certified by the Canadian Lumber Standards Administration Board for identification.

1.4.1.1.2. Provide roof sheathing bearing the COFI grading stamp for identification.

1.4.1.1.3. Provide "treated" and "fire treated" wood and plywood bearing the stamp of the Canadian Wood Preservers Bureau.

**1.5. DELIVERY, STORAGE AND HANDLING**

1.5.1. Storage and Handling Requirements:

1.5.1.1. Store lumber in a dry place and protect from dampness and damage.

1.5.1.2. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

**PART 2 - PRODUCTS**

**2.1. MATERIALS**

2.1.1. Description:

2.1.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Reg. 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.1.2. Softwood Lumber: Of grades conforming to NLGA's "Standard Grading Rules for Canadian Lumber", graded as follows:

2.1.2.1. Light Framing: Species Group D, Standard Grade.

2.1.2.2. Studding: Species Group D, Stud Grade.

2.1.2.3. Structural Light Framing: Species Group D, No. 1 Grade.

2.1.2.4. Appearance Lumber: Species Group B, Appearance Grade.

2.1.3. Hardwood Lumber: Of grades conforming to grading rules of U.S. National Hardwood Lumber Association, solid Yellow Birch, select or better.

2.1.4. Concealed Framing Lumber: No. 2 White Pine, No. 2 Red Pine, or No. 1 Construction Eastern Spruce, Balsam Fir or Jack Pine, kiln dried, free from sap, shakes, splits, knots and other defects.

2.1.5. Grounds, Nailing Strips and Blocking: No. 2 White Pine, No. 2 Red Pine, or No. 1 Construction Eastern Spruce, kiln dried, free from sap, shakes, splits, knots and other defects.

2.1.6. Glue: Waterproof.

2.1.7. Rough Hardware: Supply rough hardware to frame and fix rough carpentry. This includes bolts, anchors nails, expansion shields and other fastenings required. Hot dip galvanize hardware for exterior work; elsewhere, provide cadmium plated hardware. Provide spiral thread nails.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. V erification of Conditions: Verify the actual Site dimensions and location of adjacent materials prior to commencing the Work. Notify the Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

### 3.2. INSTALLATION

3.2.1. Properly frame together parts of the Work with members accurately cut to size, closely fitted, well spiked and erected in a substantial manner, plumb, level, square and true to dimension.

3.2.2. Locate joints over bearing or supporting surfaces.

3.2.3. Provide running members full length wherever possible.

3.2.4. Design for expansion and contraction of the materials.

3.2.5. After cutting, drilling and fitting "treated" wood and plywood but before installation, apply 1 full coat of wood preservative to exposed surfaces, including ends of blocking, furring, nailers and rough carpentry.

3.2.6. Provide fasteners and rough hardware for a rigid and secure installation.

3.2.7. Mix intumescent paint coating product to manufacturer's recommendations. Do not thin or strain. Apply primer and paint coating providing fire resistant barrier in accordance with manufacturer's recommendations to achieve requirements of Authorities Having Jurisdiction. Apply at rate 3.2 $m^2$/l (125 sq ft/gal) to obtain dry film thickness of 0.25 mm (10 mils).

3.2.8. Miscellaneous Interior Carpentry: Provide plywood, blocking, furring, nailers, rough carpentry, grounds and nailing strips as indicated on Drawings and/or as required for proper installation.

### 3.3. SITE QUALITY CONTROL

3.3.1. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

### 3.4. PROTECTION

3.4.1. Protect rough carpentry from weather.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide architectural woodwork including but not limited to the following:

1.2.1.1. wood casework.

1.2.1.2. corian surface counters.

1.2.1.3. pulls.

1.2.1.4. standard hinges and glides.

1.2.1.5. laminated casework.

1.2.1.6. casework drawers and doors.

1.2.1.7. edgebanding for casework and casework doors.

1.2.1.8. countertops.

1.2.1.9. casework hardware.

1.2.1.10. interior frames.

1.2.1.11. exterior frames.

1.2.1.12. preservative treatment.

1.2.1.13. panelling.

1.2.2. Related Sections: the following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Supply of hollow metal doors and frames: Section 08 11 13 - Steel Doors and Frames.

1.2.2.2. Supply of wood doors: Section 08 14 00 - Wood Doors.

1.2.2.3. Glass and glazing: Section 08 80 00 - Glass and Glazing.

1.2.2.4. Building in and anchoring of steel frames in gypsum board partitions: Section 09 21 16 - Gypsum Board.

1.2.2.5. Filling nail holes and provision of finish painting: Section 09 91 00 - Painting.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. AWI/AWMAC/WI: American Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute; www.awmac.com.

1.3.1.2. AWS: Architectural Woodwork Standards, Edition 1, 2009.

1.3.1.3. FSC: Forest Stewardship Council; www.fsccanada.org.

1.3.1.4. MDF: Medium Density Fibreboard.

1.3.1.5. MSDS: Material Safety Data Sheets.

1.3.1.6. NEMA: National Electrical Manufacturers Association; www.nema.org.

1.3.1.7. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.8. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.9. VOC: Volatile Organic Compound.

1.3.2. Reference Standards:

| | | |
|---|---|---|
| 1.3.2.1. | ANSI A208.1-99 | - Particleboard |
| 1.3.2.2. | ANSI/NPA A208.2-09 | - Medium Density Fiberboard (MDF) For Interior Applications |
| 1.3.2.3. | ANSI/NEMA LD 3-05 | - High-Pressure Decorative Laminates |
| 1.3.2.4. | ASTM E84-08a | - Test Method for Surface Burning Characteristics of Building Materials |
| 1.3.2.5. | CSA O112 Series-M77(06) | - CSA Standards for Wood Adhesives |
| 1.3.2.6. | CSA O153-M80(05) | - Poplar Plywood |

## 1.4. SUBMITTALS

1.4.1. Shop Drawings: Submit Shop Drawings for Work of this section in accordance with Section 01 30 00 and section 1 of AWS. Clearly indicate material being supplied and show connections, attachments, reinforcing, anchorage and location of exposed fastenings.

1.4.2. Samples: Submit samples in accordance with Section 01 30 00 samples in following sizes:

1.4.2.1. minimum 300 mm (12") long x 400 mm (16") wide x 25 mm (1") thick solid wood.

1.4.2.2. minimum 300 mm (12") square and of specified thickness, veneer mounted on 19 mm (3/4") particle board and finished as specified.

1.4.2.3. each type of hardware.

1.4.2.4. each plastic laminate in manufacturer's standard chip size.

1.4.2.5. minimum 300 mm (12") square x 25 mm (1") thick countertop materials.

## 1.5. QUALITY ASSURANCE

1.5.1. Qualifications:

1.5.1.1. Provide work of this section in accordance with sections 10 and 11 of AWS produced by AWI/AWMAC/WI, except as specified otherwise herein and by reference are hereby made a part of this section. Ensure any reference to grades and terminology in this section are as defined in AWS.

1.5.1.2. Requirements of this section govern and modify AWS.

1.5.1.3. Installers: Provide the Work of this section executed by competent installers with a minimum of 5 years' experience in the application of Products, systems and assemblies specified and be a member of AWI/AWMAC/WI.

**1.6. DELIVERY, STORAGE AND HANDLING**

1.6.1. Delivery and Acceptance Requirements:

1.6.1.1. Do not deliver finished Products during rainy or damp weather.

1.6.1.2. Do not deliver the Work of this section until building and storage areas are sufficiently dry so Products will not be damaged by excessive changes in moisture content.

1.6.1.3. Deliver Products of this section in accordance with Section 2, Rule 4.1.1 of AWS.

1.6.1.4. Do not deliver damaged Products.

1.6.2. Storage and Handling Requirements:

1.6.2.1. Store and handle Products of this section in accordance with Section 2, Rule 4.1.2 of AWS.

1.6.2.2. Cover finished plastic laminate surfaces and varnished surfaces with heavy kraft paper and put in cartons for protection. Protect installed plastic laminate surfaces by acceptable means. Do not remove protective covers until immediately prior to final cleaning.

**1.7. WARRANTY**

1.7.1. Manufacturer Warranty: Warrant work of this Section for a period of 2 years against defects and/or deficiencies in accordance in Article A-6 of the Contract between Owner and Contractor and GC 37 of the General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of the Consultant and at no expense to the Owner. Defects include but are not limited to, delamination of plastic laminate, opening of seams, warpage and extensive colour fading.

**PART 2 - PRODUCTS**

**2.1. MATERIALS**

2.1.1. Description:

2.1.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.1.2. Performance/Design Requirements: Ensure millwork (e.g. countertops, wall cabinets, etc.) are capable of supporting structural loads without deflection in accordance with Casework Integrity in Appendix A of AWS.

2.1.3. Framing Lumber: Select Merchantable Western White Spruce, kiln dried, or sound material of any species may be used for concealed members, free from sap, shakes, knots, splits and other defects.

2.1.4. Architectural Lumber: Clear, straight, kiln dried, Select Yellow Birch for fitments and door jambs. Provide kiln dried lumber to 7% moisture content, free from blemishes that would be apparent after finish is applied.

2.1.5. Plywood: "A" grade selected birch veneer for exposed faces and "B" grade birch veneer for unexposed faces.

2.1.6. Solid Birch: Of uniform grain and colour, premium grade.

2.1.7. High Pressure, Paper Base, Decorative Laminates (PLAM):

2.1.7.1. Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, schedules and the Specifications:

2.1.7.1.1. Arborite; www.arborite.com

2.1.7.1.2. Formica Inc.; www.formica.com

2.1.7.1.3. Nevamar Company, LLC; www.nevamar.com

2.1.7.1.4. Wilsonart Canada; www.wilsonart.com

2.1.7.1.5. Industrial Laminates/Norplex, Inc.; www.micarta.com

2.1.7.1.6. Pionite Decorative Laminates; www.pionite.com

2.1.7.1.7 Or Equivalent

2.1.7.2. Provide following types and thicknesses conforming to ANSI/NEMA LD 3 and Section 4, Rule 4.2c of AWS:

| | | |
|---|---|---|
| 2.1.7.2.1. | Horizontal General Purpose: | HGS - 1.2 mm (0.048"). |
| 2.1.7.2.2. | Horizontal Light Duty: | HGL - 1.0 mm (0.039"). |
| 2.1.7.2.3. | Vertical General Purpose: | VGS - 0.7 mm (0.028"). |
| 2.1.7.2.4. | Vertical Light Duty: | VGL - 0.5 mm (0.020"). |
| 2.1.7.2.5. | Postforming Horizontal: | HGP - 1.0 mm (0.039"). |
| 2.1.7.2.6. | Postforming Vertical: | VGP - 0.7 mm (0.028"). |
| 2.1.7.2.7. | Cabinet Liner: | CLS - 0.5 mm (0.020"). |
| 2.1.7.2.8. | Backer Sheet: | BKV - 0.7 mm (0.028"). |
| 2.1.7.2.9. | Backer Sheet: | BKM - 1.0 mm (0.039"). |
| 2.1.7.2.10. | Backer Sheet: | BKH - 1.2 mm (0.048"). |
| 2.1.7.2.11. | Backer Sheet: | BKL - 0.5 mm (0.020"). |
| 2.1.7.2.12. | Special Purpose: | HSH - 3.0 mm (0.118"). |
| 2.1.7.2.13. | Special Purpose: | HSM - 1.5 mm (0.059"). |
| 2.1.7.2.14. | Flooring Grade, High Wear: | HDH - 3.0 mm (0.118"). |
| 2.1.7.2.15. | Flooring Grade, High Wear: | HDM - 1.5 mm (0.059"). |
| 2.1.7.2.16. | Flooring Grade, High Wear: | HDS - 1.2 mm (0.048"). |
| 2.1.7.2.17. | Flame Retardant: | SGF - 1.5 mm (0.059"). |
| 2.1.7.2.18. | Flame Retardant: | HGF - 1.2 mm (0.048"). |
| 2.1.7.2.19. | Flame Retardant: | VGF - 0.8 mm (0.032"). |

2.1.7.3. Colours and Finishes: Provide full colour range including solid, woodgrain and printed patterns, textured, mirror, suede or matte, glossy, high luster/furniture crystal and ashwood finishes. Colours and Product design will be selected later by the Consultant from any or all of above listed manufacturers.

2.1.8. Plastic Laminate Adhesive:

2.1.8.1. Heat-cured urea-formaldehyde type resin in accordance with requirements of CSA O112 Series-M for Work except as otherwise specified in the Contract Documents.

2.1.8.2. Heat-cured resorcinol resin in accordance with requirements of CSA O112 Series-M for wet areas and counter tops with sinks and lavatories built-in.

2.1.9. Wood Cores:

2.1.9.1. Particleboard Laminating Core: Particleboard core of minimum 720 kg/m$^3$ (45 lbs/cu ft) density conforming to ANSI A208.1, Grade R, sanded both sides.

2.1.9.2. MDF Core: Medium density panels, meeting requirements of ANSI/NPA A208.2, balanced design, manufactured from 100% recycled materials, without the use of formaldehyde resins,, of minimum density of 770 kg/m$^3$ (48 lb/cu ft) and surface character to match sample in Consultant's possession. Ensure fire retardant Product contains fire-retardant chemicals injected with raw materials during manufacturing and achieve a maximum flame spread rating of 25 with a maximum smoke developed of 200 when tested to ASTM E84. Do not use MDF panels in moist areas. Acceptable Products are "Excel+ MDF" by Uniboard Canada Inc.; www.uniboard.com or Canfibre Group Limited or Equivalent.

2.1.9.3. Plywood Core: Poplar plywood conforming to CSA O153-M, Grades A and B.

2.1.10. **SOLID SURFACE MATERIAL**

2.1.10.1. H omogenous compression moulded material composed of acrylic resins or polyester/acrylic resin blend, fire-retardant filler materials, fibre reinforcement, and colouring agents, conforming to ANSI Z124 and FED WW-P-541E, and meeting the following requirements:

2.1.10.1.1. Manufacturers: Provide Products by the following manufacturers as specified:

2.1.10.1.1.1 The Swan Corporation, contact Nancy Martin, 1-800-325-7008, ext. 227

2.1.10.1.1.2 Corian, as distributed by Willis Supply Company, contact Kelly Robinson, 1-888-994-5547, ext. 379.

2.1.10.1.1.3 Wilsonart, contact Sherrie Beckford, 647-222-2384.

2.1.10.1.1.4 Avonite Surfaces, as distributed by McFadden's, 1-800-268-0942.

2.1.10.1.1.5 Or Equivalent

2.1.10.2. Adhesives and Colour Matched Silicon Sealants: As recommended by the manufacturer to suit details and conditions.

2.1.10.3. Sheet thickness: 12mm nominal size.

2.1.10.4. Colour (SS1): Corian Silver Birch

2.1.11. Finishing:

2.1.11.1. Prime unexposed surfaces including backs of fitments against walls and underside of fitments.

2.1.11.2. Before priming, treat knots and sap streaks, with a coat of shellac and then prime with a wood primer.

2.1.11.3. Shop finish natural finished wood surfaces.

2.1.12. Hardware:

2.1.12.1. Millwork pulls shall be “#527160” in #195 stainless steel finish by Richelieu or equivalent.

2.1.12.2. Provide standard hinges and glides, refer to the Drawings.

**2.2. COMPONENTS**

2.2.1.1. Exposed Parts Core: Composition board veneer plywood.

2.2.1.2. Exposed Parts Finish: Premium grade in accordance with Section 10, paragraph 1.2.10 of AWS.

2.2.1.3. Semi-Exposed Parts Core: Composition board veneer plywood.

2.2.1.4. Semi-Exposed Parts Finish: Premium grade in accordance with Section 10, paragraph 1.2.11 of AWS.

2.2.2. Casework for Opaque Finish:

2.2.2.1. AWI/AWMAC/WI Quality Grade: Premium.

2.2.2.2. Construction: Ensure casework conforms to Section 10 of AWS.

2.2.2.3. Exposed Parts Core: Composition board veneer.

2.2.2.4. Exposed Parts Finish: Premium grade in accordance with Section 10, paragraph 1.2.10 of AWS.

2.2.2.5. Semi-Exposed Parts Core: Composition board veneer.

2.2.2.6. Semi-Exposed Parts Finish: Premium grade in accordance with Section 10, paragraph 1.2.11 of AWS.

2.2.3. Casework for Plastic Laminate Finish:

2.2.3.1. AWI/AWMAC/WI Quality Grade: Premium.

2.2.3.2. Construction: Ensure casework conforms to Section 10 of AWS.

2.2.3.3. Exposed Parts Core: Composition board veneer.

2.2.3.4. Exposed Parts Finish: Plastic laminate; HGS for horizontal surfaces and VGS for vertical surfaces in accordance with Section 10, paragraph 1.2.10 of AWS.

2.2.3.5. Semi-Exposed Parts Core: Composition board veneer.

2.2.3.6. Semi-Exposed Parts Finish: Plastic laminate; HGS for horizontal surfaces and VGS for vertical surfaces in accordance with Section 10, paragraph 1.2.11 of AWS.

2.2.3.7. Concealed Parts Finish: Backing sheet; BKV.

2.2.4. Edge Banding: 6mm solid wood edge on all exposed edges and adjustable shelf.

2.2.5. Solid Surface Countertops:

2.2.5.1. Ensure front edge type is 6 mm pencil edge. Refer to Drawings.

2.2.6. Exterior Frames:

2.2.6.1. AWI/AWMAC/WI Quality Grade: Premium.

2.2.7. Factory Finishing:

2.2.7.1. Apply finishes in accordance with Section 5 of AWS.

2.2.8. Field Touch-Up: Field touch-up is responsibility of Contractor. Field touch-up includes filling and touch-up of exposed job-made nail and screw holes, refinishing of raw surface resulting from job fitting, repair of job-inflicted scratches and mars and final cleaning up of finished surfaces.

2.2.9. Fabrication:

2.2.9.1. Fabricate joints accurately fitted, coped where possible and well glued up. Fabricate joints mitred to perfect fit and alignments carefully matched.

2.2.9.2. Fabricate finished woodwork in 1 piece where possible. Fabricate running members in the longest lengths obtainable.

2.2.9.3. Fabricate to conceal fastenings.

2.2.9.4. Provide plastic laminate work in shop.

2.2.9.5. Fabricate exposed gables to match the required exposed finishes.

2.2.9.6. Exposed wood construction:

2.2.9.6.1. Fabricate joints carefully matched for grain and colour.

2.2.9.6.2. Fabricate millwork with slow fed machines free from sticker and/or sander markings, with sections and moulding work cut accurately to profiles.

2.2.9.6.3. Sandpaper woodwork, smooth removing burrs, feathers, sleeves, raised grain and sharp arises and leave exposed surfaces perfectly clean and smooth ready for finishing.

2.2.9.6.4. Provide edges noted to be solid, as minimum 6 mm (1/4") thick wood to match exposed veneer, glued to core prior to the application of face veneers.

2.2.9.7. Countertops:

2.2.9.7.1. Fabricate and assemble countertops and splashbacks in shop to profiles and lengths indicated in the Drawings.

2.2.9.7.2. Fabricate cutouts for services penetrations.

2.2.9.7.3. Verify governing dimensions before fabricating items which abut wall surfaces.

2.2.9.7.4. Provide cutouts and round internal corners, chamfer edges and seal exposed core.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. Verification of Conditions: Verify the actual Site dimensions and location of adjacent materials prior to commencing Work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

### 3.2. INSTALLATION

3.2.1. Install Work of this section in accordance with appropriate section of AWS.

3.2.2. Provide Work of this section true and straight and securely fastened in place.

3.2.3. Mitre exposed corners and butt joints.

3.2.4. Provide solid surface countertops plumb and true, neatly scribed to adjoining surfaces.

3.2.5. Thoroughly fix and anchor Work of this section into position.

3.2.6. Mechanical and Electrical Fittings:

3.2.6.1. Provide openings required to accommodate mechanical and electrical fittings as part of the Work of this Section and provide a core sealant to protect counter cores which are exposed to accommodate:

3.2.6.1.1. mechanical services and fittings.

3.2.6.1.2. washroom accessories.

3.2.6.2. Mechanical and electrical fittings and services will be provided as part of the Work of Divisions 21, 22, 23, 26, 27 and 28.

3.2.7. Installation of Hardware:

3.2.7.1. Install architectural woodwork hardware in accordance with manufacturer's requirements and templates. Adjust architectural woodwork hardware to provide smooth operation and ensure clearances are maintained. Repair damage to adjacent surfaces resulting from failure to conform with this requirement.

3.2.7.2. Provide lubricants required and use in manner to ensure smooth function of hardware consistent with manufacturer's recommendations.

3.2.7.3. Verify fastening components are tightened securely. Align screws, bolts and similar fastenings such that relationship of screw head indentations, similar surfaces and slots are perpendicular to matching vertical or horizontal position when on same surface. Do not burr or otherwise mar edges of surfaces of hardware components. Repair defects caused by work of this section in an acceptable manner.

3.2.8. Millwork pulls shall be “#527160” in #195 stainless steel finish by Richelieu or Equivalent.

3.2.9. Do not install damaged Products.

3.2.10. Solid Surfacing Material:

3.2.10.1. Fabricate components in shop to the greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings.

3.2.10.2. Form joints between components using manufacturer's standard joint adhesive. Joints shall be inconspicuous in appearance and without voids.

3.2.10.3. Provide holes and cutouts for plumbing and accessories, as indicated on the Drawings.

3.2.10.4. Rout and finish component edges to a smooth, uniform finish.

3.2.10.5. All surfaces shall have a uniform finish.

**3.3. SITE QUALITY CONTROL**

3.3.1. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to Owner.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide general installations including but not limited to following:

1.2.1.1. installation of hollow metal doors and frames.

1.2.1.2. spot grouting of door frames in gypsum board partitions.

1.2.1.3. installation of finish hardware.

1.2.2. Related Sections: the following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Provision of architectural woodwork: Section 06 40 00 - Architectural Woodwork.

1.2.2.2. Supply of hollow metal doors and frames: Section 08 11 13 - Steel Doors and Frames.

1.2.2.3. Supply of wood doors: Section 08 14 00 - Wood Doors.

1.2.2.4. Installation of gypsum wall board partition steel frames and wall boards: Section 09 21 16 - Gypsum Board.

1.2.2.5. Mechanical fittings and services: Division 22 - Plumbing.

1.2.2.6. Electrical fittings and services: Division 26 - Electrical.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. DHI: Door and Hardware Institute Canada; www.dhicanada.ca.

1.3.1.2. MSDS: Material Safety Data Sheets.

1.3.1.3. NFPA: National Fire Protection Association; www.nfpa.org.

1.3.1.4. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.5. VOC: Volatile Organic Compound.

1.3.2. Reference Standards:

| | | |
|---|---|---|
| 1.3.2.1. | ANSI/WDMA I.S. 1A-04 | - Industry Standard for Architectural Flush Wood Doors |
| 1.3.2.2. | ASTM C305-06 | - Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency |
| 1.3.2.3. | ASTM C1107/C1107M-06 | - Standard Specification for Packaged Dry Hydraulic-Cement Grout (Non-Shrink) |

1.3.2.4. NFPA 80-07 - Standard for Fire Doors and Fire Windows

1.3.2.5. CAN/ULC-S702-97 - Standard for Thermal Insulation Mineral Fibre, for Buildings

**1.4. ADMINISTRATIVE REQUIREMENTS**

1.4.1. Preinstallation Meeting:

1.4.1.1. Prior to commencement of the Work, arrange for the Site meeting of parties associated with the Work of this Section. Presided over by the Contractor, include the Consultant, Subcontractor(s), testing company's representative and the manufacturer's representative.

1.4.1.2. Review Work included under this section and determine complete understanding of requirements and responsibilities relative to Work included, storage and handling of hardware, hardware to be used, installation of methods and procedures related to electrified door hardware, sequence and quality control, Project staffing, restrictions on areas of Work and other matters affecting construction, to permit compliance with intent of this section. Also discuss following items:

1.4.1.2.1. electrical roughing in and other preparatory work performed by other trades.

1.4.1.2.2. sequence of operation of each type of electrified door hardware.

1.4.1.2.3. construction schedule and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.

1.4.1.2.4. required testing, inspecting and certifying procedures.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, schedules and the Specifications:

2.1.1.1. ChemRex Inc.; www.chemrex.com

2.1.1.2. CPD Construction Products; www.cpd.ca

2.1.1.3. Euclid Canada; www.euclidchemical.com

2.1.1.4. Sika Canada Inc.; www.sikacanada.com

2.1.1.5. W.R. Meadows of Canada; www.wrmeadows.com

2.1.1.6 or Equivalent

**2.2. MATERIALS**

2.2.1. Description:

2.2.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act, R.S.O. 1990, c. O.1*, Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.2.2. Doors, Frames and Hardware: Refer to the following sections for Products to be installed as part of

the Work of this section:

2.2.2.1. Section 06 40 00 -Architectural Woodwork.

2.2.2.2. Section 08 11 13 - Steel Doors and Frames.

2.2.2.3. Section 08 14 00 - Wood Doors.

2.2.3. Spot Grout: Proportion when used at metal door frames; 1 part hardwall plaster to not more than 2-1/2 parts "Perlite" by weight, with enough water added for "hand pack" consistency and/or use "Gyproc 90" by Georgia-Pacific Canada, Inc. or "Durabond 90" by CGC Inc. or Equivalent.

2.2.4. Threshold Sealant: As recommended by installer in accordance with Section 07 92 00 - Joint Sealants.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

3.1.1. Verification of Conditions: Verify actual Site dimensions and location of adjacent materials prior to commencing Work. Verify frames comply with indicated requirements for type, size, location, swing characteristics and have been installed with plumb jambs and level heads. Notify the Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

**3.2. INSTALLATION**

3.2.1. Hollow Metal Frames:

3.2.1.1. Install hollow metal frames in accordance with manufacturer's instructions.

3.2.1.2. Set frames plumb, square, level and at correct elevation, maintaining uniform door width and height.

3.2.1.3. Secure anchorages and connections to adjacent construction.

3.2.1.4. Remove temporary steel shipping jamb spreaders prior to setting 1-piece welded frames. Brace frames rigidly in position while being built in. Use precisely-dimensioned installation spreaders at sill and third-points of door opening height to maintain door opening width during building-in. Follow manufacturer’s instructions regarding proper use of floor and jamb anchors. Remove installation spreaders only after mortar has set, where applicable.

3.2.1.5. Allow for deflection to prevent structural loads from being transmitted to frame.

3.2.1.6. Spot Grouting:

3.2.1.6.1. Coordinate spot grouting with Section 09 21 16 - Gypsum Board.

3.2.1.6.2. Provide spot grout to increase rigidity of frame and improve resistance to frame rotation caused by weight of door.

3.2.1.6.3. Comply with manufacturer’s recommendations for surface preparation, cleaning, forming, mixing, placement and curing of grout.

3.2.1.6.4. Mix grout in accordance with ASTM C305 requirements.

3.2.1.6.5. Spot grout at strike and hinge side jambs at steel door frames set in gypsum board partitions, walls and other similar locations in accordance with manufacturer's recommendations. Immediately insert gypsum panels into jamb and attach to framing. Do not terminate gypsum board against trim.

3.2.1.6.6. Do not use pumped slurry method to perform spot grouting.

3.2.2. Wood Doors:

3.2.2.1. Install wood doors in accordance with manufacturer's instructions and recommendations of ANSI/WDMA I.S. 1A.

3.2.2.2. Condition doors to average temperature and humidity in area of installation for not less than 48 hours prior to installation.

3.2.2.3. Install doors in a neat and workmanlike manner free from hammer or tool marks, open joints or slivers.

3.2.2.4. Set plumb, level, square and true. Install doors after building humidity is at an acceptable level.

3.2.2.5. Install in accordance with following edge clearances unless otherwise indicated:

3.2.2.5.1. Between doors and frames: at head and jambs: 3 mm (1/8").

3.2.2.5.2. At door bottom: 9 mm (3/8") maximum unless doors are indicated to be undercut.

3.2.2.5.3. Between meeting edges of pairs of doors: 3 mm (1/8").

3.2.2.6. Cut, drill and prepare doors to template to receive hardware.

3.2.2.7. Ensure smoke gaskets are in-place before pre-finished door installation.

3.2.3. Finish Hardware:

3.2.3.1. Install hardware to doors and frames in accordance with manufacturer's packaged installation, template and adjusting instructions.

3.2.3.2. Adjust hardware to provide smooth operation of doors and ensure clearances are maintained. Provide lubricants to allow smooth function of hardware consistent with manufacturer's recommendations.

3.2.3.3. Mount hardware at heights in accordance with the "Recommended Locations for Builder's Hardware" by DHI Canada except as otherwise indicated in the Contract Documents or required by the Authorities Having Jurisdiction.

3.2.3.4. Install door louvres and frame bumpers.

3.2.3.5. Tighten fastening components snugly. Do not burr or otherwise mar the edges of surfaces of hardware components. Repair defects resulting from the Work of this section in accordance with the Consultant's review.

3.2.3.6. Set exterior door thresholds in a continuous bed of sealant to prevent water and air intrusion beneath sill.

3.2.3.7. Unless otherwise indicated in the Contract Documents, mounting heights for door hardware is as follows:

3.2.3.7.1. Locksets - 1023 mm (40-5/16") from floor to centre line of knob.

3.2.3.7.2. Deadlocks - 1524 mm (60") from floor to centre line of cylinder.

3.2.3.7.3. Panic Bolts - 1023 mm (40-5/16") from floor to centre line of bar.

3.2.3.7.4. Pulls - 1041 mm (41") from floor to centre line of pull.

3.2.3.7.5. Push Plates - 1143 mm (45") from floor to centre line of plate.

3.2.3.7.6. Guard Bars - 1066 mm (42") from floor to centre line of bar.

3.2.3.8. Provide locked room for storage of finish hardware at the job Site and a person responsible for control and distribution of finish hardware.

**3.3. SITE QUALITY CONTROL**

3.3.1. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to Owner.

**3.4. ADJUSTING**

3.4.1. Adjust doors and hardware and other moving or operating parts to function smoothly and correctly.

**3.5. CLEANING**

3.5.1. Carefully wipe clean doors of dust created due to the Work of this project.

**END OF SECTION**

## PART 1 - GENERAL

1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

1.2. SUMMARY

1.2.1. Section Includes: Provide firestopping and smoke seals including but not limited to the following:

1.2.1.1. firestopping and smoke seals in accordance with Ontario Building Code and Fire Code requirements, at openings and around penetrations, at un-penetrated openings, at projecting and recessed items and at openings and joints within fire separations and assemblies having fire resistance rating, excluding those inside sealed mechanical and electrical assemblies (e.g. inside ducts, dampers, bus ducts etc.).

1.2.1.2. firestopping and smoke seals in accordance with Code requirements, at openings and spaces at perimeter edge conditions, excluding those inside sealed mechanical and electrical assemblies (e.g. inside ducts, dampers, bus ducts etc.).

1.2.1.3. firestopping and smoke seals edge of slab.

1.2.1.4. ensure seal provides and maintains a fire-resistance rating as determined by OBC for adjacent floor, wall or other fire separation assembly to requirements of and as acceptable to Authorities Having Jurisdiction and to the Consultant.

1.2.1.5. firestopping and smoke seals in and around fire separations, including spaces around mechanical and electrical penetrations, at tops of fire walls, between slab edges and other gaps and penetrations at fire assemblies.

1.2.1.6. ensure Divisions 21, 22, 23, 26, 27 and 28 respectively are responsible for firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside electrical bus ducts). Ensure firestopping and smoke seals around outside of such mechanical and electrical assemblies where they penetrate fire-rated separations are part of the Work of this Section.

1.2.1.7. systems and specified Products are only a guide and may not address all firestopping conditions pertaining to situations which may be present in the Work. Provide firestopping and smoke seal required for the Work. These Products and systems are not presented to restrict other tested and approved listed assemblies of other manufacturers designing assemblies conforming to Code and resolving firestopping required for the Work.

1.2.2. Related Sections: t h e following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Sealants and caulking: Section 07 92 00 - Joint Sealants.

1.2.2.2. Gypsum board partitions: Section 09 21 16 - Gypsum Board.

1.2.2.3. Firestopping and smoke seals inside mechanical assemblies: Division 21, Fire Suppression, Division 22, Plumbing and Division 23, Heating Ventilating and Air Conditioning.

1.2.2.4. Firestopping and smoke seals inside electrical assemblies: Division 26, Electrical, Division 27, Communications and Division 28, Electronic Safety and Security.

1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. MSDS: Material Safety Data Sheets.

1.3.1.2. OBC: Ontario Building Code, 2006.

1.3.1.3. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.4. UL: Underwriters Laboratories Inc.; www.ul.com.

1.3.1.5. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.6. VOC: Volatile Organic Compound.

1.3.2. Definitions:

1.3.2.1. Firestop System Types:

1.3.2.1.1. Head of Wall Joint Firestop Systems: (HW): Systems intended for installation in vertical separations between wall and floor or roof structures. Ensure these systems do not incorporate penetrating items such as pipes or cables.

1.3.2.1.2. Joint Firestop Systems (JF): Systems intended for installation in openings such as construction joints, gaps and spaces in floors or walls or at floor and wall intersections in accordance with approved systems. Ensure these systems do not incorporate penetrating items such as pipes or cables.

1.3.2.1.3. Perimeter Joint Firestop Systems (PJ): Perimeter joint firestop system rating are governed by lowest of fire resistance ratings of individual components (i.e. the wall, floor or joint system). These systems consist of floor with fire endurance rating, exterior wall with or without fire endurance rating and perimeter joint system. Ensure these perimeter joint firestop systems do not incorporate penetrating items such as pipes or cables.

1.3.2.1.4. Service Penetration Firestop Systems (SP): Systems intended for installation in openings of limited dimensions and shape in floor or wall assemblies in accordance with approved systems. Ensure penetrating pipes, cable trays and similar items are in exact accordance with approved systems.

1.3.2.1.5. Service Penetration for Combustible Systems (SPC): Systems intended for installation in openings of limited dimensions and shape in floor or wall assemblies in accordance with systems approved by the Consultant. . These systems are tested with a minimum differential pressure of 50 Pa between exposed and unexposed surfaces of assembly to meet Code requirements for Combustible Pipes for Use in Drain, Waste and Vent Piping.

1.3.2.2. Ratings: Rating of firestop system applies to its use in specific assembly of materials, penetration and floor or walls in which it is tested as follows:

1.3.2.2.1. F Rating: When system remains in opening during fire test for rating period without permitting passage of flame through openings or occurrence of flaming on any element of unexposed side of assembly.

1.3.2.2.2. FT Rating: When system remains in opening during fire test in accordance with F Rating requirement and additionally, transmission of heat through firestop system during rating period shall not have been such as to raise temperature of any thermocouple on unexposed surface of system more than 163 deg C (325 deg F) above initial temperature.

1.3.2.2.3. FH Rating: When system remains in opening during fire and hose test in accordance with F Rating requirement and additionally, during hose stream test firestop system shall not develop any opening that would permit a projection of water from stream beyond unexposed side.

1.3.2.2.4. FTH Rating: When system remains in opening during fire test and hose stream test within limitations described for F, FT and FH ratings.

1.3.2.2.5. L Rating: Based on volume of air flowing, per unit of time through opening around test sample under specified pressure difference applied across surface of system. L Ratings are intended to determine acceptability of firestop systems with reference to control of air movement through assembly. Rating is expressed in litres per second (l/s) per linear metre of opening for joint systems.

1.3.3. Reference Standards:

| | | |
|---|---|---|
| 1.3.3.1. | NFPA 101-09 | - Life Safety Code |
| 1.3.3.2. | CAN/ULC-S101-07 | - Standard Methods of Fire Endurance Tests of Building Construction and Materials |
| 1.3.3.3. | CAN/ULC-S102-07 | - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies |
| 1.3.3.4. | ULC-S115-05 | - Standard Method of Fire Tests of Firestop Systems |
| 1.3.3.5. | ULC Guide No. 40 U19 | - Firestop Systems |
| 1.3.3.6. | ULC Guide No. 40 U19.13 | - Firestop Systems Components |

1.4. ADMINSTRATIVE REQUIREMENTS

1.4.1. Preinstallation Meetings: Prior to commencement of sealing, arrange for Product manufacturer's knowledgeable representative to meet and discuss installation procedures and unique conditions at the Place of the Work, inspect substrate surfaces and recommend solutions to accommodate adverse conditions, periodically visit and verify installations before being concealed and report unsatisfactory conditions to the Contractor, attend final inspection and to submit written certification that Products, systems and assemblies have been installed in accordance with manufacturer's requirements.

1.4.2. Scheduling: Coordinate with Subcontractors involved and advise dates where work will take place throughout various areas of work.

1.5. SUBMITTALS

1.5.1. Product Data: Submit manufacturers' specifications and technical data for each material including compositions, limitations, documentation conforming to ULC firestop system proposed for this project and the manufacturers' installation instructions.

1.5.2. Shop Drawings:

1.5.2.1. Submit Shop Drawings in accordance with Section 01 30 00 – Administrative Requirements. Submit complete and detailed Shop Drawings for each condition encountered on site. Indicate following:

1.5.2.1.1. ULC assembly number certification and material safety data sheets.

1.5.2.1.2. required temperature rise and flame rating.

1.5.2.1.3. hose stream rating (where applicable).

1.5.2.1.4. thickness.

1.5.2.1.5. proposed installation methods.

1.5.2.1.6. material of firestopping and smoke seals, primers, reinforcements, support and securement methods, damming materials, reinforcements and anchorages /fastenings.

1.5.2.1.7. size of opening.

1.5.2.1.8. adjacent materials.

1.5.2.1.9. number of penetrations.

1.5.2.2. Designate on Shop Drawings fixed penetrants, relative positions, number of penetrations, expansion and control joints in rated slabs and walls, firestopping details at receptacles and similar poke-through devices and surrounding permanent materials. Identify re-entry locations.

1.5.2.3. Submit fireproofing manufacturer's written verification that manufacturers have identified where firestopping is required, have selected correct firestop system and applicators have been trained by system manufacturers. Products, systems and assemblies have been installed in accordance with manufacturer's requirements.

1.5.3. Samples: Submit only as requested and in accordance with Section 01 30 00 – Administrative Requirements, various types of firestopping and smoke seal material.

1.5.4. Certificates:

1.5.4.1. Submit manufacturer's verification that installed firestopping and smoke seal materials comply with specified requirements.

1.5.4.2. Submit copies of ULC and/or Warnock Hersey Listing cards for review.

1.6. CLOSEOUT SUBMITTALS

1.6.1. Operational and Maintenance Data: Provide maintenance data for materials and prefabricated devices, providing descriptions sufficient for identification on Site in accordance with requirements of Section 01 70 00 - Execution and Closeout Requirements.

1.7. QUALITY ASSURANCE

1.7.1. Qualifications:

1.7.1.1. Installers: Provide the work of this Section executed by competent installers experienced, trained, licensed and approved, by material or system manufacturer for application of materials and systems being used having a minimum of 5 years' experience in application of Products, systems and assemblies specified. Ensure firestopping systems conform to requirements of ULC-S115 tested assemblies that provide fire rating as shown.

1.8. DELIVERY, STORAGE AND HANDLING

1.8.1. Delivery and Acceptance Requirements: Deliver materials to the Site in the manufacturer's sealed and labelled containers. Materials are subject to Consultant's inspection.

1.8.2. Storage and Handling Requirements:

1.8.2.1. Store materials inside building for 24 hours prior to use; store in area designated by Consultant. Protect from damage and environmental conditions detrimental to material.

1.8.2.2. Comply with manufacturer's temperature, relative humidity and substrate moisture content for storage, mixing, application and curing of Products.

1.9. SITE CONDITIONS

1.9.1. Ambient Conditions:

1.9.1.1. Comply with the manufacturer's recommended requirements for temperature, relative humidity, moisture content and presence of any sealer or release agents on substrate during application and curing of materials. Ensure surfaces are dry and frost free.

1.9.1.2. Maintain minimum temperature of 5 deg C (40 deg F) for minimum period of 1 week before application, during application and until application is fully cured.

1.9.1.3. Ventilate areas in which firestopping is being applied. Protect water-soluble material from wetting until fully cured.

1.10. WARRANTY

1.10.1. Manufacturer Warranty: Warrant work of this Section against defects and deficiencies for period of 5 years in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within the warranty period, to satisfaction of the Consultant and at no additional expense to the Owner. Defects include but are not limited to cracking, breakdown of bond, failure to stay in place or bleeding.

**PART 2 - PRODUCTS**

2.1. MANUFACTURERS

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, schedules and the Specifications:

2.1.1.1. A/D Fire Protection Systems Inc.; www.adfire.com

2.1.1.2. GE Canada, Inc.; www.gesilicones.com

2.1.1.3. Electrical Products Division/3M; www.3m.com

2.1.1.4. Grace Construction Products; www.graceconstruction.com

2.1.1.5. Instant Firestop Inc.

2.1.1.6. Hilti (Canada) Corporation; www.ca.hilti.com

2.1.1.7. Johns Manville, Fire Protection Systems; www.jm.com

2.1.1.8. M.W. McGill and Associates Ltd.

2.1.1.9. Nelson Firestop Products; www.nelsonfirestop.com

2.1.1.10. ThermoFire Systems Inc.

2.1.1.11. Thomas & Betts Ltd.

2.1.1.12. Tremco Canada; www.tremcosealants.com

2.1.1.13 Or equivalent

2.1.2. Substitution Limitations: Comparable Products from manufacturers listed herein will be accepted

provided they meet requirements of this Specification.

2.2. MATERIALS

2.2.1. Description:

2.2.1.1. Regulatory Requirements: Where required, provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act, R.S.O. 1990, c. O.1*, Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 - Quality Requirements for further requirements.

2.2.2. Performance/Design Criteria: Ensure firestop systems intended for installation in fire separations have assigned fire ratings as defined herein when tested in accordance with ULC-S115. Ensure firestop systems intended for use in fire resistive wall and/or floor assemblies are evaluated in accordance with CAN/ULC-S101 (Refer to ULC Guide No. 40 U19).

2.2.3. Head of Wall Joint Firestop Systems: (HW): Supply materials and systems capable of effectively impeding passage of fire, smoke, gasses and where specifically indicated on the Drawings. Use only firestop systems that have been ULC tested for specific fire rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire rating involved for each separate instance.

2.2.4. Ensure firestopping system provides fire-resistance rating, flame and temperature not less than fire resistance rating of surrounding floor, wall or assembly, in accordance with requirements of OBC.

2.2.5. Firestop System Rating: Where applicable, comply with F rating based on number of hours system can resist flames and gases; T rating based on maximum temperature rise of 163 deg C (325 deg F) above ambient for any thermocouple in addition to flame, gas and stream performance and H rating based on capacity to withstand hose stream after burn. Design combined and/or built-up Site systems in accordance with approved restrictions and technical evaluations acceptable to the Consultant and Authorities Having Jurisdiction.

2.2.6. Ensure systems provide fire and temperature rating in accordance with those outlined in OBC and effectively impeding passage of flame, smoke and gasses.

2.2.7. Firestopping seals except for wall joints in visible areas must be of easily identifiable colour, such as red or yellow to be clearly distinguished from other building materials.

2.2.8. Ensure service penetration components and assemblies, including back-up materials and supports are certified in accordance with ULC-S115 or CAN/ULC-S101 and be ULC listed by a certified authority recognized by Building Code officials in the Town of Newmarket.

2.2.9. Ensure suitability of Products for application and compatibility of materials with surfaces to which it will be applied.

2.2.10. Ensure Site system assembly is in accordance with ULC-S115 labeled and listed system design limitations, unless proposed assembly is approved by Authorities Having Jurisdiction and meets Consultant's approval. Design combined and/or built-up Site systems in accordance with approved restrictions and technical evaluations acceptable to Consultant and Authorities Having Jurisdiction. Engineering judgements from firestopping manufacturers reviewed by the Consultant and Authorities Having Jurisdiction may be used for conditions where a ULC firestopping system is not available.

2.2.11. Ensure sealants and putty for overhead and vertical joints are non-sagging; seals for floors, self- levelling. Ensure flexible fire stop sealant provides movement capability in fire rated joint applications. Ensure sealants are compatible with base materials such as without limitations masonry, concrete, metal, gypsum board and other similar items.

2.2.12. Ensure Products have a compressive strength capable of providing self-support at a penetrating item and shall maintain their integrity as tested in a ULC vertical application.

2.2.13. Ensure Products are compatible with abutting dissimilar architectural coatings and finishes at floors, walls, ceilings, waterproofing membranes and the like. Review Drawings and check the manufacturer of selected materials being installed.

2.2.14. Integral Pipe Sleeves/Firestopping Components: Other Sections within Divisions 21, 22 and 23 may specify fire-rated pipe sleeves, cast-in pipe/sleeve assemblies and integral firestopped penetration devices and accessories listed by authorized testing and certification authorities. These systems may eliminate need for separate firestopping applications at certain designated locations and it is responsibility of this Section to determine any and all locations where such devices will be utilized on project.

2.2.15. Do not provide Products containing asbestos.

2.2.16. Firestopping System 1 (JF Systems):

2.2.16.1. This Firestopping System is primarily an expansion, control and perimeter seal without smoke resistance and be non-combustible, semi-rigid, felt fire protection. Certified assembly of 1 of listed manufacturers or Equivalent and acceptable to the Consultant.

2.2.16.2. Ensure blanket type firestopping is listed and labelled in accordance with ULC Guide No. 40 U19 or 40 U19.13, with reference to `JF System Listings'.

2.2.16.3. Where required by listing, ensure impaling clips are heavy gauge galvanized wire or 25 mm (1") wide x 0.607 mm (24 ga) galvanized steel, Z formed with horizontal bottom and dimensions conforming to location of firestopping and width of void to be filled. Ensure compression of joint do not damage clips.

2.2.17. Firestopping System 2: Same materials as in System 1, but without use of impaling clips and with smoke and fluid seal with hose stream resistance. Certified assembly of 1 of listed manufacturers or Equivalent and acceptable to the Consultant.

2.2.18. Firestopping System 3: Fire, gas, fluid and hose stream resistant elastomeric sealant with movement capabilities, ULC labeled assembly of 1 of listed manufacturers or Equivalent and acceptable to the Consultant. Ensure materials have elastic characteristics where used at openings subject to movement. Intumescent pads may form part of this system, at the Contractor’s option.

2.2.19. Firestopping System 4: Ensure firestopping, gas, fluid and hose stream resistant seals at openings intended for ease of re-entry such as cables be an elastomeric seal or proprietary assembly of following types; a cementitious or rigid seal at such locations is not permitted. Certified assembly of 1 of listed manufacturers or Equivalent and acceptable to the Consultant.

2.2.20. Firestopping System 4-A: Where openings are considered large such as at cable trays and bus ducts. Certified assembly of 1 of listed manufacturers or Equivalent and acceptable to the Consultant.

2.2.21. Firestopping System 5 (Cavity Wall Compartment Closer and Firestopping): Strips of "RXL Safe" semi-rigid mineral fibre insulation by Roxul Inc. 75 mm (3") wide by depth of cavity plus 13 mm (1/2") with galvanized skewers for securement at 300 mm (12") oc., or compressed 25% to fill depth of cavity.

2.2.22. Primers: To manufacturer's recommendations for specific material, substrate and end use.

2.2.23. Framing and Backup Materials, Supports and Anchoring Devices: Non-combustible, to manufacturer's recommendations in accordance with tested assembly being installed and as acceptable to Authorities Having Jurisdiction. Ensure sheet steel covers over temporarily unused sleeves in tenant and similar spaces are minimum 0.912 mm (20 ga) thick galvanized sheet steel formed to a tight fit over opening with specified firestopping materials installed beneath. Combustible materials are acceptable only if they are approved under ULC systems, otherwise they should be removed after permanent firestop materials have cured.

2.2.24. Pipe and Duct Insulation and Wrappings Compatible with Firestopping Systems: "Nelson WRP" by Nelson Electric Ltd. for use with Nelson Electric Ltd. firestops and "Instant Type PI" by Instant Firestop Inc. for use with Instant Firestop Inc. firestops; or "TREMstop WS" by Tremco Canada; or Equivalent.

2.2.25. Intumescent Pads: “FSP 1077" by Grace Construction Products or "FSP Pads" by Nelson Electric, or "Instant Putty 200" by Instant Firestop Inc., or "Type PLW Firestop Pillow" by Electrovert Ltd.; or Equivalent.

2.2.26. Re-Entry Pillows: Permanently pliable, “FSPIL Pillows" by Grace Construction Products or "Type PLW Firestop Pillow" by Electrovert; or "PLW" by Nelson Electric; or "TREMstop PS" by Tremco Canada; or Equivalent.

2.2.27. Mixes:

2.2.27.1. Mix materials at correct temperature and in accordance with manufacturer's directions.

2.2.27.2. Cleaning Materials: As recommended by firestop manufacturer.

**PART 3 - EXECUTION**

3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. Verify actual Site dimensions and location of adjacent materials prior to commencing Work. Notify Consultant in writing of any conditions which would be detrimental to the installation.

3.1.1.2. Verify openings, dimensions and surfaces conform to fire and smoke seal assembly.

3.1.1.3. Examine sizes of penetrating service, percentage fill and sleeve or opening sizes with exact annular space calculations, anticipated movement and conditions necessary to establish correct type, thickness and installation of back-up materials and seals.

3.1.2. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

3.2. PREPARATION

3.2.1. Surface Preparation:

3.2.1.1. Provide primer or surface conditioner if required by Product manufacturer. Prime surfaces in accordance with manufacturer's directions.

3.2.1.2. Remove combustible material and loose material detrimental to bond from edges of penetration. Clean, prime or otherwise prepare substrate material to manufacturer's recommendation.

3.2.1.3. Remove insulation from insulated pipe and duct where such pipes or ducts penetrate a fire separation unless ULC certified assembly permits such insulation to remain within assembly, or where mechanical trades have installed special fire rated insulated sleeves. Ensure continuity of thermal and vapour barriers where such are removed, altered or replaced, to satisfaction of Divisions 21, 23, 23 and the Consultant.

3.2.1.4. Alternatively, ensure pipe and duct insulation and wrappings occurring within openings to receive firestopping and smoke seals under this Section are installed prior to Work of this Section and insulation and wrappings within fire seals are ULC listed components of system to be installed under this Section, unless ULC certified assembly permits such other insulation and wrappings to remain within assembly. Coordinate the Work of this Section with Divisions 21, 22 and 23.

3.2.1.5. Clean bonding surfaces to remove deleterious substances including dust, paint, rust, oil, grease, moisture, frost and other foreign matter which may otherwise impair effective bonding.

3.3. INSTALLATION

3.3.1. Do not apply firestop material to surfaces previously painted or treated with sealer, curing compound, water repellent to other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings which prohibit firestop from being applied.

3.3.2. Provide temporary forming, packing and bracing materials necessary to contain firestopping. Upon completion, remove forming and damming materials not required to remain as part of system.

3.3.3. Install damming and firestopping materials as per manufacturer's instructions.

3.3.4. Mix and apply firestopping and smoke seals in accordance with manufacturer's instructions and tested designs to provide required fire (temperature and flame) rated seal, to prevent passage of smoke and where specifically designated, passage of fluids.

3.3.5. Provide temporary forming and packing if required. Apply materials with sufficient pressure to properly fill and consolidate mass to seal openings.

3.3.6. Tool or trowel exposed surfaces. Allow materials to cure by not covering up materials until full curing has taken place.

3.3.7. Where a designated system described hereinafter does not meet Code requirements for particular service condition, substitute with next higher system meeting required rating.

3.3.8. Notify the Consultant when completed installations are ready for inspection and prior to concealing or enclosing firestopping and smoke seals.

3.3.9. System 1:

3.3.9.1. Install fire rated joint firestopping by compressing material minimum of 25% to ensure complete sealing and to follow irregularities of concrete slabs at perimeter of building where junction occurs with back of cladding system. Apply firestopping sealant of spray over compressed mineral wool.

3.3.9.2. Butt succeeding sections of firestopping material tightly up against preceding. Leave no voids.

3.3.9.3. Provide firestopping between exterior wall cladding and concrete floor slab. Secure and support to suit design requirements.

3.3.9.4. Use this system for joint seals through fire-resistance rated floor slabs, ceilings and roofs.

3.3.10. System 2:

3.3.10.1. At fire-rated masonry walls and gypsum board partitions which extend nominally to within 19 mm (3/4") of underside of deck above, insert fire rated joint assembly firestopping material in 25% compression in accordance with ULC test requirements and manufacturer's instructions. Provide adequate depth of material to fill gap flush with face of wall.
Apply firestopping sealant of spray over compressed mineral wool.

3.3.10.2. Insert at intersection of fire-resistance rated masonry and gypsum board partitions.

3.3.10.3. Insert at both sides of control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

3.3.10.4. Where wall/slab junction is exposed in finished work, keep fibre back 9 mm (3/8") from face of block and apply fire-resistant sealant to gap, tooling to a concave joint.

3.3.10.5. At perimeter slab locations where this system would otherwise be exposed in finished Work and where smoke seal is required, provide cover spray material of thickness as recommended by manufacturer of System 3 material set flush with top of slab and tooled smooth. Minimum

cover spray thickness 3 mm (1/8"). Where anticipated movement in joint width is inevitable, select sealant with elastic capabilities.

3.3.11. System 3:

3.3.11.1. This system establishes fire rated firestopping for service penetrations throughout the project. Seal gaps and holes in fire-rated walls and slabs and composite construction through which conduit, wire, cables, ductwork, piping and other protrusions pass as a result of work using fire-resistant penetration sealant. Include opening which have been formed, sleeved and cored.

3.3.11.2. Apply at unpenetrated openings and sleeves installed for future use through fire-resistance rated assemblies.

3.3.11.3. Apply this system between spaces having different air pressures. (See mechanical Drawings for pressurized areas and locations of moving penetrants.)

3.3.11.4. Apply at "wet" rooms supported by suspended slabs at locations over electrical and equipment rooms or similar areas containing power devices in which future re-entry is not required.

3.3.11.5. Apply at mechanical rooms and similar rooms having systems containing liquids, including piping runs, unless such rooms are located over slab-on-grade.

3.3.11.6. Install System 3 materials at elevator shafts, duct shafts and other similar locations over occupied spaces.

3.3.11.7. Install 6 mm to 9 mm (1/4" to 3/8") bead of firestop caulking at interface of retaining angles around fire dampers, where angles meet fire-rated assembly and between retaining angles and fire damper, both sides of penetration. At floor locations, sealant bead at top of assembly is adequate.

3.3.11.8. Where necessary, remove insulation from insulated pipe and duct where such services penetrate a fire separation unless certified assembly permits such insulation to remain within assembly. Apply wrapping materials as listed herein.

3.3.11.9. Install System 3 materials at open wall joints, including expansion joints between fire rated enclosures and assemblies.

3.3.12. Systems 4 and 4A: Install at following locations:

3.3.12.1. At electrical, electrical switchgear, electrical transformer rooms and at telephone equipment rooms requiring re-entry for additional services.

3.3.12.2. Install at communications and computer cable penetration points throughout.

3.3.13. Accessories: At hollow fire-rated walls, apply intumescent pads to back surfaces and cable entry points of electrical boxes, panels and other service penetration points, ensuring close coordination with electrical, mechanical and drywall trades. Where greater dimension of panel exceeds 500 mm (20"), gypsum board trades construct fire-rated enclosure around recessed panels.

3.3.14. System 5: Maintain maximum cavity wall compartments to lesser of following 2 criteria by bridging gap between cavity back-up material and back face of brick with full-depth strips of compartment closer and firestopping material, securing in position with mechanical fasteners and sealing against firm, primary cavity materials:

3.3.14.1. 10 m² (100 sq ft).

3.3.14.2. Division B, Part 3, Paragraph 3.1.11 of OBC.

3.3.15. Penetration Sizing: Ensure following regulates sizing of service penetrations to be firestopped, other

than for fire dampered openings:

3.3.15.1. Ensure single, circular penetration is sleeved by work of Divisions 21, 22, 23, 26, and 27.

3.3.15.2. Multiple penetrations of circular elements are defined as more than 1 circular penetration having a maximum space of 100 mm (4") between closest faces of such penetrating elements. Forming of multiple penetrations through fire rated assemblies shall be square or rectangular frame around group of penetrations in which maximum clearance between outer penetration element and face of opening shall be 25 mm (1").

3.3.15.3. Create single and multiple rectangular penetrations in same manner as specified above, but edge clearance may be increased to a maximum of 50 mm (2").

3.3.15.4. Exception; at fire dampers, clearances are governed by Newmarket building inspectors.

3.3.15.5. For purposes of this specification, a moving penetrant is defined as a penetrating device having an anticipated movement of greater than 9 mm (3/8") when measured at right angles to face of rated assembly.

3.3.16. Cable Tray Penetrations:

3.3.16.1. Seal cable tray penetrations with re-enterable matrices having a minimum compressive strength of 250 psi having a minimum FTH Rating of 1/2 hr for 500 MCM cables and 2 hr for 300 MCM cables.

3.3.16.2. Ensure listings are for cable tray tests carried out having maximum percentage listed by ULC and/or UL of cable density.

3.4. SITE QUALITY CONTROL

3.4.1. Site Testing and Inspections:

3.4.1.1. Perform a series of 5 fog tests to random locations as designated by the Consultant. Should any penetration, joint or void, under jurisdiction of this Section, emit visible fog, make repairs and replace deficiencies and re-perform fog test at no additional cost to the Owner.

3.4.1.2. Ensure fog units (machines) have a formulation output range of (1.5 gal/hr). Formulation particle size 0.5 - 25 µm. Ensure fogging agent is non-toxic, non-staining and provides a heavy fog at 30 ppm with a permissible airborne level concentration of 50 ppm.

3.4.1.3. Fog at a rate of 4 s/100 cu ft. Maintain fog density until inspection is complete.

3.4.1.4. Independent inspection and testing company may be appointed and paid for by the Owner to carry out additional inspection and testing as directed by the Consultant. Refer to Section 01 40 00 – Quality Requirements. Tests include 3 fog tests per floor at random locations.

3.4.1.5. Where Work or materials fail to meet requirements as indicated by test results, pay costs of additional inspection and testing required for new replacement work or materials.

3.4.2. Ensure firestopping systems do not affect structural integrity of load bearing walls and assemblies. Coordinate with the Consultant prior to penetrating any load bearing assembly. For unusual firestop application for which no tested system is available, ensure manufacturers submit their proposal to local Authorities Having Jurisdiction for their review and approval prior to installation.

3.4.3. Ensure all Work of this Section is by 1 Subcontractor responsible for firestopping materials and systems except as specified herein.

3.4.4. Conform to both temperature and flame ratings of standards listed hereinafter and other requirements of Authorities Having Jurisdiction.

3.4.5. Manufacturer Services: Consult with the Product manufacturer's technical representative about following items:

3.4.5.1. fire stopping system for fire separation required.

3.4.5.2. curing characteristics of materials specified

3.4.5.3. joint characteristics as built.

3.5. CLEANING

3.5.1. Remove excess materials and debris and clean adjacent surfaces immediately after application to satisfaction of the Consultant. Remove and or correct staining and discolouring of adjacent surfaces as directed.

3.5.2. Remove temporary dams after initial set of firestopping and smoke seal materials where such materials are left exposed in finished areas and flame spread rating of such materials exceed a value of 25, in accordance with CAN/ULC-S102.

3.6. PROTECTION

3.6.1. Fully protect walls, windows, floors and other surfaces around areas to be firestopped from marring or damage. Mask where necessary to avoid spillage on to adjoining surfaces. Mask areas adjacent to openings, where necessary to prevent contamination or marring of adjacent surface materials. Remove masking after seal has been completed and an initial set has been achieved. Remove stains on adjacent surfaces as required.

END OF SECTION

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide joints sealants including but not limited to the following:

1.2.1.1. Interior:

1.2.1.1.1. control and expansion joints on exposed interior surfaces of exterior walls.

1.2.1.1.2. perimeter joints of exterior openings where indicated.

1.2.1.1.3. tile control and expansion joints.

1.2.1.1.4. joints between different materials listed above.

1.2.1.1.5. perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.

1.2.1.1.6. joints between plumbing fixtures and adjoining walls, floors and counters.

1.2.1.1.7. other joints as indicated.

1.2.1.2. mildew resistant sealants.

1.2.1.3. self leveling sealants.

1.2.1.4. pick proof sealants.

1.2.2. Related Sections: Following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Firestopping and smoke seals: Section 07 84 00 - Firestopping and Smoke Seals.

1.2.2.2. Sealing of joints around sound attenuating gypsum board partitions: Section 09 21 16 - Gypsum Board.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. IPA: Isopropyl Alcohol.

1.3.1.2. MEK: Methyl-ethyl-ketone.

1.3.1.3. MSDS: Material Safety Data Sheets.

1.3.1.4. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.5. SWRI: Sealant, Waterproofing, & Restoration Institute; www.swrionline.org.

1.3.1.6. VOC: Volatile Organic Compound.

1.3.2. Reference Standards:

| | | |
|---|---|---|
| 1.3.2.1. | ASTM C661-06 | - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealant by Means of a Durometer |
| 1.3.2.2. | ASTM C719-93(05) | - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle) |
| 1.3.2.3. | ASTM C834-05 | - Standard Specification for Latex Sealants |
| 1.3.2.4. | ASTM C920-08 | - Standard Specification for Elastomeric Joint Sealants |
| 1.3.2.5. | ASTM C1021-08 | - Standard Practice for Laboratories Engaged in Testing of Building Sealants |
| 1.3.2.6. | ASTM C1248-08 | - Standard Test Method for Staining of Porous Substrate by Joint Sealants |

## 1.4. SUBMITTALS

1.4.1. Product Data: Submit Product information from sealant manufacturer to Consultant prior to commencement of the Work of this Section verifying:

1.4.1.1. selected sealant materials are from those specified.

1.4.1.2. composition and physical characteristics.

1.4.1.3. surface preparation requirements.

1.4.1.4. priming and application procedures.

1.4.1.5. suitability of sealants for purposes intended and joint design.

1.4.1.6. test report on adhesion, compatibility and staining effect on samples of adjacent materials used on project.

1.4.1.7. sealants compatibility with other materials and Products with which they come in contact including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, brick, stone, concrete, masonry, metals and metal finishes, ceramic tile, plastic laminates and paints.

1.4.1.8. suitability of sealants for temperature and humidity conditions at time of application.

1.4.2. Test and Evaluation Reports:

1.4.2.1. Compatibility Testing Report: Submit in accordance with Section 01 30 00 – Administrative Requirements. Prior to supply or installation, test exterior sealant materials for compatibility with joint substrates. Test for staining and adhesion including substrates treated with sealers, curing compounds and water repellants etc. Submit a written report of test results to the Consultant.

1.4.2.2. Colour: Submit colours for acceptance in accordance with following general colour hierarchy i.e. Between 2 dissimilar materials, colour the sealant to match the material with the higher relative position on the colour hierarchy scale (highest is at ".1"):

1.4.2.2.1. concrete.

1.4.2.2.2. masonry.

1.4.2.2.3. metal extrusions.

1.4.2.2.4. metal (formed).

1.4.3. Samples: Submit samples in accordance with Section 01 30 00 – Administrative Requirements. Provide cured, colour samples of manufacturer's standard range of colours in each type of sealant and caulking compound for colour selection by the Consultant. Submit samples of primer, bond breaker tape and joint backing material, if requested by the Consultant.

**1.5. QUALITY ASSURANCE**

1.5.1. Qualifications:

1.5.1.1. Installers: Provide the Work of this Section executed by competent installers who have a membership in good standing with SWRI and have a minimum of 5 years' experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.5.1.2. Testing Agencies: An independent testing agency qualified according to ASTM C1021 to conduct testing indicated. Ensure Products are verified by SWRI in accordance with ASTM C719 and ASTM C661.

1.5.2. Preconstruction Testing:

1.5.2.1. Test for compatibility of sealant and accessory Products with joint substrates. Provide test results and written recommendations to the Consultant for primers and substrate preparation required for proper adhesion. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures, including use of specialty formulated primers.

1.5.2.2. Test elastomeric joint sealants for compliance with requirements of ASTM C920 and where applicable, to other standard test methods.

1.5.2.3. Test elastomeric joint sealants for compliance with requirements of ASTM C719 for adhesion and cohesion under cyclic movement, adhesion-in peel and indentation hardness.

1.5.2.4. Test other joint sealants for compliance with requirements indicated by referencing standard Specifications and test methods.

1.5.3. Include lists of completed projects with Name of Consultants and contact persons.

**1.6. DELIVERY, STORAGE AND HANDLING**

1.6.1. Delivery and Acceptance Requirements: Deliver caulking and sealant materials to the Site in original, unopened containers with manufacturers' labels and seals intact. Labels to identify manufacturer's name, brand name of Product, grade and type, application directions and shelf life or expiry date of Product.

1.6.2. Storage and Handling Requirements:

1.6.2.1. Handle and store materials in accordance with the manufacturer's printed directions. Store flammable materials in safe, approved containers to eliminate fire hazards.

1.6.2.2. Do not use caulking and sealant materials that have been stored for period of time exceeding maximum recommended shelf life of materials.

**1.7. SITE CONDITIONS**

1.7.1. Ambient Conditions:

1.7.1.1. Do not apply any sealant under adverse weather conditions, when joints to be sealed are damp, wet or frozen or when at ambient temperatures below 5 deg C (40 deg F). Maintain minimum temperature of application during application and for 8 hours after application. Consult manufacturer for specific instructions before proceeding and obtain the Consultant's approval.

1.7.1.2. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated and until contaminants capable of interfering with adhesion are removed from joint substrates.

**1.8. WARRANTY**

1.8.1. Manufacturer Warranty: Warrant work of this Section for period of 20 years for silicone type sealants and 5 years for other sealants against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of the Consultant and at no expense to the Owner. Defects include but are not limited to; cracking, crumbling, melting, shrinkage, sag, failure of adhesion, cohesion or reversion, air and moisture leakage, marbling or streaking due to improper mixing, discolouration due to dirt pick-up during curing and staining of adjacent materials.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, schedules and Specifications:

2.1.1.1. ChemRex Inc.; www.chemrex.com

2.1.1.2. CPD Construction Products; www.cpd.com

2.1.1.3. Dow Corning; www.dowcorning.com

2.1.1.4. Euclid Chemical Canada Ltd.; www.euclidchemical.com

2.1.1.5. Momentive Performance Materials; www.momentive.com

2.1.1.6. Sika Canada Inc.; www.sika.ca

2.1.1.7. Tremco Canada; www.tremcosealants.com

2.1.1.8. W.R. Meadows of Canada; www.wrmeadows.com

2.1.1.9 Or Equivalent

**2.2. MATERIALS**

2.2.1. Description:

2.2.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Regulation 851, Industrial Establishments as amended. Refer to Section 01 40 00 – Quality Requirement for further requirements.

2.2.2. Performance/Design Criteria: Provide exterior and interior elastomeric joint sealants establishing and maintaining water tight, water resistant and air tight continuous joint seals without staining or deteriorating joint substrates.

2.2.3. General: Ensure elastomeric sealants comply with standards specified in this Section for type, grade, class and uses.

2.2.4. Provide Products with capability, when tested for adhesion and cohesion under maximum cyclic movement in accordance with ASTM C719, to withstand required percentage change in joint width existing at time of installation and remain in compliance with other requirements of ASTM C920 for uses indicated.

2.2.5. Where elastomeric sealants shall be non-staining to porous substrates, provide Products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for the project.

2.2.6. Type B Sealant: Non-sag type, 1 component, mildew resistant silicone containing non-toxic fungicidal agents sealant conforming to ASTM C920, Type S, Grade NS, Class 25, Use NT. Supply in standard colours as selected by the Consultant. Supply 1 of following:

2.2.6.1. “Dow Corning 786" by Dow Corning.

2.2.6.2. “Trade Mate Tub, Tile & Ceramic Silicone Sealant” by Dow Corning.

2.2.6.3. “GE Sanitary SCS1700" by Momentive Performance Materials.

2.2.6.4. “Tremsil 200, white or clear" by Tremco Canada.

2.2.6.5 Or Equivalent

2.2.7. Type C Sealant: Provide 1 of the following:

2.2.7.1. Non-sag type, 1 component, acrylic latex sealant conforming to ASTM C834, Type OP, Grade -18°C. Supply in standard colours as selected by the Consultant. Supply 1 of following:

2.2.7.1.1. “GE RCS20" by Momentive Performance Materials.

2.2.7.1.2. “Sonolac” by Sonneborn.

2.2.7.1.3. “Tremflex 834" by Tremco Canada.

2.2.7.1.4 Or Equivalent

2.2.7.2. Non-sag type, multi-component polyurethane sealant conforming to ASTM C920, Type M, Grade NS, Class 50, Use T, I, M, A and O. Supply in standard colours as selected by the Consultant. Supply
1 of the following:

2.2.7.2.1. “Sonoplastic NP 2" by ChemRex Inc.

2.2.7.2.2. “Eucolastic II” by Euclid Chemical Canada Ltd.

2.2.7.2.3. “Sikaflex -2c NS” by Sika Canada Inc.

2.2.7.2.4. “DYmeric 240” by Tremco Canada.

2.2.7.2.5 Or Equivalent

2.2.7.3. Non-sag type, 1 component polyurethane sealant conforming to ASTM C920, Type S, Grade NS, Class 25, Use NT, M, A and O. Supply in standard colours as selected by the Consultant. Supply 1 of the following:

2.2.7.3.1. “Sonoplastic NP1" by ChemRex Inc.

2.2.7.3.2. “Sikaflex -1a” by Sika Canada Inc.

2.2.7.3.3. “DyMonic” and/or “Vulkem 116" by Tremco Canada.

2.2.7.3.4 Or Equivalent

2.2.8. Type D Sealant: Provide 1 of following:

2.2.8.1. Pour grade, 1 component polyurethane sealant conforming to ASTM C920, Type S, Grade P, Class 25, Use T, M, A, I and O. Supply in standard colours as selected the Consultant. Supply 1 of following:

2.2.8.1.1. “SL 1" by ChemRex Inc.

2.2.8.1.2. “Sikaflex Self Levelling Sealant” by Sika Canada Inc.

2.2.8.1.3. “Vulkem 45” by Tremco Canada.

2.2.8.1.4 Or Equivalent

2.2.8.2. Pour grade, multi-component, polyurethane sealant conforming to ASTM C920, Type M, Grade P, Class 25, Use T, M, A, I and O. Supply 1 of following:

2.2.8.2.1. “NP 2" by ChemRex Inc.

2.2.8.2.2. “Sikaflex 2c SL” by Sika Canada Inc.

2.2.8.2.3. “THC-900/901 or Vulkem 245" by Tremco Canada.

2.2.8.2.4. Or Equivalent

2.2.8.3. Pour grade, 1 component ultra-low modulus, pre-pigmented, neutral cure elastomeric silicone sealant. Supply in standard colours as selected by the Consultant. Supply 1 of the following:

2.2.8.3.1. “Dow Corning SL Parking Structure Sealant (Self Leveling)” by Dow Corning.

2.2.8.3.2. “GE Tosseal* 817” by Momentive Performance Materials.

2.2.8.3.3. “Spectrum 900SL Self Leveling Silicone Highway and Parking Structure Sealant” by Tremco Canada.

2.2.8.3.4. Or Equivalent

2.2.8.4. Non-sag type, 1 component low-modulus, pre-pigmented, neutral cure elastomeric silicone sealant conforming to ASTM C920, Type S, Grade NS, Class 50, Use NT, G, M, A and O. Supply in standard colours as selected by the Consultant. Supply 1 of following:

2.2.8.4.1. “Dow Corning Contractors Concrete Sealant (CCS)” by Dow Corning.

2.2.8.4.2. “Dow Corning NS Parking Structure Sealant (Non-Sag)” by Dow Corning.

2.2.8.4.3. "GE Tosseal* 811" by Momentive Performance Materials.

2.2.8.4.4. "Spectrum 800 Low Modulus Silicone Highway and Parking Structure Sealant" by Tremco Canada.

2.2.8.4.5. Or Equivalent

2.2.9. Type E Sealant: Self-levelling type, epoxy modified joint sealant, cold-applied, 2 component, pour grade, grey colour. Supply 1 of following:

2.2.9.1. "EP 280 Control Joint Sealant" by ChemRex Inc.

2.2.9.2. "CPD Joint-Flex P.E." by CPD Construction Products.

2.2.9.3. "Loadflex" by Sika Canada Inc.

2.2.9.4. "Rezi-Weld™ Flex" by W.R. Meadows of Canada.

2.2.9.5. "Foil-fast Epoxy Injection Gel" by The RawPlug Co. Inc.

2.2.9.6. Or Equivalent

2.2.10. Joint Primer: Non-staining, suitable for substrate surfaces, compatible with joint forming materials and as recommended by sealant manufacturer for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

2.2.11. Joint Backing: Preformed, compressible, resilient, non-waxing, non-extruding, non-staining strips of closed cell polyethylene or urethane foam, compatible with joint substrates and are approved by sealant manufacturer based on field experience and laboratory test. Sizes and shapes to suit various conditions, diameter 25% greater than joint width. Ensure backing is compatible with sealant, primer and substrate.

2.2.12. Bond Breaker Tape: As recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.2.13. Masking Tape: Provide non-staining, non-absorbent tapes and sheets which effectively mask substrate without leaving an adhesive residue compatible with joint sealants and surfaces adjacent to joints.

2.2.14. Cleaning Material: Non-corrosive, non-staining, solvent type, xylol, MEK, toluol, IPA or as recommended by sealant manufacturer and acceptable to material or finish manufacturers for surfaces adjacent to sealed areas free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants with joint substrates.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. Examine joints for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealant performance. Ensure joints are suitable to accept and receive sealants.

3.1.1.2. Verify joint surfaces are clean, sound, free of defects and dimensions are within sealant manufacturer's size requirements.

3.1.1.3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1.1.4. Do not apply sealant to masonry until mortar has cured.

3.1.2. Pre-installation Testing: Before any sealing Work is commenced, test materials for indications of staining or poor adhesion.

3.1.3. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

**3.2. PREPARATION**

3.2.1. Protection of In-Place Conditions: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2.2. Surface Preparation:

3.2.2.1. Clean joints and spaces which are to be sealed and ensure they are dry and free of dust, loose mortar, oil, grease, oxidation, coatings, form release agents, sealers and other foreign material.

3.2.2.2. Clean porous surfaces such as concrete, masonry or stone by wire brushing, grinding or blast cleaning, mechanical abrading or combination of these methods as required to obtain clean and sound surfaces.

3.2.2.3. Remove laitance by grinding or mechanical abrading.

3.2.2.4. Remove oils by sandblast cleaning.

3.2.2.5. Remove loose particles present or resulting from grinding, abrading or sandblast cleaning by thorough brushing.

3.2.2.6. Clean ferrous metals of rust, mill scale and foreign materials by wire brushing, grinding or sanding.

3.2.2.7. Wipe non-porous surfaces such as metal and glass to be sealed, except pre-coated metals, with cellulose sponges or clean rags soaked with ethyl alcohol, ketone solvent, xylol or toluol and wipe dry with clean cloth. Where joints are to be sealed with silicone based sealants clean joint with MEK or xylol. Do not allow solvent to air-dry without wiping. Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with joint primer and sealant. Check ferrous metal surfaces are painted before applying sealant.

3.2.2.8. Examine joint sizes and where depth of joint exceed required depth of sealant correct to achieve proper following width/depth ratio:

3.2.2.8.1. Maintain 2:1 Width/Depth Ratio: Ensure maximum sealant depth is 13 mm (1/2) and minimum contact width with each substrate is 6 mm (1/4").

3.2.2.9. Install joint backing material to achieve correct, uniform joint profile and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

3.2.2.10. Do not leave gap between ends of sealant backing; do not stretch, twist, puncture, or tear sealant backings; remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

3.2.2.11. Where joint design or depth of joint prevents use of joint backing material, apply bond breaker tape at back of joint to prevent 3-sided adhesion.

3.2.2.12. Do not stretch, twist, puncture or tear joint backing. Butt joint backing at intersections. Install bond breaker tape at back of joint where joint backing is not required or cannot be installed.

3.2.2.13. On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.

3.2.2.14. Where surfaces adjacent to joints are likely to become coated with sealant during application, mask them prior to priming and sealing.

3.2.2.15. Do not exceed shelf life and pot life of materials and installation times, as stated by manufacturer.

3.2.2.16. Be familiar with work life of sealant to be used. Do not mix multiple component materials until required for use.

3.2.2.17. Use materials as received from manufacturer, without additions, deletions and adulterations of materials.

3.2.2.18. Mix multiple component sealants and bulks sealants using mechanical mixer capable of mixing without mixing air into material, in accordance with manufacturer's directions and recommendations. Continue mixing until material is homogeneously blended, uniform in colour and free from streaks of unmixed material. Install compound prior to start of hardening or curing cycle.

3.2.2.19. Prior to painting, seal joints in surfaces to be painted. Where surfaces to be sealed are prime painted in shop before sealing ensure prime paint is compatible with primer and sealant. If they are incompatible, inform Consultant and change primer and sealant to compatible types approved by Consultant.

3.2.2.20. Where irregular surface or sensitive joint border exists, apply masking tape at edge of joint to ensure joint neatness and protection.

3.2.2.21. Prime sides of joints for type of surface being sealed prior to application of joint backing, bond breaker or sealant as recommended by sealant manufacturer.

3.2.3. Removal:

3.2.3.1. Remove existing caulking and/or sealant from joints, as required.

3.2.3.2. Remove existing caulking and/or sealants including any residual caulking/sealant material using suitable methods to prevent damage to adjacent surfaces. Take care to ensure no damage or visible changes take place to surface of substrate that will not be covered by replacement sealant material.

3.2.3.3. Clean surfaces of joints and spaces in accordance with procedures specified herein under "Surface Preparation".

3.2.3.4. Ensure materials in contact with sealant are compatible.

3.2.3.5. Where required, mask adjacent surfaces prior to priming and application of sealant to prevent staining.

3.2.3.6. Prime inner surfaces of joint, where required, immediately prior to caulking, in accordance with sealant manufacturer's recommendations, to provide full adhesion and to prevent staining of adjacent exposed surfaces.

**3.3. APPLICATION**

3.3.1. Apply in accordance with the manufacturer's directions and recommendations unless more stringent requirements apply.

3.3.2. Apply sealant by proven techniques using hand operated guns or pressure equipment fitted with suitable nozzle size and equipment approved by sealant manufacturer.

3.3.3. Force sealant into joint and against sides of joints to obtain uniform adhesion. Use sufficient pressure to completely fill voids in joint regardless of variation in joint widths and to proper joint depth as prepared. Ensure full firm contact with interfaces of joint. Superficial pointing with skin bead is not acceptable.

3.3.4. Finish face of compound to form smooth, uniform beads. At recesses in angular surfaces, finish compound with flat face, flush with face of materials at each side. At recesses in flush surfaces, finish compound with concave face flush with face of materials at each side.

3.3.5. Compound may be tooled, provided such tooling does not damage seal or tear compound. Avoid pulling of sealant from sides.

3.3.6. Tool surfaces as soon as possible after sealant application or before any skin formation has occurred, particularly when using silicone sealants.

3.3.7. Ensure joint surfaces are straight, neatly finished, free from ridges, wrinkles, sags, dirt, stains, air pockets and embedded foreign matter or other defacement and be uniform in colour, free from marbling and/or colour streaking due to improper mixing or use of out of shelf life Products.

3.3.8. Do not use solvent curing sealants indoors.

3.3.9. Use 1 of sealants specified for each type in following locations. Ensure sealant chosen (from several specified under each type under "MATERIALS") for each location is recommended by manufacturer for use for conditions encountered:

3.3.9.1. Type A: Typically used in joints between metal frames and adjacent masonry and/or concrete construction in exterior walls, exterior and interior sides; control and expansion joints in exterior and interior surfaces of poured-in-place concrete walls, precast architectural wall panels and unit masonry walls; sealing of joints between underside of pre-stressed precast concrete floor slabs and masonry; and other locations where sealant is required or noted on Drawings except in locations designated for Type B, C, D, E, F and G and except where sealant is specified in other Sections.

3.3.9.2. Type B: Typically used in joints between urinals and walls, around washrooms accessories, at corners of walls, between splash backs and walls, in shower, damp or wet areas, at ceramic tiles where mildew resistant sealant is required.

3.3.9.3. Type C: Typically used in joints between interior metal and/or wood frames and adjacent construction in interior partitions.

3.3.9.4. Type E (load bearing): Typically used in static joints in horizontal surfaces where self-levelling sealants are required.

3.3.10. Joint designation in preceding paragraphs and fact that Drawings do not show all locations to be sealed does not limit responsibility of this Section to seal all locations except those indicated in other Sections of Work, required to create and ensure continuous enclosure.

3.3.11. Firestopping and Smoke Seal: Sealants part of firestopping systems and smoke seals provided within fire rated assemblies are part of work of Section 07 84 00 - Firestopping and Smoke Seals and carried out under supervision of this Section.

**3.4. REPAIR**

3.4.1. Repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original Work.

**3.5. SITE QUALITY CONTROL**

3.5.1. Site Tests and Inspections:

3.5.1.1. Independent inspection and testing company may be appointed and paid for under the Cash Allowance listed in the Bid Form as Item No. 4 – Inspection and Testing to carry out inspection and testing as directed by Consultant. Refer to Section 01 40 00.

3.5.1.2. Inspect joints for complete fill, for absence of voids and for joint configuration complying with specified requirements. Record results in a manner acceptable to the Consultant.

3.5.1.3. Tests may include sampling of installed Product where adhesion, cohesion or reversion failure is suspected.

3.5.1.4. Where Work or materials fail to meet requirements as indicated by test results, pay costs of additional inspection and testing required for new replacement work or materials.

3.5.2. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

3.5.3. Manufacturer Services:

3.5.3.1. Prior to commencement of sealing, arrange for sealant manufacturer's technical representative to visit the Place of the Work and inspect surfaces and joints to be sealed.

**3.6. CLEANING**

3.6.1. Immediately clean adjacent surfaces which have been soiled and leave work in neat, clean condition. Remove excess materials, compounds smears or other soiling resulting from application of sealants. Use recommended cleaners and solvents as provided by the product manufacturers. Leave finished Work in neat, clean condition with no evidence of spillovers onto adjacent surfaces.

**3.7. PROTECTION**

3.7.1. Provide approved, non-staining means of protection for completed joint sealant installations where required to protect work from mechanical, thermal, chemical and other damage by construction operations and traffic.

3.7.2. Maintain protection securely in place until completion of Work. Remove protection when so directed by the Consultant.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Supply finish hardware including but not limited to following:

1.2.1.1. pressed steel frames.

1.2.1.2. wood doors.

1.2.2. Related Sections: the following description of work is included for reference only and shall not be presumed complete:

1.2.2.1. Provision of hardware for cabinetry work: Section 06 40 00 - Architectural Woodwork.

1.2.2.2. Installation of finish hardware: Section 06 90 00 - General Installations.

1.2.2.3. Supply of hollow metal doors and frames: Section 08 11 13 - Steel Doors and Frames.

1.2.2.4. Supply of wood doors: Section 08 14 00 - Wood Doors.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. ADA: Americans with Disabilities Act; www.ada.gov.

1.3.1.2. AHC: Architectural Hardware Consultant.

1.3.1.3. BHMA: Builders Hardware Manufacturers Association; www.buildershardware.com.

1.3.1.4. CSA: Canadian Standards Association; www.csa.ca.

1.3.1.5. DHI: Door and Hardware Institute Canada; www.dhicanada.ca.

1.3.1.6. NFPA: National Fire Protection Association; www.nfpa.org.

1.3.1.7. UL: Underwriters' Laboratories Inc.; www.ul.com.

1.3.1.8. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.2. Reference Standards:

1.3.2.1. NFPA 80-07 - Standard for Fire Doors and Fire Windows

1.3.2.2. CAN4-S104-M80(85) - Standard Method for Fire Tests of Door Assemblies

1.3.2.3. CAN4-S105-M85(92) - Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104

## 1.4. SUBMITTALS

1.4.1. Shop Drawings:

1.4.1.1. Submit Shop Drawings for hardware installation in accordance with Section 01 30 00 – Administrative Requirements.

1.4.1.2. Submit Shop Drawings in schedule form, prepared by an AHC, indicating manufacturers' names, Product descriptions, makes, models, materials, finishes, functions, location of each item, complete keying schedule and other pertinent information. Repeat hardware item numbers used in Finish Hardware Schedule. Include list of abbreviations and finish symbols and their meaning. Include manufacturer's cut sheets for each hardware item.

1.4.2. Samples:

1.4.2.1. Submit samples in accordance with Section 01 30 00 - Administrative Requirements.

1.4.2.2. Do not order hardware from manufacturer until samples have been approved by the Consultant. Hardware and finishes supplied shall be identical to approved samples.

1.4.2.3. Supply 1 of each item of hardware with specified finishes to the Consultant. Label each sample as to manufacturer, type, finishes, size and location for use proposed. Approved samples will be retained for comparison and returned upon completion of the Work.

1.4.2.4. Do not submit substitutions to accepted alternates.

## 1.5. CLOSEOUT SUBMITTALS

1.5.1. Operational and Maintenance Data:

1.5.1.1. Instruct the Owner's designated representative in proper care and preventative maintenance of hardware to assure longevity of operation.

1.5.1.2. Provide 3 copies of descriptive information, operating, adjustment and maintenance instructions and "As-Built" record of location of each hardware group and other pertinent information.

1.5.1.3. Provide maintenance data, parts list and manufacturer's instructions for each type of door closer, lockset, fire exit hardware and door holder. Provide manufacturer's instructions for proper care of hardware, including lubrication, for incorporation into operation and maintenance instruction manual.

1.5.1.4. Provide this information in 3-ring binders suitably identified in accordance with requirements of Section 01 70 00 – Execution and Closeout Requirements.

## 1.6. MAINTENANCE MATERIAL SUBMITTALS

1.6.1. Tools: Prior to date of Substantial Performance of the Work, supply a complete set of specialized tools as needed for the Owner's continued adjustment, maintenance and removal and replacement of builders hardware.

**1.7. QUALITY ASSURANCE**

1.7.1. Qualifications:

1.7.1.1. Suppliers: A recognized architectural door hardware supplier for exit devices, cylinders, power supply, magnetic holders and similar items that has a record of successful in-service performance for supplying door hardware similar in quantity, type and quality to that indicated for this Project and employs an experienced AHC who is available to the Owner, the Consultant and the Contractor at reasonable times during course of the Work for consultation.

**1.8. DELIVERY, STORAGE AND HANDLING**

1.8.1. Delivery and Acceptance Requirements: Supply scheduled hardware to the Place of the Work.

1.8.2. Storage and Handling Requirements:

1.8.2.1. Pack hardware in suitable wrappings and containers to protect from damage during shipping and storage. Enclose accessories, fastening devices and other loose items with each item. Pack screws, bolts and fastenings necessary for proper installation in same package. Mark packages for easy identification legibly indicating manufacturer's numbers, types, sizes. Markings must include floor, item number and door number.

1.8.2.2. Provide assistance in counting hardware on major shipments to confirm hardware is shown as shipped. Provide inventory list with Finish Hardware Schedule. Obtain assistance from hardware supplier to confirm hardware has been delivered to Site correctly for all major shipments. Be responsible to unload hardware, to check hardware shipments and to set up shelving and organize hardware room.

1.8.2.3. Provide templates, template information, installation instructions and details necessary for preparation and installation of hardware.

1.8.2.4. Provide 3 copies of installation instructions for hardware supplied.

**1.9. WARRANTY**

1.9.1. Manufacturer Warranty: Warrant the Work of this Section for period of 2 years for general, 10 years for closers and lifetime for butt hinges against defects and/or deficiencies in accordance with the General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period including making good any Work damaged by this Work, to satisfaction of the Consultant and at no expense to the Owner.

**PART 2 - PRODUCTS**

**2.1. MATERIALS**

2.1.1. Description:

2.1.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.1.2. Finish Hardware:

2.1.2.1. Finish hardware will be paid for under the Cash Allowance in the Bid Form. Products specified in this Section are for installation guidance to suit the project design requirements as applicable.2.1.2.2. Hardware shall match existing hardware in type, manufacturer and finish, or except where noted in the Specifications herein.

2.1.2.3. Provide door closers, locksets and latch sets meeting ANSI/BHMA Qualified Products List. Provide finish hardware in accordance with Finish Hardware Schedule. No substitutions are allowed without written approval of the Consultant.

2.1.3. Fastenings:

2.1.3.1. Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

2.1.3.2. Exposed fastening devices to match finish of hardware.

2.1.3.3. Use fasteners with material through which they pass.

2.1.4. Keying:

2.1.4.1. Key locks to the Owner's requirements (construction master keyed, grand master keyed, sub- master keyed,

2.1.4.2. Provide interchangeable cores to the Owner's grand master key system. Number of keys to be determined by the Owner. Provide a minimum of 2 cut keys per cylinder but coordinate the “maximum” quantity per key group with the Owner before ordering final amounts.

2.1.4.3. Provide operational brass construction cores for locks and cylinders. Cores will be returned to manufacturer when permanent cores are provided.

2.1.4.4. Include permanent cores.

2.1.4.5. Hardware supplier shall provide 20 construction keys for use by the Contractor, as well as 4 construction control keys for use by the Owner.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

3.1.1. Verification of Conditions:

3.1.1.1. Before supplying any hardware and installation instructions, carefully check the Drawings for Work requiring hardware, verify door swings, door and frame materials and operating conditions and assure hardware will fit work to be attached.

3.1.1.2. Check Shop Drawings and frame and door lists affecting hardware type and installation, and verify to correctness thereof, or advise of required revisions. Ensure doors, frames and panels requiring additional support are reinforced.

3.1.1.3. Point out special requirements to installer and ensure final adjustment of hardware, in particular closer arms, valves and locksets has all been done properly.

3.1.1.4. Be responsible to check and confirm dimensions for hardware for this project, including door protection, overhead stop sizes, exit devices, power door operators and other related hardware items that may require coordination for sizing.

**3.2. INSTALLATION**

3.2.1. Supply finish hardware to Section 06 90 00 – General Installations for installation.

**3.3. SITE QUALITY CONTROL**

3.3.1. Site Tests and Inspections: After installation, have hardware inspected by manufacturer's representative, an experienced AHC who is a member of DHI, who shall certify in writing with a copy to the Consultant, items and their installation are in accordance with Specification requirements and are functioning properly and notify the Consultant of any cases where it has not been properly installed, is defective or is not as specified. Replace or re-install defective or improperly installed hardware at no cost to the Owner.

3.3.2. Supervision: Provide following project services relative to the project co-ordination, supervision and inspection:

3.3.2.1. Provide services of AHC familiar with type of work being performed, with type of the project, for preparation of hardware Shop Drawings (schedule), keying, coordination with other trades, consultation with the Owner and the Consultant and for performing on-Site inspections

3.3.2.2. Inspect to verify hardware has been properly installed and is functioning satisfactorily.

3.3.2.3. Recommend adjustments.

3.3.2.4. Replace defective hardware.

3.3.2.5. Check door closers after installation to ensure adjustment such as backchecking degree has been properly made and if not, make such adjustments or instruct those installing hardware to make these adjustments.

3.3.2.6. Submit 6 copies of the finalized schedule to the Consultant for acceptance. Provide additional copies as required for the project and office use.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide glass and glazing including but not limited to following:

1.2.1.1. glazing borrowed lights and screens.

1.2.1.2. glazing wood doors (glass).

1.2.1.3. window film.

1.2.1.4. miscellaneous specialty glass, gaskets, tapes and glazing materials.

1.2.2. Related Sections: Following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Provision of architectural woodwork: Section 06 40 00 - Architectural Woodwork.

1.2.2.2. Supply of hollow steel doors and frames: Section 08 11 13 - Steel Doors and Frames.

1.2.2.3. Supply of wood doors: Section 08 14 00 - Wood Doors.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. EPDM: Ethylene Propylene Diene Monomer.

1.3.1.2. GANA: Glass Association of North America; www.glasswebsite.com.

1.3.1.3. MSDS: Material Safety Data Sheets.

1.3.1.4. MSVD: Magnetically Sputtered Vacuum Deposition.

1.3.1.5. OBC: Ontario Building Code.

1.3.1.6. PVB: Polyvinyl Butyral.

1.3.1.7. PVC: Polyvinyl Chloride.

1.3.1.8. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.9. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.10. VOC: Volatile Organic Compound.

1.3.2. Definitions:

1.3.2.1. Pattern Glass: One type of rolled glass having a pattern impressed on 1 or both sides for light control, bath enclosures and decorative glazing. Sometimes called “rolled”, “figured”, or “obscure” glass.

1.3.2.2. Sandblasted Finish: Surface treatment for flat glass obtained by spraying glass with hard particles to roughen 1 or both surfaces of glass. Effect is to increase obscurity and diffusion.

1.3.2.3. United Inches: Total of 1 width and 1 height of a lite of glass in inches.

1.3.3. Reference Standards:

1.3.3.1. ANSI Z97.1-04 - Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test

1.3.3.2. ANSI/ASME B18.6.3-03(08) - Machine Screws and Machine Screw Nuts

1.3.3.3. ASTM C509-06 - Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

1.3.3.4. ASTM C864-05 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

1.3.3.5. ASTM C920-08 - Standard Specification for Elastomeric Joint Sealants

1.3.3.6. ASTM C1036-06 - Standard Specification for Flat Glass

1.3.3.7. ASTM C1048-04 - Standard Specification for Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass

1.3.3.8. ASTM C1115-06 - Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories

1.3.3.9. ASTM C1349-04 - Standard Specification for Architectural Float Glass Clad Polycarbonate

1.3.3.10. ASTM C1503-01 - Standard Specification for Silvered Flat Glass Mirror

1.3.3.11. CAN/CGSB-12.6-M91 - Transparent (One-Way) Mirrors

1.3.3.12. CAN/CGSB-12.12-M90 - Plastic Safety Glazing Sheets

1.3.3.13. CAN/CGSB-12.13-M91 - Patterned Glass

1.3.3.14. CAN/CGSB-12.20-M89 - Structural Design of Glass for Buildings

1.3.3.15. CAN4-S104-M80(85) - Standard Method of Fire Test of Door Assemblies

1.3.3.16. CAN4-S106-M80(85) - Standard Method For Fire Test of Windows and Glass Assemblies

1.3.3.17. NFPA 80-07 - Standard for Fire Doors and Fire Windows

**1.4. SUBMITTALS**

1.4.1. Samples:

1.4.1.1. Submit samples of materials identifying quality and type of glass if required by the Consultant before commencing Work. Ensure samples are clearly labelled with manufacturer's name and type.

1.4.1.2. Submit following samples:

1.4.1.2.1. window film.

**1.5. CLOSEOUT SUBMITTALS**

1.5.1. Operation and Maintenance Data: Provide maintenance data indicating cleaning instructions for inclusion into Maintenance Manual.

**1.6. QUALITY ASSURANCE**

1.6.1. Qualifications

1.6.1.1. Installers: Provide experienced installer who is trained and experienced in glass and glazing requirements of this Section including familiarization of with standards specified herein and capable to instruct installation requirements of this Section.

**1.7. DELIVERY, STORAGE AND HANDLING**

1.7.1. Delivery and Acceptance Requirements: Deliver glass and associated materials to Site in original crates and containers with manufacturer's name and brand distinctly marked thereon and with glass labelled as to types. Do not remove labels on glass until after Work is accepted by the Consultant.

1.7.2. Storage and Handling Requirements: Store materials within the building, in a clean, dry location, acceptable or as designated by the Consultant. Fully protect materials from damage of any kind until ready for use.

**1.8. SITE CONDITIONS**

1.8.1. Ambient Conditions: Do not perform glazing when temperature is less than 7 deg C (44 deg F) or sash or frames are wet, damp or frosted.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, schedules and Specifications:

2.1.1.1. AGC Flat Glass North America Ltd.; www.na.agc-flatglass.com

2.1.1.2. Dow Corning; www.dowcorning.com

2.1.1.3. Guardian Industries Corp.; www.guardian.com

2.1.1.4. Momentive Performance Materials; www.momentive.com

2.1.1.5. PPG Canada Inc.; www.ppgglazing.com

2.1.1.6. Pilkington Special Glass Limited; www.pilkington.com

2.1.1.7. TechniGlas, A Division of ProScience Inc.; www.fireglass.com

2.1.1.8. Tremco Canada; www.tremcosealants.com

2.1.1.9. Viracon; www.viracon.com

2.1.1.10 Or Equivalent

2.1.2. Single Source Responsibility for Sealants, Gaskets and Other Glazing Accessories: Ensure consistent quality of performance by providing glazing sealant and seals from single manufacturer.

## 2.2. MATERIALS

2.2.1. Description:

2.2.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.2.2. Performance/Design Criteria:

2.2.2.1. Design glass and glazing to CAN/CGSB-12.20-M complying to OBC design and fire rating requirements and regulations of Authorities Having Jurisdiction, being the minimum, except where more stringent requirements are specified herein. In case of conflict of requirements comply with most stringent requirements.

2.2.2.2. Provide accessories, closures and trims required and necessary to complete Work.

2.2.2.3. Deflection: Limit glass deflection to flexural limit of glass with full recovery of glazing materials.

2.2.3. Glass: Free from bubbles, waves, discolouration and other defects and of following types for locations indicated on the Drawings or noted on Door Schedule. Ensure glass bears manufacturer's label indicating quality. Leave labels in place until final cleaning.

2.2.4. Single Glazed Glass Types:

2.2.4.1. Tempered Glass (TGL): Clear transparent tempered glass conforming to ASTM C1048, Kind FT and meeting requirements of ANSI Z97.1, minimum 6 mm (1/4") thick. Ensure surface compression is equal to or greater than 69 MPa (10 000 psi).

2.2.4.2. Tempered Laminated Glass (TLGL): Clear transparent laminated tempered glass conforming to ASTM C1172, Kind LT and meeting requirements of ANSI Z97.1, minimum 6 mm (1/4") thick overall; clear PVB interlayer of 1.6 mm (0.060") thickness.

2.2.5. Window Film: Provide "3M Scotchcal ElectroCut Special Effects Film" by 3M; www.3m.com in colour "7725-314 Dusted Crystal", translucent opacity, transparent synthetic liner, clear pressure sensitive adhesive, or Equivalent. Ensure film cutouts suit design and are located on glass doors and other areas as indicated on the Drawings.

2.2.6. Glazing, Sealing Compounds and Accessories:

2.2.6.1. Ensure glazing, sealing compounds and accessories are compatible with contact surfaces of frames, other accessories used in glazing system and contact surfaces of compounds used on insulated glass units. Wood or other organic materials are not acceptable for use in glazing systems including spacer blocks.

2.2.6.2. Glazing Compound: Non-hardening modified oil type. Colour to match adjacent surfaces unless indicated otherwise.

2.2.6.3. Sealant Compound: One component type, elastomeric chemical curing, ASTM C920, Type S, Grade NS. Colour to match adjacent surfaces unless indicated otherwise in the Contract Documents.

2.2.6.4. Sealant Compound: ASTM C920, multi-component chemical curing, Type M, Grade NS. Colour to match adjacent surfaces.

2.2.6.5. Sealant Compound: One component, silicone base solvent curing. Colour to match adjacent surfaces.

2.2.6.6. Sealant for Interior Glass-to-Glass Butt Glazing Installation: Translucent 1 part silicone sealant conforming to ASTM C920, Type S, Grade NS, "Tremsil® 200 General Construction Grade Silicone Sealant" by Tremco Canada or "Dow Corning 999-A Silicone Building & Glazing Sealant" by Dow Corning or "GE Contractors SCS1000 Silicone Sealant" by Momentive Performance Materials or Equivalent.

2.2.6.7. Cellular Gaskets for Compression Glazing: ASTM C509 cellular, elastomeric, preformed, black. Closed cell neoprene or EPDM extrusions including moulded corners where applicable by Cellular Rubber Extrusions, Tremco Canada or Equivalent.

2.2.6.8. Dense Gaskets for Compression Glazing: ASTM C864, Option II or ASTM C1115, Type C, dense neoprene or EPDM extrusions, 60 and 70 Durometer density including molded corners where applicable by Poly-Wej Gaskets, Tremco Canada or Equivalent.

2.2.6.9. Glazing Splines: Neoprene or EPDM manufacturer's standard dry glazing splines to suit aluminum extrusions. Colour to match adjacent surfaces unless indicated otherwise.

2.2.6.10. Glazing Points and Wire Spring Clips: Corrosion resistant, manufacturer's standards.

2.2.6.11. Edge Blocking, Setting Blocks, Later Shims, Gaskets and Tapes:

2.2.6.11.1. Edge Blocking for Glass: 60 - 70 Durometer neoprene, silicone or EPDM, channel shaped, 100 mm - 150 mm (4" - 6") long.

2.2.6.11.2. Setting Blocks: 7 mm x 100 mm (5/16 x 4") EPDM or extruded 80 - 90 Durometer neoprene; at insulating glass, use EPDM only. At fire-rated glazed doors and partitions, use similar sized fire-rated silicone GE "Gel 516" or asbestos cement blocks. Width; 1.6 mm to 3 mm (1/16" to 1/8") less than design glazing pocket width. For 4 sided structural glazing, use silicone compatible rubber or silicone.

2.2.6.11.3. Lateral Shims: Neoprene, silicone or EPDM, 40 - 60 Durometer, 100 mm (4") long or as required.

2.2.6.11.4. Compression Glazing Tape: Preformed, ribbon-shaped, non-skinning, 100% solids, non-oxidizing polyisobutylene: butyl, paper release, EPDM shim with continuous synthetic rubber spacer rod of 60 Durometer hardness. Acceptable Product: "Polyshim II Tape" by Tremco Canada or Equivalent. Ensure tape is sufficiently wide and thick to completely cover bite area of glazing unit when unit is pushed into place.

2.2.7. Primer Sealers and Cleaners: To glass and plastic glazing manufacturer's standards.

2.2.8. Fabrication:

2.2.8.1. Label each light of glass and/or plastic glazing with registered name of Product and weight and quality of glass and/or plastic glazing.

2.2.8.2. Check dimensions on job site before cutting materials.

2.2.8.3. Grind and chamfer edges of unframed glass and mirrors. Grind and chamfer edges of glass shelves and sliding doors.

2.2.8.4. Ensure minimum bite or lap of glass and/or plastic glazing on stops and rabbets as recommended by glass and/or plastic glazing manufacturer.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. Verify the actual Site dimensions and location of adjacent materials prior to commencing Work. Notify the Consultant in writing of any conditions which would be detrimental to the installation.

3.1.1.2. Ensure glass is not more than 4 mm (3/16") less than the rebate size in either dimension, with allowance for edge spacers, shims and setting blocks as required.

3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

### 3.2. PREPARATION

3.2.1. Surface Preparation:

3.2.1.1. Thoroughly clean glass rebates and glass of dust, dirt, mortar and other foreign materials prior to glazing. Remove oils and grease with non-staining solvents such as Xycol or Methyl Ethyl Ketone solutions.

3.2.1.2. Properly prime, before glazing, glazing rebates in wood doors.

### 3.3. INSTALLATION

3.3.1. Perform the work of this Section in accordance with “GANA Glazing Manual, 2004” and GANA Laminated Glazing Reference Manual, 2006” for laminated glazing installation methods.

3.3.2. If required, thoroughly mix glazing compound as recommended by manufacturer. Thinning of glazing compound will not be permitted.

3.3.3. Carefully remove glazing stops and replace after glazing. Take care to prevent damage to stops.

3.3.4. Doors, Screens, Sidelites and Interior Windows:

3.3.4.1. Place setting blocks on sill at 1/4 points from each corner unless otherwise directed by glazing manufacturer.

3.3.4.2. Place continuous glazing gaskets on edges of glass.

3.3.4.3. Centre and space each piece of glass with spacers located and installed according to manufacturer's directions.

3.3.4.4. Place glass so no voids occur between glass and glazing material and glazing stops.

3.3.4.5. Secure glass in place with stops, secured in place with screws.

3.3.5. Glazing Sealant:

3.3.5.1. Apply glazing sealant to clean, dry, grease and oil free surfaces. Provide exposed glazing sealant smooth, free from ridges, wrinkles, air pockets and embedded foreign materials.

3.3.5.2. Prime surfaces if required by glazing sealant manufacturer.

3.3.5.3. Trim glazing sealant flush with tops of stops and glazing channels.

3.3.5.4. Remove excess glazing sealant or droppings which would set up or become difficult to remove from finished surfaces. Do not use chemicals, scrapers, or other tools which would affect finished surfaces.

3.3.6. Interior Glazing:

3.3.6.1. Tape/Tape Method:

3.3.6.1.1. Cut glazing tape to proper length and install against permanent stop projecting 1.6 mm (1/16") above sightline.

3.3.6.1.2. Place glazing tape on free perimeter of glass projecting 1.6 mm (1/16") above sightline.

3.3.6.1.3. Trim off excess tape to sightline.

3.3.6.2. Combination Method-Tape/Sealant:

3.3.6.2.1. Cut glazing tape to proper length and install against permanent stop projecting 1.6 mm (1/16") above sightline.

3.3.6.2.2. Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass to uniform and level line.

3.3.6.2.3. Trim off excess tape to sightline.

3.3.6.3. Window Film:

3.3.6.3.1. Install window film in accordance with manufacturer's printed instructions by experienced film applicators as recommended by glass film manufacturer.

3.3.6.3.2. Ensure glass surfaces are clean and ambient temperature is between 16 deg C and 38 deg C (61 deg F and 100 deg F).

3.3.6.3.3. Whenever 2 or more pieces of same colour translucent film are seamed together as a continuous band of colour, they must match to ensure uniform reflected daytime colour and transmitted night appearance.

## 3.4. SITE QUALITY CONTROL

3.4.1. Site Tests and Inspections: Ensure framing to be glazed is plumb, secure and permanently fixed in position.

3.4.2. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

## 3.5. CLEANING

3.5.1. Clean installed glass and metal frequently during construction. Avoid etching and staining glass and metal during construction.

3.5.2. Remove sealant and compound droppings from finished surface.

3.5.3. Remove markings and labels at time of final clean-up. Ensure final clean-up is carried out in accordance with glass and sealant manufacturer's recommendations to the Consultant's satisfaction.

3.5.4. Avoid storing materials adjacent to glass.

## 3.6. PROTECTION

3.6.1. Provide and maintain necessary protection of completed work against damage.

3.6.2. Do not mark or attach anything directly to exposed glass and framing surfaces.

3.6.3. If welding is to take place above or near completed glazing work, protect glass with plywood or other suitable means to reduce likelihood of weld spatter damaging glass surfaces.

3.6.4. Protect glass from other trades, workers, tools and other similar materials.

3.6.5. Replace cracked, broken, or defective glass at no additional cost to the Owner and to the Consultant's satisfaction.

3.6.6. Identification of Glazing: Mark glass lites with temporary, easily removable, large safety markings, immediately after glass installation. Maintain safety markings until final clean-up.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to with the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide steel doors and frames including but not limited to following:

1.2.1.1. supply of hollow metal door frames.

1.2.1.2. supply of hollow metal transom panels.

1.2.1.3. supply of hollow metal frames and mullions for borrowed lights and glazed screens.

1.2.1.4. preparation of hollow metal doors and frames for finish hardware.

1.2.1.5. glazing stops.

1.2.2. Related Sections: t h e following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Hanging door and installation of finish hardware: Section 06 90 00 - General Installations.

1.2.2.2. Caulking and/or sealing door frames: Section 07 92 00 - Joint Sealants.

1.2.2.3. Supply of finish hardware: Section 08 71 00 - Finish Hardware.

1.2.2.4. Provision of glazing: Section 08 80 00 - Glass and Glazing.

1.2.2.5. Finish painting: Section 09 91 00 - Painting.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. CSDMA: Canadian Steel Door Manufacturers Association; www.csdma.org.

1.3.1.2. OBC: Ontario Building Code, 2006.

1.3.1.3. PVC: Polyvinyl-Chloride.

1.3.1.4. RRPC: Resin Reinforced Polychloroprene.

1.3.1.5. STC: Sound Transmission Class.

1.3.1.6. TL: Transmission Loss.

1.3.1.7. TRR: Temperature Rated Rise.

1.3.1.8. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.2. Reference Standards:

1.3.2.1. ANSI A115.IG-94 - Installation Guide for Doors and Hardware

1.3.2.2. ANSI A224.1-94 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

| | | |
|---|---|---|
| 1.3.2.3. | ANSI A250.4-94 | - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings |
| 1.3.2.4. | ASTM A568/A568M-07a | - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for |
| 1.3.2.5. | ASTM A653/A653M-08 | - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process |
| 1.3.2.6. | ASTM C177-04 | - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus |
| 1.3.2.7. | ASTM C518-04 | - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus |
| 1.3.2.8. | ASTM E90-04 | - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements |
| 1.3.2.9. | ASTM E413-04 | - Classification for Rating Sound Insulation |
| 1.3.2.10. | CGSB 41-GP-19Ma | - Rigid Vinyl Extrusions for Windows and Doors |
| 1.3.2.11. | CAN/CGSB-82.5-M88 | - Insulated Steel Doors |
| 1.3.2.12. | CSA W59-03(08) | - Welded Steel Construction (Metal Arc Welding) |
| 1.3.2.13. | NAAMM-HMMA 840-07 | - Guide Specification for Installation of Hollow Metal Doors and Frames |
| 1.3.2.14. | NFPA 80-07 | - Standard for Fire Doors and Fire Windows |
| 1.3.2.15. | NFPA 252-08 | - Standard for Fire Tests of Door Assemblies |
| 1.3.2.16. | NFPA 257-07 | - Standard for Fire Tests of Window Assemblies and Glass Block Assemblies |
| 1.3.2.17. | CAN4-S104-M80(85) | - Standard Method for Fire Tests of Door Assemblies |
| 1.3.2.18. | CAN4-S105-M85(92) | - Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104 |
| 1.3.2.19. | CAN4-S106-M80(85) | - Standard Method for Fire Test of Window and Glass Block Assemblies |
| 1.3.2.20. | CAN/ULC-S702-97 | - Standard for Mineral Fibre Thermal Insulation for Buildings |

## 1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Scheduling: Submit a schedule indicating each frame related to the doors and frames shown on the Drawings.

**1.5. SUBMITTALS**

1.5.1. Shop Drawings: Submit Shop Drawings in accordance with Section 01 30 00 – Administrative Requirements. Show each type of frame, metal thicknesses and finishes, openings (glazed and/or louvred), fire ratings, location of exposed fasteners, cutouts, hardware blanking, reinforcing, tapping and drilling arrangements. Show large scale frame sections and anchoring details. Submit door and frame schedule identifying each unit. Ensure each unit bears legible identifying mark corresponding to that listed in the Door and Frame Schedule.

1.5.2. Samples: Submit samples in accordance with Section 01 30 00 – Administrative Requirements. Provide 1 cut-away corner sample minimum 300 mm (12") square for each type of door to indicated following:

1.5.2.1. frame.

**1.6. QUALITY ASSURANCE**

1.6.1. Qualifications:

1.6.1.1. Manufacturers: Execute the work of this Section by a manufacturer who is a member of CSDMA.

**1.7. DELIVERY, STORAGE AND HANDLING**

1.7.1. Delivery and Acceptance Requirements:

1.7.1.1. Protect frames during shipping.

1.7.1.2. Note damage incurred during shipping.

1.7.2. Storage and Handling Requirements:

1.7.2.1. Protect doors and frames during storage.

1.7.2.2. Store and protect materials in accordance with NAAMM-HMMA 840. Coordinate this requirement with Section 06 90 00 – General Installations for installing doors.

1.7.2.3. Remove wrappings or coverings from doors upon delivery at site. Store doors in vertical position, spaced by blocking to permit air circulation between them.

**1.8. WARRANTY**

1.8.1. Manufacturer Warranty: Warrant work manufactured from ASTM A653/A653M, A40 galvannealed steel, touched up only with zinc-rich rust inhibitive primer where coating was removed during its manufacture for period of 10 years against defects and/or deficiencies in accordance with the General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within the warranty period, to satisfaction of the Consultant and at no expense to the Owner. Defects include but are not limited to; rust perforation when stored, installed and finish painted in accordance with manufacturer's written instructions.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, schedules and Specifications:

2.1.1.1. Ali-Porte Inc.; www.aliporte.com

2.1.1.2. Artek Door Limited; www.artekdoor.com

2.1.1.3. Baron Metal; www.baronmetal.com

2.1.1.4. Daybar Industries Limited; www.daybar.com

2.1.1.5. Fleming Door Products Ltd.; www.flemingdoor.com

2.1.1.6. Metal Door Ltd.; www.metaldoorltd.com

2.1.1.7 Or Equivalent

**2.2. MATERIALS**

2.2.1. Description:

2.2.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.2.1.2. Ensure Product quality meets standards set by CSDMA.

2.2.2. Sheet Steel: Commercial grade steel to ASTM A568/A568M, Class 1, hot-dip galvanized to ASTM A653/A653M, ZF120 (A40), known commercially as "Colourbond", "Satincoat", or "Galvanneal". Steel sheet thicknesses specified are base metal thicknesses prior to galvanizing.

2.2.3. Frame Anchors:

2.2.3.1. Floor Anchors: Minimum 3 mm (1/8") thick adjustable base anchors with 2 holes for bolting to floor.

2.2.3.2. Wall Anchors:

2.2.3.2.1. Masonry T-strap Type Wall Anchors: Minimum 1.2 mm thick (18 ga) steel

2.2.3.2.2. Existing Masonry/Concrete Wall Type Anchors: Minimum 0.912 mm thick (20 ga) steel.

2.2.3.2.3. Masonry Stirrup-strap Type 50 mm x 250 mm (2" x 10"): Minimum 1.519 mm thick (16 ga) steel.

2.2.3.2.4. Steel/Wood Stud Type: Minimum 0.912 mm thick (20 ga) steel.

2.2.3.2.5. Steel/Wood Stud Tension and Associated Wall Type: Minimum 0.912 mm thick (20 ga) steel.

2.2.4. Fire Rated Door and Frame Assemblies: Conform to CAN4-S104-M, CAN4-S105-M, NFPA 80 and NFPA 252.

2.2.5. Fabrication:

2.2.5.1. Welding: Carry out welding in accordance with CSA W59.

2.2.5.2. Grind exposed welds smooth and flush. Fill open joints, seams and depressions with filler or by continuous brazing or welding. Grind smooth to true sharp arises and profiles and sand down to smooth, true, uniform finish.

2.2.5.3. Hardware Requirements: Blank, mortise, reinforce, drill and tap doors and frames to receive mortised templated hardware. Check hardware list for requirements.

2.2.5.4. Frames - General:

2.2.5.4.1. Fabricate frames for doors, screens and borrowed lights to profiles indicated.

2.2.5.4.2. Reinforce frame as required for surface mounted hardware. For door frames wider than 1500 mm (5'), reinforce door frame head and jamb and mullions at junction of head.

2.2.5.4.3. Protect mortise cut outs with mortar guard boxes. Omit for gypsum board applications.

2.2.5.4.4. Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb. Provide 2 anchors for rebate opening heights up to and including 1500 mm (5') and 1 additional anchor for each additional 760 mm (30") of height or fraction thereof, except as indicated below. For frames in previously placed concrete, masonry or structural steel provide anchors located not more than 150 mm (6") from top and bottom of each jamb and intermediate anchors at 660 mm (26") on centre maximum.

2.2.5.4.5. Where floor finishes allow, fabricate frames to extend 38 mm (1-1/2") below finished floor level. Where frames are to terminate at finished floor level, provide plates for anchorage to slabs.

2.2.5.4.6. Prepare each door opening for single stud door silencers: 3 for single door openings placed opposite hinges: 2 for double door openings approximately 150 mm (6") each side of centreline of head stop.

2.2.5.4.7. Supply removable portion of stop and frame where required for overhead concealed door closers and properly connect to frame and prepare for attachment to closer prior to shipment.

2.2.5.4.8. Provide 0.912 mm thick (20 ga) steel snap-in or welded-in “Z” type stud anchors for door frames installed in steel stud gypsum board partitions. Ensure snap-in clips are supplied to Section 09 21 16.

2.2.5.4.9. Fabricate thermally broken door frames in accordance with Shop Drawings. Provide wall and floor anchors suitable for installation conditions. Anchoring devices must not permit thermal conductivity from exterior frames to interior frame sections. Provide thermal break to separate interior and exterior frame sections.

2.2.5.4.10. Factory apply touch-up primer to areas where zinc coating has been removed during fabrication.

2.2.5.5. Hollow Metal Door Frames and Transom Frames:

2.2.5.5.1. Steel:

2.2.5.5.1.1. Interior: Minimum 1.519 mm thick (16 ga) steel.

2.2.5.5.2. Reinforcements:

2.2.5.5.2.1. Lock and Strike Reinforcements: Minimum 1.519 mm thick (16 ga) steel.

2.2.5.5.2.2. Hinge Reinforcements: Minimum 3.4 mm thick (10 ga) steel.

2.2.5.5.2.3. Flush Bolt Reinforcement: Minimum 1.519 mm thick (16 ga) steel.

2.2.5.5.2.4. Reinforcement for Surface Applied Hardware: Minimum 1.2 mm thick (18 ga) steel.

2.2.5.5.2.5. Concealed Door Closer or Holder Reinforcements: Minimum 2.6 mm thick (12 ga) steel.

2.2.5.5.2.6. Top and Bottom End Channels: Minimum 1.2 mm thick (18 ga) steel.

2.2.5.5.3. Jamb Spreaders: Minimum 0.912 mm thick (20 ga) steel.

2.2.5.6. Sidelight and Window Frame Assemblies:

2.2.5.6.1. Steel: Minimum 1.519 mm thick (16 ga) steel.

2.2.5.6.2. Glazing Stops: Minimum 0.912 mm thick (20 ga) steel, formed, drilled and countersunk for fastenings.

2.2.5.7. Welded Type Frames:

2.2.5.7.1. Mitre corners of frames. Cut frame mitres accurately and weld continuously on returns and inside of frame faces.

2.2.5.7.2. When required due to site access or due to shipping limitations, fabricate frame Product for large openings in sections, with splice joints for field assembly. Indicate joints for field assembly on Shop Drawings.

2.2.5.7.3. Accurately cope and securely weld butt joints of mullions, transom bars, centre rails and sills. Grind welded joints to a smooth, uniform finish.

2.2.5.7.4. Securely attach floor anchors to inside of each jamb profile.

2.2.5.7.5. Weld in 2 temporary jamb spreaders at each frame to maintain alignment during shipment.

2.2.5.7.6. Use formed channel glazing stops, minimum 16 mm (5/8") in height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

2.2.5.8. Prime Painting: Apply factory touch up primer at areas where zinc coating has been damaged during fabrication.

**2.3. SOURCE QUALITY CONTROL**

2.3.1. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

**PART 3 - EXECUTION**

**3.1. INSTALLATION**

3.1.1. Supply steel frames to Section 06 90 00 – General Installations for installation.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide wood doors including but not limited to following:

1.2.1.1. wood doors.

1.2.1.2. glass stops.

1.2.2. Related Sections: t h e following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Installation of wood doors and finish hardware: Section 06 90 00 - General Installations.

1.2.2.2. Supply steel door frames: Section 08 11 13 - Steel Doors and Frames.

1.2.2.3. Supply of finish hardware: Section 08 71 00 - Finish Hardware.

1.2.2.4. Glazing: Section 08 80 00 - Glass and Glazing.

1.2.2.5. Setting steel door frames in gypsum board partitions: Section 09 21 16 - Gypsum Board.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. AWI/AWMAC/WI: American Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute; www.awmac.com.

1.3.1.2. AWS: Architectural Woodwork Standards, Edition 1, 2009.

1.3.1.3. FSC: Forest Stewardship Council; www.fsccanada.org.

1.3.1.4. HVAC: Heating, Ventilating and Air Conditioning.

1.3.1.5. ITS: (Warnock Hersey) - Certification Listings for Fire Doors.

1.3.1.6. MDO: Medium Density Overlay.

1.3.1.7. MSDS: Material Safety Data Sheets.

1.3.1.8. OBC: Ontario Building Code, 2006.

1.3.1.9. VOC: Volatile Organic Compound.

1.3.2. Reference Standards:

1.3.2.1. ANSI/WDMA I.S. 1A-04 - Industry Standard for Architectural Flush Wood Doors

1.3.2.2. ANSI/WDMA I.S. 6A-08 - Industry Standard for Architectural Stile and Rail Doors

1.3.2.3. ASTM E90-04 - Standard Test Method for Laboratory Measurement of Sound Transmission Loss of Building Partitions

1.3.2.4. ASTM E413-04 - Classification for Rating Sound Insulation

1.3.2.5. CAN/CGSB-11.3-M87 - Hardboard

1.3.2.6. CSA O112 Series-M77 - CSA Standards for Wood Adhesive

1.3.2.7. CAN4-S104-M80(85) - Standard Method for Fire Tests of Door Assemblies

1.3.2.8. CAN4-S113-79(00) - Standard Specification for Door, Wood Core, Meeting the Performance Required by CAN4-S104 for Twenty Minute Fire Rated Closure Assemblies

1.3.2.9. NFPA 80-07 - Standard for Fire Doors and Fire Windows

1.3.2.10. NFPA 252-08 - Standard Methods of Fire Tests of Door Assemblies

1.3.2.11. UL 10B - Underwriters Laboratories Fire Tests for Door Assemblies

**1.4. SUBMITTALS**

1.4.1. Shop Drawings:

1.4.1.1. Submit Shop Drawings in accordance with Section 01 30 00 – Administrative Requirements.

1.4.1.2. Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special bevelling, special blocking for hardware, identify cut outs for glazing and other openings.

1.4.1.3. Submit Product data indicating door core materials and construction and face type wood veneer.

1.4.14. 12”x12” wood veneer sample to be provided to Consultant for approval prior to supply/install

**1.5. QUALITY ASSURANCE**

1.5.1. Qualifications:

1.5.1.1. Provide the Work of this Section in accordance with Section 9 of AWS produced by AWI/AWMAC/WI, except as specified otherwise herein and by reference are hereby made a part of this Section. Ensure any reference to grades and terminology in this Section is as defined in AWS.

1.5.1.2. Requirements of this Section govern and modify AWS.

1.5.1.3. Installers: Provide the Work of this Section executed by competent installers with a minimum of 5 years’ experience in the application of Products, systems and assemblies specified and be a member of AWI/AWMAC/WI.

**1.6. DELIVERY, STORAGE AND HANDLING**

1.6.1. Delivery and Acceptance Requirements:

1.6.1.1. Do not subject interior wood doors to extremes in either heat or humidity. Do not accept delivery to the Site until HVAC systems are operational and balanced, providing temperature range of 10 deg C to 32 deg C (50 deg F to 90 deg F) and 25% to 55% relative humidity.

1.6.1.2. Accept doors at the Site in the manufacturer's standard packaging.

1.6.2. Storage and Handling Requirements: Store and protect wood doors in accordance with the manufacturer’s recommendations and ANSI/WDMA I.S. 1A’s Appendix Section “Care and Installation at Job Site”. Ensure Contractor responsible for receiving and storing wood doors has a copy of ANSI/WDMA I.S.1A.

**1.7. WARRANTY**

1.7.1. Manufacturer Warranty: Warrant the Work of this Section against defects and deficiencies for a period of 2 years as per the General Conditions of the Contract. Promptly correct defects and deficiencies which become apparent during the warranty period, to satisfaction of the Consultant and at no expense to the Owner. Defects include, but are not limited to, bubbling, delamination of faces, or edges, warp, twist bow exceeding 6 mm (1/4") and telegraphing of core. "Correct" referred to herein includes labour and materials for removal, repair, refinishing and replacement of Products provided as part of the Work of this Section, installing hardware, finishing, hanging and fitting.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, Door Schedule and Specifications:

2.1.1.1. Baillargeon; www.baillargeondoors.com

2.1.1.2. Cambridge Door Company Ltd.; www.cambridgedoor.com

2.1.1.3. Graham Door; www.grahamdoors.com

2.1.1.4. JWS Manufacturing Inc.; www.jwsmanufacturing.com

2.1.1.5. Lambton Doors; www.lambtondoors.com

2.1.1.6. Marshfield Door Systems, Inc.; www.marshfielddoors.com

2.1.1.7 Or Equivalent

**2.2. MATERIALS**

2.2.1. Description:

2.2.1.1. Regulatory Requirements:

2.2.1.1.1. Ensure wood doors comply with AWI/AWMAC/WI, Section 9 or ANSI/WDMA I.S. 1A.

2.2.2. Conform to AWI/AWMAC/WI, Section 9 or ANSI/WDMA I.S. 1A for wood flush doors and AWI/AWMAC/WI, Section 9 or ANSI/WDMA I.S. 6A for stile and rail doors, except as specified herein.

2.2.3. Supply wood doors from same manufacturer.

2.2.4. Solid Wood Core Wood Flush Doors:

2.2.4.1. Construction: 7 ply.

2.2.4.2. Fire Rating: Unrated.

2.2.4.3. Core: Kiln dried soft wood blocks; relative density not less than 0.30 at 12% moisture content; of random lengths placed vertically or horizontally not exceeding 50 mm (2") wide; staggered laminated by heat and pressure.

2.2.4.4. Stiles: Minimum 107 mm (4-3/16") low density laminated wood including a 22 mm (7/8") hardwood to match face.

2.2.4.5. Top and Bottom Rails: Minimum 85 mm (3-5/16") low density laminated wood.

2.2.5. Vision Frames for Unrated Doors: Wood, of same species as door; channel shape; mitre corners; prepared for countersink style screws.

2.2.6. Fabrication:

2.2.6.1. Fabricate flush doors in accordance with AWI/AWMAC/WI, Section 9 or ANSI/WDMA I.S. 1A and CAN4-S113 and stile and rail doors in accordance with AWI/AWMAC/WI, Section 9 or ANSI/WDMA I.S. 1A except as specified herein.

2.2.6.2. Size doors for 3 mm (1/8") clearance of heads and jambs and 9 mm (3/8") at bottom.

2.2.6.3. Bevel vertical edges of single acting doors 3 mm in 50 mm (1/8" in 2") on lock side and 1.5 mm in 50 mm (1/16" in 2") on hinge side.

2.2.6.4. Radius vertical edges of double acting doors to 60 mm (2-3/8") radius.

2.2.6.5. Flush Doors:

2.2.6.5.1. Fabricate solid core doors using hot or cold press construction technology. Bond stiles and rails to core using Type I or II adhesive. Sand for uniform thickness. Laminate door facing, crossbanding and assembled core in hot or cold press.

2.2.6.5.2. Factory cut glass light openings. Ensure openings are square with internal corners slightly rounded. Ensure portion between cutout and door edge is not less than 125 mm (5") wide at any point. Ensure cut out area is not greater than 40% of area of door face. Ensure cut out does not exceed half height of door.

2.2.6.5.3. Provide hardwood glass stops, finished to match face veneer, for vision panels in un-rated doors

2.2.6.5.4. Factory fit doors for frame opening dimensions identified on Shop Drawings.

2.2.6.6. Finish:

2.2.6.6.1 White oak wood veneer finish. Stain grade quality

2.2.6.6.2. Factory finish doors in accordance with AWI/AWMAC/WI, Section 5, System -11, Polyurethane, catalyzed or ANSI/WDMA I.S. 1A, TR-6 & OP-6 Catalyzed Polyurethane; clear coat finish, stain colour and sheen as selected by Consultant.

**2.3. SOURCE QUALITY CONTROL**

2.3.1. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

**PART 3 - EXECUTION**

**3.1. INSTALLATION**

3.1.1. Installation of wood doors and finish hardware forms part of the Work of Section 06 90 00 – General Installations.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide gypsum board Work including but not limited to following:

1.2.1.1. steel studs and furring channels.

1.2.1.2. gypsum board ceilings, partitions, bulkheads and soffits.

1.2.1.3. corner beads, casing beads, trim, control joints and corner reinforcement.

1.2.1.4. taping and filling.

1.2.2. Related Sections: the following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Grouting of door frames: Section 06 90 00 - General Installations.

1.2.2.2. Firestopping, smoke seals and penetration firestopping: Section 07 84 00 - Firestopping and Smoke Seals.

1.2.2.3. Finish painting of gypsum board: Section 09 91 00 - Painting.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. CSA: Canadian Standards Association; www.csa.ca.

1.3.1.2. MSDS: Material Safety Data Sheets.

1.3.1.3. OBC: Ontario Building Code, 2006.

1.3.1.4. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.5. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.6. VOC: Volatile Organic Compound.

1.3.2. Definitions:

1.3.2.1. Drywall: Gypsum board.

1.3.3. Reference Standards:

1.3.3.1. ASTM A653/A653M-07 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

| | | |
|---|---|---|
| 1.3.3.2. | ASTM A666-03 | - Standard Specification for Annealed or Cold Worked Austenitic Stainless Steel, Sheet, Strip, Plate and Flat Bar |
| 1.3.3.3. | ASTM A1011/A1011M-07 | - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength |
| 1.3.3.4. | ASTM C475/C475M-02(07) | - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board |
| 1.3.3.5. | ASTM C514-04 | - Standard Specification for Nails for the Application of Gypsum Board |
| 1.3.3.6. | ASTM C645-08a | - Standard Specification for Nonstructural Steel Framing Members |
| 1.3.3.7. | ASTM C754-07 | - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products |
| 1.3.3.8. | ASTM C834-05 | - Standard Specification for Latex Sealants |
| 1.3.3.9. | ASTM C840-08 | - Standard Specification for Application and Finishing of Gypsum Board |
| 1.3.3.10. | ASTM C919-08 | - Standard Practice for Use of Sealants in Acoustical Applications |
| 1.3.3.11. | ASTM C920-08 | - Standard Specification for Elastomeric Joint Sealants |
| 1.3.3.12. | ASTM C954-07 | - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness |
| 1.3.3.13. | ASTM C1047-05 | - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base |
| 1.3.3.14. | ASTM C1177/C1177M-06 | - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing |
| 1.3.3.15. | ASTM C1280-07 | - Standard Specification for Application of Gypsum Sheathing |
| 1.3.3.16. | ASTM C1325-08 | - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Interior Substrate Sheets |
| 1.3.3.17. | ASTM C1396/C1396M-06a | - Standard Specification for Gypsum Board |
| 1.3.3.18. | ASTM C1629/C1629M-06 | - Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels |
| 1.3.3.19. | ASTM C1658/C1658M-06 | - Specification for Glass Mat Gypsum Panels |
| 1.3.3.20. | ASTM D3273-00(05) | - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber |
| 1.3.3.21. | ASTM D4060-07 | - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser |
| 1.3.3.22. | ASTM D5420-04 | - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact) |

1.3.3.23. ASTM E84-08a - Standard Test Method for Surface Burning Characteristics of Building Materials

1.3.3.24. ASTM E90-04 - Standard Test Method for Laboratory Measurement for Airborne Sound Transmission Loss of Building Partitions

1.3.3.25. ASTM E96/E96M-05 - Standard Test Methods for Water Vapor Transmission of Materials

1.3.3.26. ASTM E119-08a - Standard Test Methods for Fire Tests of Building Construction and Materials

1.3.3.27. CAN/ULC-S101-07 - Standard Methods of Fire Endurance Tests of Building Construction and Materials

1.3.3.28. ASTM E695-03 - Standard Test method of Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading

1.3.3.29. ASTM E814-08b - Standard Test Method for Fire Tests of Penetration Firestop Systems

1.3.3.30. CSA A123.3-05 - Asphalt Saturated Organic Roofing Felt

1.3.3.31. CSA S136-07 - North American Specification for Design of Cold-Formed Steel Structural Members

1.3.3.32. CAN/CGSB-51.33-M89 - Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction

1.3.3.33. CAN/ULC-S101-07 - Method of Test for Standard Methods of Fire Endurance Tests of Building Construction and Materials

1.3.3.34. CAN/ULC-S102-07 - Surface Burning Characteristics of Building Materials and Assemblies

1.3.3.35. CAN/ULC-S114-05 - Standard Method of Test for Determination of Non-Combustibility in Building Materials

1.3.3.36. CAN/ULC-S115-05 - Standard Method of Fire Tests of Firestop Systems

1.3.3.37. CAN/ULC-S702-97 - Standard for Thermal Insulation Mineral Fibre for Buildings

## 1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Sequencing:

1.4.1.1. Coordinate installation and cooperate with mechanical and electrical Subcontractors to accommodate mechanical electrical items and any other Work required to be incorporated into or coordinated with ceiling and soffit systems.

1.4.1.2. Cooperate and coordinate with Sections applying wet trades and Subcontractors installing mechanical and electrical services. Coordinate stud layout at partitions accommodating wall mounted fixtures by other trades.

## 1.5. SUBMITTALS

1.5.1. Shop Drawings: Submit Shop Drawings in accordance with Section 01 30 00 – Administrative Requirements showing design, construction, sound attenuating construction, adjacent construction, elevations, finishes and relevant details of furring, enclosures and partitions which require fire rating.

1.5.2. Samples: Submit samples in accordance with Section 01 30 00 – Administrative Requirements. Submit following samples in sizes indicated:

1.5.2.1. each trim accessory a minimum of 300 mm (12") long.

**1.6. QUALITY ASSURANCE**

1.6.1. Qualifications:

1.6.1.1. Installers: Provide the Work of this Section executed by competent installers with a minimum of 5 years' experience in application of Products, systems and assemblies specified.

**1.7. DELIVERY, STORAGE AND HANDLING**

1.7.1. Delivery and Acceptance Requirements: Deliver materials to Site with the manufacturer's original labels intact. Do not remove wrappings until ready for use.

1.7.2. Storage and Handling Requirements:

1.7.2.1. No outside storage permitted. Store in clean, dry area, off ground. Provide adequate ventilation to avoid excess moisture, surface relative humidity and mould or fungal growth. Remove immediately any board showing signs of mould, mildew or fungal growth.

1.7.2.2. Stack gypsum board flat on level and dry surface without overhanging boards. Prevent sagging and damage to edges, ends and surfaces. Protect bagged Products from moisture or wetting.

**1.8. SITE CONDITIONS**

1.8.1. Ambient Conditions:

1.8.1.1. Do not install the Work of this Section in any area unless satisfied that Work in place has dried out and that no further installation of materials requiring wetness, moisture or dampness is contemplated. Ensure relative humidity in area of the work of this Section does not exceed 55% for duration of the project.

1.8.1.2. Ensure temperature of surrounding areas is min 13 deg C (55 deg F) and max 21 deg C (70 deg F) for 7 Days before and during application of gypsum board; maintain for 4 Days thereafter. Ensure heat is provided at appropriate time before Work has started to bring surrounding and adjacent materials up to required temperature and maintained as specified. Avoid concentrated or irregular heating during drying by means of deflectors or protective screens.

1.8.1.3. Ensure ventilation is provided for proper drying of joint filler and adhesive and to prevent excessive humidity. Do not force dry adhesives and joint treatment.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, Schedules and Specifications:

2.1.1.1. Bailey Metal Products Ltd.; www.bmp-group.com

2.1.1.2. CertainTeed Corporation; www.certainteed.com

2.1.1.3. CGC Inc.; www.cgcinc.com

2.1.1.4. Chicago Metallic; www.chicagometallic.com

2.1.1.5. Georgia-Pacific Canada, Inc.; www.gpgypsum.com

2.1.1.6. Gordon Incorporated; www.gordongrid.com

2.1.1.7. Roll Formed Specialty; www.rollformed.com

2.1.1.8. Trim-Tex Inc.; www.trim-tex.com

2.1.1.9. Unifix Inc.; www.unfixinc.com

2.1.1.10. Or Equivalent

**2.2. MATERIALS**

2.2.1. Performance/Design Criteria:

2.2.1.1. Obtain services of Professional Engineer with experience in type of Work of comparable complexity and scope, licensed to practice in the Province of Ontario to design, review and provide professional services for the Work of this Section.

2.2.1.2. Design ceiling suspension system in accordance with manufacturer's printed directions and conforming to ASTM C754 requirements. Do not suspend any items from structural steel deck. Do not support the Work of this Section from, nor make attachments to, ducts, pipes, conduits or support framing of other Subcontractors.

2.2.1.3. Design suspended ceiling system for adequate support of electrical fixtures as required by current bulletin of Electrical Inspection Department of Ontario Hydro.

2.2.1.4. Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.

2.2.1.5. Design suspension system to support weight of mechanical and electrical items such as air grilles, lighting fixtures, drapery track, drapes and with adequate support to allow rotation/

2.2.2. Steel Studs: CSA S136 and ASTM C645, galvanized sheet steel, minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths possible. Provide thicker steel where required due to height.

2.2.3. Heavy Duty Studs at Openings: CSA S136 and ASTM C645, galvanized sheet steel, minimum 54 mils designation thickness (1.367 mm (0.0538") minimum base steel thickness) (previously 16 ga), minimum Z120 (G40) zinc coating, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths possible. Provide thicker steel where required due to height.

2.2.4. Furring Channels: CSA S136 and ASTM C645, galvanized sheet steel, minimum 33 mils designation thickness (0.836 mm (0.0329") minimum base steel thickness) (previously 20 ga structural) or minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, screw channels, 67 mm (2-5/8") wide x 22 mm (7/8") deep.

2.2.5. Carrying Channels for Gypsum Board: CSA S136 and ASTM C645, galvanized sheet steel, minimum 43 mils designation thickness (1.087 mm (0.0428") minimum base steel thickness) (previously 18 ga), minimum Z120 (G40) zinc coating, 38 mm (1-1/2") high with 19 mm (3/4") flanges, for primary carrying member in suspended ceilings and as horizontal stiffeners or bracing in metal stud systems.

2.2.6. Gypsum Board (GB): Conforming to ASTM C1396/C1396M. Unless indicated otherwise use 1200 mm (4') wide standard facing board in maximum continuous lengths up to 3600 mm (12'), beveled and/or tapered edges to suit design requirements with butted square ends:

2.2.6.1. Gypsum Board (Walls): Provide 15.9 mm (5/8") thick with tapered edges unless otherwise specified as follows:

2.2.6.1.1. Provide 9.5 mm (3/8") thick gypsum board on curved walls.

2.2.6.1.2. Provide 12.7 mm (1/2") or 15.9 mm (5/8") thick gypsum board on wood framed construction.

2.2.7. Abuse Resistant Gypsum Board (ARGB): Provide 1 of following:

2.2.7.1. Enhanced gypsum core encased in heavy duty paper facers on front and back, 16 mm (5/8"), conforming to ASTM C1396/C1396M and attaining a maximum of 0.014" as tested to ASTM D4060 (H-18 abrasion wheel, 500 grams, 200 cycles), a maximum of 0.123" indentation as tested to ASTM D5420 (72 in lbs) and a minimum of (133 ft lbs) as tested to ASTM E695 (50 lb bag) and ASTM C1629/C1629M Type X in fire rated assemblies, “ProRoc Abuse Resistant Type X” by CertainTeed Corporation or Equivalent.

2.2.7.2. Enhanced gypsum core encased in fibreglass facers on front and back, 16 mm (5/8"), conforming to ASTM C1629/C1629M and attaining a maximum of 0.014" as tested to ASTM D4060 (H-18 abrasion wheel, 500 grams, 200 cycles), a maximum of 0.123" indentation as tested to ASTM D5420 (72 in lbs) and a minimum of (133 ft lbs) as tested to ASTM E695 (50 lb bag) and ASTM C1629/C1629M Type X in fire rated assemblies, “DensAmor Plus® Abuse Guard” by Georgia-Pacific Canada, Inc. or Equivalent.

2.2.8. Joint Tape: Conforming to ASTM C475/C475M, provide following:

2.2.8.1. Regular Gypsum Board: Use either kraft paper joint tape with feathered edges and minute perforations 50 mm (2") wide.

2.2.9. Joint Fillers and Topping Compound: Either slow or fast setting, low shrinkage type free of asbestos fillers and as recommended by the manufacturer. Use “Gyproc 90" by Georgia-Pacific Canada, Inc. or “Durabond 90" by CGC Inc. or Equivalent at exterior soffits.

2.2.10. Metal Trim: CGC No.200-A or BMP D-4411 in lieu of "J" Mould. Do not provide "J" Mould (CGC No. 400-A) unless specifically noted on the Drawings as 'Exposed "J" Mould'.

2.2.11. Sound Control Materials:

2.2.11.1. Sound Attenuation Batts: CAN/ULC-S702, mineral (glass and rock wool) fibre, flame spread and smoke developed in conformance with OBC requirements and other Authorities Having Jurisdiction in accordance with CAN/ULC-S102. Non-combustible in accordance with requirements of CAN/ULC-S114. Acceptable Products: “QuietZone Accoustical Batts” by Owens Corning, “Roxul AFB - Acoustical Fire Batts” by Roxul Inc., "Fibrex Sound Attenuation Batt (SAFB) Insulation" by Fibrex Insulations Inc., or “Thermafibre Sound Attenuation Blankets” by CGC Inc. or Equivalent, of sufficient thickness to meet required STC rating for sound-rated partitions and of width to suit metal framing spaces.

2.2.11.2. Strip Impalement Clips: 25 mm (1") wide strip of Insul-Hold by Insul-Hold Canada Ltd. Or Equivalent, fabricated from 0.531 mm (25 ga) galvanized sheet metal in 30 mf (100') rolls with punch-out insulation securement arrows. Alternatively, use special studs with punch-out impalement strips.

2.2.11.3. Acoustic Sealant: ASTM C834 and ASTM C920, Class 25, Non-hardening, “QuietZone Acoustic Sealant” by Owens Corning or “Tremco Acoustical Sealant” by Tremco Canada or Equivalent.

2.2.11.4. Elastomeric Sealant: As recommended by manufacturer of fibre-reinforced gypsum sheathing board.

2.2.11.5. Gaskets: Closed cell neoprene, 3 mm (1/8") thick x 64 mm (2-1/2") wide.

2.2.11.6. Asphalt Felt: CSA A123.3; No. 15 Type.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

3.1.1. Verification of Conditions: Verify the actual Site dimensions and location of adjacent materials prior to commencing Work. Notify the Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

**3.2. INSTALLATION**

3.2.1. Partition Types:

3.2.1.1. Refer to Drawings for partition types.

3.2.1.2. Provide partitions complete to underside of structure, unless otherwise indicated on the Drawings.

3.2.2. Give a minimum of 48 hours' notice for the Consultant's inspection of internal wall insulation, vapour barriers and services prior to concealing with gypsum board.

3.2.3. Provide adequate ventilation to eliminate excessive moisture before commencing and during Work to ensure proper drying of joint filler and adhesive. Do not force dry adhesive and joint treatment.

3.2.4. Examine substrate for compliance with applicable requirements, installation tolerances and other conditions affecting installation of fibre-reinforced gypsum board or sheathing. Do not proceed until unsatisfactory conditions have been corrected. Beginning of installation indicates acceptance of substrate conditions.

3.2.5. Carry out Work using skilled tradesmen carefully supervised by competent foremen. Take measurements accurately.

3.2.6. Install framing, blocking and furring in accordance with ASTM C645, ASTM C1280 and ASTM C840.

3.2.7. Maintain wallboard panels minimum 6 mm (1/4") and maximum 13 mm (1/2") above floor to prevent moisture transfer. Unless otherwise shown, extend panels to minimum 100 mm (4") above finished ceiling and to underside of deck or structure where exposed and at fire rated and sound control partitions. Omit taping and filling of concealed surfaces above ceiling line, except at fire rated and sound control partitions and walls.

3.2.8. Erect plain wallboard vertically or horizontally, whichever results in fewer end joints. Keep end joints away from prominent locations and central portions of ceilings. Locate vertical joints at least 300 mm (12") from jamb lines of openings.

3.2.9. Space screws for regular wallboard at 300 mm (12") oc along board edges and in board field on walls and ceilings; at fire-rated assemblies, reduce spacings to comply with labelling Authorities assembly listings. For other specialty boards ensure screw spacing is in accordance with the manufacturer's recommendations.

3.2.10. Drive screws with power screw-gun and set with countersunk heads slightly below surface of board. Do not secure gypsum board by installing screws into aluminum or steel window and door frames.

3.2.11. Install resilient sponge tape where gypsum board ceilings abut heads of door frames and where wallboard abuts heads or jambs of exterior door and window frames. Adhere tape to casing bead and compress

during installation. Compressed thickness; 1.6 mm (1/16").

3.2.12. At partitions except shaft walls, apply 1 continuous 6 mm (1/4") bead of acoustical sealant to each side of partition where gypsum board meets dissimilar materials. Where 2 layers of gypsum board per face are required, apply bead of sealant at perimeter of base layer only.

3.2.13. Apply sealant beads at perimeter of other services and like objects which penetrate wallboard in accordance with manufacturer's directions.

3.2.14. Metal Framing for Partitions and Bulkheads:

3.2.14.1. Comply with recommendations of CGC Drywall Steel-Framed Systems Folder 09250-SA 923 for metal stud partition, ceiling, column fireproofing and bulkhead detailing.

3.2.14.2. Provide partition tracks at floor and underside of ceiling or structure above. Align accurately. Lay out to partition layout.

3.2.14.3. Erect partial height and curved partitions as indicated on the Drawings.

3.2.14.4. Place studs vertically at 400 mm (16") oc unless otherwise specified, not more than 50 mm (2") from abutting walls, and at each side of openings and corners. Position studs in tracks. Cross brace studs as required to provide rigid installation.

3.2.14.5. Provide heavy duty double boxed studs at each side of openings to extend in 1 piece from floor to underside of structure above.

3.2.14.6. Co-ordinate erection of studs and installation of service lines.

3.2.14.7. Provide continuous gasket to separate metal framing from masonry and concrete.

3.2.14.8. Do not secure studs to exterior window framing, or to ceiling grid members.

3.2.14.9. Provide continuous gasket between ceiling and floor tracks, and structure.

3.2.14.10. Metal Stud Reinforcements: Provide hollow structural steel, stud, angle and steel plate sections, galvanized sheet steel minimum 1.214 mm (18 ga) where required to support manufactured components. Weld connections. Ensure rigid and secure installation capable of offering resistance to minimum 227 kg (500 lbs) pull force. Galvanize stud reinforcements in moist areas. Do not use wood blocking for this purpose. Provide additional reinforcing framing studs or furring channels secured between studs for attachment and support without limitations following:

3.2.14.10.1. architectural woodwork.

3.2.14.10.2. fitments and fixtures.

3.2.14.10.3. equipment.

3.2.15. Provide continuous horizontal furring channels as backing to wall cabinets.

3.2.16. Access Doors and Panels: Install access doors and panels supplied as part of the work of Divisions 22, 23 and 26 and where required as part of the Work of this Section in walls, bulkheads, ceilings and soffits.

3.2.17. Metal Furring:

3.2.17.1. Erect furring in accordance with manufacturer's directions and as specified herein.

3.2.17.2. Provide furring rigid, secure, square, level or plumb, framed and erected to maintain finish dimensions and contours indicated. Allow for thermal movement.

3.2.17.3. Furr around ducts, pipes and dropped beams occurring in finished areas and for vertical gypsum board breaks within or at termination of ceilings.

3.2.17.4. Provide metal furring channels fastened to masonry or concrete surfaces in parallel rows at 400 mm (16") oc unless gypsum board is indicated to be adhered directly to masonry or concrete surfaces. Shim metal furring channels to provide a level surface.

3.2.18. Gypsum Board Application:

3.2.18.1. Provide gypsum board in accordance with manufacturer's written installation instructions and finish to requirements of ASTM C840. Ensure moisture resistant gypsum board is installed on any wall/partition containing a plumbing fixture (i.e. water closets, sinks, tubs, etc.).

3.2.18.2. Provide metal trim casing bead at junctions with dissimilar materials. Provide reveals at junctions with dissimilar materials where indicated.

3.2.18.3. Provide curved uniform surfaces by wetting or dampening board or scoring back gypsum board and form to profiles indicated. Provide additional screws and framing members to maintain design curve. Apply joint compound and trowel smooth to provide continuous, smooth radius free from flat spots, facets and trowel marks. Allow gypsum boards to dry thoroughly before handling.

3.2.18.4. Provide finished work plumb, level and true, free from perceptible waves or ridges and square with adjoining work.

3.2.18.5. Cut and fit gypsum board to accommodate or fit around other parts of the Work. Provide the Work of this Section accurately and neatly.

3.2.18.6. Butt gypsum board sheets together in moderate contact. Do not force into place. Place tapered or wrapped edges next to 1 another.

3.2.18.7. Provide gypsum board perpendicular to framing and in lengths that will span ceilings and walls without creating end (butt) joints. If butt joints do occur stagger and locate them as far from centre of walls and ceilings as possible. Accurately fit exposed butt joints together and make edges smooth.

3.2.18.8. Support ends and edges on framing.

3.2.18.9. Fasten gypsum board to metal furring and metal studs with screws. Space screws at 200 mm (8") oc at board edges and 300 mm (12") oc on board field. Ensure perimeter screws are not less than 9 mm (3/8") nor more than 13 mm (1/2") from edges and ends are opposite screws on adjacent boards.

3.2.18.10. Gypsum Board - Single Layer:

3.2.18.10.1. Ceilings: Apply gypsum board to metal furring with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members. Space screws at 200 mm (8") oc.

3.2.18.10.2. Partitions: Apply gypsum board to metal studs with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members. Locate vertical joints at least 300 mm (12") from jamb lines of openings. Space screws at 200 mm (8") oc at board edges and 300 mm (12") oc on board field.

3.2.18.10.3. Ceiling and Partition Fasteners: Ensure perimeter screws are not less than 9 mm (3/8") nor more than 13 mm (1/2") from edges and ends are opposite screws on adjacent boards. Drive screws with power screw gun and set with countersunk head slightly below surface of board.

3.2.18.10.4. Joints: Finish all joints unless specified otherwise in the Contract Documents.

3.2.19. Metal Trim and Accessories:

3.2.19.1. Provide metal trim casing beads at reveals; at ceiling-wall intersections and partition perimeters; and at intersection of dissimilar constructions such as gypsum board to concrete.

3.2.19.2. Provide metal trim casing beads where gypsum board abuts against a surface having no trim concealing junction.

3.2.19.3. Provide a 13 mm (1/2") separation gasket between metal trim casing beads and window frames or other cold surfaces or provide sponge tape between gypsum board partition or furring framing, where such framing abuts exterior door or window frame, sponge tape between floor and gypsum board partition track. Ensure tape is either full width or 1 strip 9 mm (3/8") wide on each side of framing member.

3.2.19.4. Provide casing bead and sponge tape where gypsum board abuts materials other than itself and acoustic tile ceilings including at exterior door and window frames, where juncture is not concealed with trim; or elsewhere where indicated on the Drawings. Unless indicated otherwise, use tape 3 mm (1/8") narrower than casing bead to provide recess at exposed side. Compress tape by 25%.

3.2.19.5. Provide metal trim casing beads where indicated on the Drawings.

3.2.19.6. Provide pre-finished metal angle trim supports and provide light pockets and eggcrate grilles and/or louvres in accordance with manufacturer's instructions. Install light pockets and eggcrate grilles and/or louvre units square, straight and in 1 piece where possible or with inconspicuous joints at long runs.

3.2.20. Control Joints:

3.2.20.1. Provide pre-fabricated, pre-manufactured control joints and/or prepared to suit site conditions control joints and in accordance with manufacturer's instructions and in accordance with ASTM C840.

3.2.20.2. Set in gypsum facing board, supporting control joints with studs or furring channels on both sides of joint. Ensure double studs with discontinuous tracks and double suspended ceiling furring channels have been installed prior to commencing board and bead application at control joints. Provide control joints at following locations:

3.2.20.2.1. support construction changes.

3.2.20.2.2. partition, ceiling or furring runs exceed 9000 mm (30').

3.2.20.3. Provide control joints full height floor to ceiling or door header to ceiling in partitions and furring runs.

3.2.20.4. Provide control joints from wall to wall in ceiling areas.

3.2.20.5. Provide continuous polyethylene dust barrier behind and across control joints.

3.2.20.6. Obtain the Consultant's acceptance of exact locations of control joints.

3.2.21. Sound Control:

3.2.21.1. Where indicated on the Drawings, provide sound rated partitions and ceiling in locations indicated to meet required minimum STC rating. Apply gypsum board on both sides of sound-proofed partitions. Follow manufacturer's details and recommendations.

3.2.21.2. Provide sound attenuation insulation to completely fill height of stud cavities. Tightly butt ends and sides of blankets within cavities. Cut blankets to fit small spaces. Carefully fit

blankets behind electrical outlets, bracing, fixture attachments and mechanical and electrical services.

3.2.21.3. Mechanically fasten blankets to back of gypsum board as recommended by gypsum board manufacturer.

3.2.21.4. At sound attenuating suspended ceiling and enclosures having spring isolator hangers, terminate ceiling or enclosure at adjacent construction by providing continuous isolator strip and sealed joint.

3.2.22. Joint Treatment - Gypsum Board:

3.2.22.1. Verify board is firm against framing members and screw heads are properly depressed.

3.2.22.2. Mix joint compound or ready-to-use compounds according to manufacturer's directions. Use pure, unadulterated, clean water for mixing. Permit mixed material to stand 30 minutes before using. Do not mix more material than can be used within 1 hour. Do not use set or hardened compound. Clean tools and equipment after mixing each batch.

3.2.22.3. Tape and fill joints and corners in accordance with gypsum board manufacturer's printed instructions. Fill either manually, using hand tools of trade, or by a mechanical taping and filling machine of proven efficiency.

3.2.22.4. Remove plastic tape from control joints after finishing with joint compound.

3.2.22.5. After final coats of filler have dried at least 24 hours, sand surface lightly with No. 00 sandpaper to leave it smooth, ready for decoration.

3.2.22.6. Provide finished work smooth, seamless, plumb and true, flush and with square plumb neat corners.

3.2.22.7. Levels of Finish: Provide following levels of finish in accordance with ASTM C840:

3.2.22.7.1. Level 0: No taping, finishing or accessories required for temporary construction or areas where final decoration is not required.

3.2.22.7.2. Level 1: Use this level in plenum areas above ceilings, attics, areas where assembly would generally be concealed or in building service corridors and other areas.

3.2.22.7.3. Level 2: Use this level where water resistant gypsum backing board is used as substrate for tile; may be used in garages, warehouse storage, or other similar areas where surface appearance is not of primary concern.

3.2.22.7.4. Level 3: Use this level in appearance areas which are to receive heavy or medium texture spray or hand applied finishes before final painting or where heavy grade wall coverings are to be applied as final decoration.

3.2.22.7.5. Level 4: Use this level where flat paints, light textures or wall coverings are to be applied.

3.2.22.7.6. Level 5: Use this level to provide a uniform surface and minimize possibility of joint photographing and of fasteners showing through final decoration.

3.2.22.7.7. Exposed Moisture Resistant Gypsum Board Finish: Ensure joints and interior angles have tape embedded in joint compound and 2 separate coats of joint compound applied over all flat joints and 1 separate coat of joint compound applied over interior angles. Cover fasteners heads and accessories with 3 separate coats of joint compound. Ensure surface is smooth and free of tool marks and ridges.

3.2.23. Cutting and Patching: Cooperate and coordinate with the Work of other Sections to obtain satisfactory gypsum board finish work. Do cutting, patching and Make Good as required by installation of the Work of other Sections.

**3.3. SITE QUALITY CONTROL**

3.3.1. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

**3.4. CLEANING**

3.4.1. Clean off beads, casings, joint cement droppings and similar items and remove surplus materials and rubbish on completion and as directed.

**3.5. PROTECTION**

3.5.1. Provide protection of materials and Work of this Section from damage by weather and other causes. Perform Work in areas closed and protected from damage due to weather. Protect Work of other trades from damage resulting from the Work of this Section. Make Good such damage immediately.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide tiling including but not limited to the following:

1.2.1.1. grouting control joints in floor slab under tile.

1.2.1.2. waterproofing membrane.

1.2.1.3. levelling bed.

1.2.1.4. fast-setting cement leveling bed for interior floors.

1.2.1.5. CIM for both floors and walls.

1.2.1.6. thin-set mortar bond coat.

1.2.1.7. fast-setting thin-set mortar bond coat.

1.2.1.8. floor tile, base and fittings.

1.2.1.9. wall tile.

1.2.1.10. caulking tile control joints.

1.2.1.11. caulking penetrations through wall and floor tile.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. CIM: Crack Isolation Membrane.

1.3.1.2. EGP: Exterior Grade Plywood.

1.3.1.3. MSDS: Material Safety Data Sheets.

1.3.1.4. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.5. TTMAC: Terrazzo, Tile & Marble Association of Canada; www.ttmac.com.

1.3.1.6. VOC: Volatile Organic Compound.

1.3.1.7. WHMIS: Workplace Hazardous Materials Information System.

1.3.2. Reference Standards:

1.3.2.1. ANSI A108.6-99(05) - Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy

| | | |
|---|---|---|
| 1.3.2.2. | ANSI A108.8-99(05) | - Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout |
| 1.3.2.3. | ANSI A108.10-99 (05) | - Installation of Grout in Tilework |
| 1.3.2.4. | ANSI A118.1-08 | - American National Standard Specifications for Dry-Set Portland Cement Mortar |
| 1.3.2.5. | ANSI A118.3-08 | - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive |
| 1.3.2.6. | ANSI A118.4-08 | - American National Standard Specifications for Latex-Portland Cement Mortar |
| 1.3.2.7. | ANSI A118.5-08 | - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation |
| 1.3.2.8. | ANSI A118.6-08 | - American National Standard Specifications for Standard Ceramic Grouts for Tile Installation |
| 1.3.2.9. | ANSI A118.7-08 | - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation |
| 1.3.2.10. | ANSI A118.10-08 | - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-set Ceramic Tile and Dimension Stone Installation |
| 1.3.2.11. | ANSI A118.11-99(05) | - American National Standard Specifications for EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar |
| 1.3.2.12. | ANSI A118.12-08 | - American National Standard Specification for Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installation |
| 1.3.2.13. | ANSI A136.1-08 | - American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile |
| 1.3.2.14. | ANSI A137.1-08 | - Specification for Ceramic Tile |
| 1.3.2.15. | ASTM A185/A185M-07 | - Specification for Steel Welded Wire Reinforcement, Plain, for Concrete |
| 1.3.2.16. | ASTM C144-04 | - Specification for Aggregate for Masonry Mortar |
| 1.3.2.17. | ASTM C207-06 | - Specification for Hydrated Lime for Masonry Purposes |
| 1.3.2.18. | ASTM C373-88(06) | - Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products |
| 1.3.2.19. | ASTM C503-08 | - Specification for Marble Dimension Stone (Exterior) |
| 1.3.2.20. | ASTM C627-93(99) | - Standard Method of Evaluating Ceramic Floor Tile Systems using the Robinson-Type Floor Tester |
| 1.3.2.21. | ASTM C648-04a | - Specification for Standard Test Method for Breaking Strength of Ceramic Tile |
| 1.3.2.22. | ASTM C650-04 | - Test Method for Resistance of Ceramic Tile to Chemical Substances |

1.3.2.23. ASTM C847-06 - Specification for Metal Lath

1.3.2.24. ASTM F1869-04 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

1.3.2.25. CAN/CGSB-51.34-M86 - Vapour Barrier, Polyethylene Sheet for Use in Building Construction

1.3.2.26. CSA A3000-08 - Cementitious Materials Compendium

1.3.2.27. CSA A123.3-05 - Asphalt Saturated Organic Roofing Felt

1.3.2.28. CSA A23.1-04 - Concrete Materials and Methods of Concrete Construction

1.3.2.29. ISO 13006:1998 - International Standard – Ceramic Tiles - Definitions, classification, characteristics and marking

1.3.2.30. ISO 10545-7:1996 - International Standard - Ceramic Tiles – Part 7: Determination of resistance to surface abrasion for glazed tiles

1.3.2.31. ISO 13007-1:2004 - International Standard - Ceramic tiles - Grouts and adhesives – Part 1: Terms, definitions and specifications for adhesives

1.3.2.32. ISO 13007-3:2004 - International Standard - Ceramic tiles - Grouts and adhesives – Part 3: Terms, definitions and specifications for grouts

## 1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Pre-installation Meetings: Arrange pre-installation meeting 1 week prior to commencing Work with Subcontractors as designated in the Contract Documents or as requested by the Consultant. Presided over by the Contractor, include the Consultant who may attend, Subcontractor performing work of this trade, testing company's representative and consultants of applicable discipline. Review the Contract Documents for the Work included under this Section and determine complete understanding of requirements and responsibilities relative to the Work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, the Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of the Work of this Section.

## 1.5. SUBMITTALS

1.5.1. Product Data:

1.5.1.1. Submit manufacturer’s technical data sheets, WHMIS, MSDS and installation instructions for specified materials.

1.5.1.2. Where more than 1 manufacturer’s Products are part of single tile assembly, arrange for each manufacturer to submit a written statement of compatibility with respect to other manufacturer’s materials.

1.5.2. Shop Drawings: Submit Shop Drawings for the Work of this Section in accordance with Section 01 30 00 – Administrative Requirements. In addition to minimum requirements indicate following:

1.5.2.1. details of construction.

1.5.2.2. joint layouts.

1.5.2.3. dimensions.

1.5.2.4. patterns.

1.5.2.5. markings.

1.5.2.6. lettering.

1.5.3. Samples: Submit samples in accordance with Section 01 30 00 – Administrative Requirements. Submit individual sample panels of each colour of ceramic tile, set with adhesive, grouting and bonding method as specified, showing quality, colour and finish of material, grout and pattern of tiles. Ensure each panel is minimum 600 mm x 600 mm (24" x 24").

**1.6. CLOSEOUT SUBMITTALS**

1.6.1. Operational and Maintenance Data: Submit maintenance instructions in accordance with Section 01 70 00 – Execution and Closeout Requirements. Provide the Owner with 3 copies of TTMAC's "2000 Maintenance Guide". Include specific warnings of any maintenance practice or materials which may damage or disfigure tile work.

**1.7. MAINTENANCE MATERIAL SUBMITTALS**

1.7.1. Extra Stock Materials:

1.7.1.1. Supply in addition to quantities required for Work, extra materials and Products to be stored by the Owner as follows:

1.7.1.1.1. Provide 20 extra tiles of each type of tile and special units.

1.7.1.2. Deliver extra stock to the Owner as soon as permanent, locking storage facilities are available. Place extra stock in designated storage area where directed by Owner.

**1.8. QUALITY ASSURANCE**

1.8.1. Qualifications:

1.8.1.1. Manufacturers: Provide Product of company specializing in manufacture of ceramic tile, porcelain tile, mosaics, pavers, trim units, thresholds, setting, grouting and installation Products with a minimum experience of 5 years. Provide test reports if requested by Consultant to substantiate that Products supplied on this Project will be of consistent quality in appearance and physical properties.

1.8.1.2. Installers: Execute the Work of this Section using a company who is a member in good standing with TTMAC and has a minimum of 5 years successful experience in application of Products, systems and assemblies specified. Perform tile Work using skilled mechanics trained and experienced in Work of this complexity. Install waterproofing system using an applicator approved by system manufacturer.

**1.9. DELIVERY, STORAGE AND HANDLING**

1.9.1. Delivery and Acceptance Requirements:

1.9.1.1. Coordinate deliveries to comply with construction progress schedule and arrange for above ground, under cover storage before materials are delivered to Site.

1.9.1.2. Deliver tile in a manner to avoid chipping, breakage, staining and any other damage.

1.9.1.3. Deliver packaged materials in their original bags and containers clearly identified.

1.9.2. Storage and Handling Requirements:

1.9.2.1. Store and handle tile in a manner to avoid chipping, breakage, staining and any other damage.

1.9.2.2. Store packaged materials in their original bags and containers clearly identified. Keep containers sealed and labels intact unit time of use. Prevent damage or contamination to materials by water, moisture, freezing, excessive heat, foreign matter or other causes. If materials have frozen, do not stir liquids or mix materials until they are completely thawed.

1.9.2.3. Provide secure heated and dry storage facilities on site. Maintain temperatures in storage area between 15 deg C (59 deg F) and 30 deg C (86 deg F).

**1.10. SITE CONDITIONS**

1.10.1. Ambient Conditions:

1.10.1.1. Do not perform the Work of this Section at temperature below 12 deg C (54 deg F) when using portland cement mortars or dry set mortars, latex portland mortars or bond coat. Maintain temperature between 12 deg C (54 deg F) and 32 deg C (90 deg F).

1.10.1.2. Observe manufacturer's recommended working temperatures for installation of adhesives and grouts.

1.10.1.3. Close doors and windows and turn off direct forced ventilation systems and apparatus. Turn off radiant floor heating systems and protect Work area from direct draft, sun and heat exposure during installation and for at least 72 hours after completion

1.10.1.4. Do not perform Work of this Section when either substrate and/or ambient temperatures are below 10 deg C (50 deg F) or above 35 deg C (95 deg F). Maintain temperature in tiled areas within these temperature limits during installation and for 7 Days after completion of the Work unless otherwise indicated in the Product instructions and/or in ANSI A108 Installation Standard Procedure requirements.

**1.11. WARRANTY**

1.11.1. Manufacturer Warranty:

1.11.1.1. Warrant the Work of this Section for a period of 2 years against defects, excessive wear and loss of adhesion including replacement of defective tiling, materials, labour costs for demolition of defective Work, accessories and installation systems at Owner's convenience Cracks arising from normal shrinkage and/or expansion of concrete are not considered as structural failure. Hairline cracks in grout joints which result from these causes are considered normal and warranty is not voided as a result of these minor defects.

1.11.1.2. Warrant waterproofing Work of this Section against defects of workmanship and materials and against any actual leakage, for a period of 5 years. Leakage due to structural failure of concrete is excepted.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of the following manufacturers are acceptable subject to conformance to requirements of the Drawings, schedules and Specifications:

2.1.1.1. Custom Building Products; www.custombuildingproducts.com

2.1.1.2. Flextile Ltd.; www.flextile.net

2.1.1.3. Laticrete International, Inc.; www.laticrete.com

2.1.1.4. Mapei Corporation; www.mapei.ca

2.1.1.5 Or Equivalent

2.1.2. Use proprietary Products in full compliance with the manufacturer's recommendations. As far as possible obtain Product from single manufacturer ensuring compatibility with adjacent components while maintaining quality.

**2.2. MATERIALS**

2.2.1. Description:

2.2.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review as required in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Regulation 851, Industrial Establishments. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.2.2. CIM: Provide 1 of following:

2.2.2.1. Two part system made up of liquid rubber and reinforcing fabric to provide crack bridging capability over non-structural cracks, compatible with thin set mortar, supply "Laticrete Blue 92" by Laticrete International, Inc., "WP-980 Waterproof & Crack Isolation Membrane" or "1000 – Flexilastic Crack Isolation and Sound Reduction Membrane" by Flextile Ltd. or Equivalent.

2.2.2.2. Single component highly flexible load bearing peal and stick sheet membrane and primer compatible with tile/stone setting mortars, supply "Mapeguard Primer and Mapeguard SM" by Mapei Corporation or Equivalent

2.2.3. Waterproofing Membrane: Provide 1 of following:

2.2.3.1. Extra heavy duty, seamless, load bearing conforming to ANSI A118.10, for installation of ceramic tile and quarry tile for areas such as bathrooms, plazas, showers, kitchens, fountains, swimming pools and balconies: "Flextile WP-980 Waterproof & Crack Isolation Membrane with Reinforcing Fabric" by Flextile Ltd. or "Latacrete 9235" waterproof membrane system with Latacrete's fiberglass cloth reinforcement by Laticrete International, Inc. or "Mapelastic™ 315" by Mapei Corporation or Equivalent.

2.2.3.2. A single component self-curing liquid rubber polymer that forms a flexible, seamless waterproofing membrane; provide "Hydro Ban" by Laticrete International, Inc. or "Aqua Defense" by Mapei Corporation or Equivalent.

2.2.4. Adhesive and Mortar Materials:

2.2.4.1. Latex Mortar Bond Coat: ISO 13007-1 performance level (C2ES2P2); ANSI A118.4; ANSI A118.11; for improved (C2) cement adhesive with (E) extended open time (S2) high-deformability (>5 mm) and improved (P2) for adherence to EGP characteristics, conforming to ANSI A118.4 and ANSI A118.11 requirements, supply "Laticrete 4237 with Portland Filler Powder" by Laticrete International, Inc., "Kerabond/Keralastic" by Mapei Corporation or "#51 Floor and Wall Mix Thin-Set Mortar" and "#44 High Solids Latex Thin-Set Mortar Additive" by Flextile Ltd. or Equivalent.

2.2.4.2. Enriched, modified Portland cement thin bed mortar, single component, with polymer, conforming to ANSI A118.4 and ANSI A118.11 requirements, supply "Flextile 52"by Flextile Ltd., or "254 Platinum Multipurpose Thin Set-Mortar" by Laticrete or "Ultraflex 3" or "Ultraflex RS" by Mapei or Equivalent.

2.2.5. Grout Materials:

2.2.5.1. Epoxy grout, commercial grade, conforming to ANSI A118.3, for joints greater than 1.5 mm (1/16") less than 12.7 (1/2"), low VOC, non-toxic, non-flammable, non-hazardous during storage, chemically and stain resistant, supply "Flex-Epoxy 100 Grout" by Flextile or "SpectraLOCK PRO Grout" by Laticrete or "Kerapoxy" by Mapei or Equivalent.

2.2.5.2. Grout colours to be later selected by the Consultant from manufacturer's full range of colours.

2.2.5.3. Grout sealer: as recommended by grout manufacturer.

2.2.6. Ceramic Tile:

2.2.6.1. Conforming to ANSI A137.1, ISO 13006. Provide bullnoses, copings, caps, cove base, nosings, corner pieces, and other special units as specified, indicated, and required. Colour as selected by the Consultant from manufacturer's full ranges. Provide tile with minimum following characteristics:

2.2.6.1.1. Water Absorption: ASTM C373 - < 3.0%.

2.2.6.1.2. Breaking Strength: ASTM C648 - > 250 lbs.

2.2.6.1.3. Abrasion Resistance: ISO 10545-7 - Class Four Heavy Traffic.

2.2.6.1.4. Scratch Hardness: MOH's - 7.

2.2.6.1.5. Chemical Resistance: ASTM C650 - Resistant.

2.2.6.1.6. Coefficient of Friction: Wet: < 0.60; Dry: > 0.80.

2.2.6.2. Wall Tile Type TL-1: Supply 108 mm x 216 mm size unglazed porcelain tiles "Color and Dimensions Collection" by Olympia Tile, in colour 'Artic White Bright' or Equivalent.

2.2.6.3. Floor Tile Type TL-2: Supply 600 mm x 1200 mm , porcelain tile by Olympia Tile, Series: Maxstone, Colour: Medium Grey Matte.

2.2.6.4. Wall Tile Type TL-3: Supply 600 mm x 600 mm size by Olympia Tile, Series: Colour Series Colour: White Matte.

2.2.6.5. Wall Tile Type TL-4: Supply 600 mm x 600 mm size by Olympia Tile, Series: Colour Series Colour: Blue Matte.

2.2.7. Grout:

2.2.7.1. Type TL-1/TB-1: Epoxy Grout: Conforming to ANSI A118.3 and ISO 13007-3 (RG) performance level for reactive resin grouts; 100% Solids, 2 component water washable epoxy grout, "Mapei, in #38 Avalanche colour or Equivalent.

2.2.8. Transition Strips and Reducer Strips: Custom made metal extrusion; stainless steel, or brass, or zinc or anodized aluminum type.

2.2.9. Metal Dividers: Brass [Zinc], 15 mm x 15 mm x 3 mm (19/32" x 19/32" x 1/8") continuous angle.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. Verification of Conditions:

3.1.1.1. Verify existing conditions and finishes are ready to receive specified tile Work. Ensure backings are structurally sound, level, and plumb within required tolerances. Notify Consultant in writing of unacceptable substrate conditions.

3.1.1.2. Ensure compatibility of adhesives, waterproofing, reinforcing and fillers with adjacent substrate and component coming in contact with these Products.

3.1.1.3. Ensure waterproofing and adhesive manufacturers; examine substrate conditions, verify conditions are suitable for installation prior to commencement and review application procedures. If requested submit written report.

3.1.2. Pre-installation Testing: Perform calcium chloride test in accordance with requirements of ASTM F1869 immediately prior to tiling for moisture on concrete floors around perimeter of areas, at columns and where moisture may be anticipated. Conduct 3 tests for first 93 $m^2$ (1000 sq ft) and 1 additional test for every 93 m² (1000 sq ft) of flooring. Ensure moisture emission from concrete floor does not exceed 1.36 kg/93 m² (3 lbs/1000 sq ft) in 24 hours unless otherwise stated in flooring Product instructions and limitations. Do not proceed with installation until moisture problem has been corrected. Provide results to the Consultant prior to commencement of installation.

3.1.3. Evaluation and Assessment:

3.1.3.1. Prior to installation, set aside for further inspection and replacement on a tile for tile basis by tile or dimension stone Supplier, sub-standard tiles, fractured tiles or tiles with chipped corners, pinholes or voids that are unusable for cuts. Ensure this that a Subcontractor responsible for the Work of this Section replaces at its own expense, sub-standard and/or pre-damaged tiles once installed.

3.1.3.2. Carefully select, set-aside and shade-mix tiles and/or dimension stones to a homogeneous blend throughout. During installation, provide supplementary lighting equipment if necessary to easily identify shade differences, which could normally be very slight and provide a standard even aesthetic blend effect. This is best achieved by using a strong floodlight or spotlight fitted to a movable pole stand immediately over the Work area.

3.1.3.3. Before setting, examine tile backs for possible dust or other contaminants. If necessary, use a slightly damp towel and wipe tile backs to remove any such dust or contaminant residue.

3.1.3.4. Commencement of Work implies acceptance of previously completed work.

**3.2. PREPARATION**

3.2.1. Surface Preparation:

3.2.1.1. Ensure substrates are structurally sound, solid, stable, level, plumb and true to a tolerance in plane of 6 mm in 3 m (1/4” in 10’ - 0”) in accordance with ANSI A108 specification requirements. Ensure substrates are clean and free of dust, oil, grease, paint, tar, wax, curing agent, primer, sealer, form release agent or any deleterious substance and debris which may prevent or reduce adhesion.

3.2.1.2. Mechanically sand, shot blast or scarify substrate as required to completely remove paint, loosely bonded topping, loose particles and contaminants. Surface etching or contaminant removal by chemical means is not permitted.

3.2.1.3. Apply latex cementitious leveling coat to correct substrate irregularity up to 8 mm (5/16”) thickness. Above 8 mm (5/16”) correct irregularity by mortar bed method or fast-setting mortar bed method.

3.2.1.4. Ensure substrates are dry.

3.2.1.5. In all cases, structural design of substrate shall not allow a deflection greater than L/360 when tested to 136 kg (300 lb) concentrated loads in accordance with ASTM C627 test method. Deflection and curvature should be uniform over length of the span.

3.2.1.6. Review setting out point with the Consultant for each location, verify patterns and edge condition.

3.2.1.7. Verify substrate expansion joints have been installed properly.

**3.3. INSTALLATION**

3.3.1. Provide tiling in accordance with TTMAC's "Specification Guide 09 30 00 Tile Installation Manual 2006-2007" unless specified otherwise in the Contract Documents.

3.3.2. Lay out tile so field or patterns are centered on wall and floor areas or conform architectural details so no tile less than 1/2 size occurs. No cut tiles are allowed at finished ceiling level. Align joints in walls, bases and floors, where tile sizes accommodate. Provide uniform joint widths throughout.

3.3.3. Prior to installation ensure back of each tile is free of contaminants. Distribute production run variations evenly, maintaining continuity of appearance. When necessary, wipe the back face of stone or tile with a damp towel or cloth to remove dust and residual contaminants.

3.3.4. Arrange accessories in tile work so they are spaced evenly, centered with joints and set true with proper and adequate projection conforming to the manufacturer's recommendations.

3.3.5. Make sure tile has adequate solid backing. Ensure corner and edges are fully supported by bonding material. Avoid slippage. Ensure tile installation has a minimum of 95% bond coverage by back-buttering.

3.3.6. Fit tile units around corners, fitments, fixtures, drains and other built-in-objects to maintain uniform joint appearance. Cut, drill and set anchors, bolts for fastening fixtures and fittings in tile work. Make cut edges smooth, even and free from chipping. Do not split tile.

3.3.7. Grout to match colour of tile unless indicated otherwise. Fill joints.

3.3.8. Expansion and Control Joints:

3.3.8.1. Carry existing movement joints all the way through from substrate surface layer including tiling surface. Ensure control and expansion joints are kept free of setting materials.

3.3.8.2. Install control joints where tiling abuts restraining surfaces, around perimeter of work (and or panel) and at base of columns and curbs.

3.3.8.3. Install and space expansion and control joints in accordance with following:

3.3.8.3.1. interior: 4878 mm (16') to 6098 mm (20') in each direction with minimum joint width of 6 mm (1/4").

3.3.8.3.2. interior exposed to direct sunlight or moisture: 2439 mm (8') to 3659 mm (12') in each direction with minimum joint width of 6 mm (1/4").

3.3.8.3.3. exterior - normal: 2439 mm (8') to 3659 mm (12') in each direction with minimum joint width of 9 mm (3/8").

3.3.8.3.4. exterior - excessive: 2439 mm (8') to 3049 mm (10') in each direction with minimum joint width of 13 mm (1/2").

3.3.8.4. Caution: Under no circumstances cut in control joints after tiling has been installed. Install tiling up to movement joint and stop. If required, cut tiling and resume setting from opposite side of the joint. Before continuing, rake joint clean.

3.3.8.5. Install an approved compressible bead and specified sealant to caulk expansion and control joints. Follow sealant manufacturer's installation instructions or install preformed proprietary brand control joint profiles as specified in the Contract Documents.

3.3.9. Ceramic Tile:

3.3.9.1. Provide setting bed in accordance with manufacturer's printed instructions and as specified herein.

3.3.9.2. Prepare gypsum board and cement board surfaces, by applying a scratch coat of setting bed material.

3.3.9.3. Provide setting compound in 1 layer with notched trowel to provide a continuous 3 mm to 6 mm (1/8" to 1/4") bed, in accordance with tile manufacturer's written instructions.

3.3.9.4. Place tiles to achieve uniform:

3.3.9.4.1. shading.

3.3.9.4.2. colouring.

3.3.9.4.3. jointing.

3.3.9.5. Lay tiles in true lines, conforming to lines of building and arrange symmetrically in accordance with the Drawing layouts. Review layout and slopes with the Consultant prior to setting of tiles.

3.3.9.6. Lay out work to produce a symmetrical pattern with minimum amount of cutting. Ensure cut tile at room perimeter is not less than 1/2 full size.

3.3.9.7. Provide slopes to floor drains using levelling bed material.

3.3.9.8. Set wall tile in a true vertical plane with edges of tiles flush with each other.

3.3.9.9. Set floor tile flat and level, with uniform joints throughout, properly aligned. Provide uniform slopes to floor drains.

3.3.9.10. Neatly and closely fit tiles around pipes, accessories and other items occurring in floor and walls. Provide necessary cutting without marring tile.

3.3.9.11. Replace cracked, discoloured, chipped and damaged tile.

3.3.9.12. Align joints of floor, wall and base tiles.

3.3.10. Grouting:

3.3.10.1. Where tiling is installed with normal setting thin-set mortar, grout no sooner than 24 hours after installation.

3.3.10.2. Where tiling is installed with fast-setting mortar system, grout no sooner than 3 to 4 hours after installation.

3.3.10.3. Where tiling or stone tiling is installed with reactive epoxy mortars and adhesives, grout no sooner than 24 hours after installation.

3.3.10.4. Where tiling or stone tiling is installed with reactive polyurethane adhesive, grout no sooner than 24 hours after installation.

3.3.10.5. Install epoxy grouts in accordance with Product instructions and ANSI Al08.6.

3.3.10.6. Install unsanded cement grout in accordance with Product instructions and ANSI A108.10.

3.3.10.7. Install sanded cement grout in accordance with Product instructions and ANSI A108.10.

**3.4. SITE QUALITY CONTROL**

3.4.1. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

3.4.2. Manufacturer Services: Have manufacturer’s representative visit Site at commencement of tile Work to give proper direction and thereafter at regular interval to ensure proper workmanship.

**3.5. CLEANING**

3.5.1. Remove grout and mortar residue immediately while work progresses and before materials harden on tiling surface.

3.5.2. Clean tiling completely leaving no apparent cement laitance on the surface. Do not acid wash especially where pigmented grouts are specified.

3.5.3. Clean adjacent surfaces that have been soiled or otherwise marred, to completely remove evidence of materials causing same.

3.5.4. Upon completion, remove protective coverings and clean down finished work of this Section leaving it in a correct condition according to industry standards. Correct defective jointing and grouting and other non-conformities.

**3.6. PROTECTION**

3.6.1. Protect other parts of Work from spatters, stains or damage.

3.6.2. Remove and replace with new materials, sections of Work that have become stained, soiled, broken, chipped or otherwise damaged.

3.6.3. Protect finished Work from weather, freezing and complete water immersion for periods of at least 72 hours to 14 Days after completion of the Work depending on setting and grouting materials used. Follow Product instructions for requirements.

3.6.4. Walls: Protect walls from impact, vibration and hammering on adjacent and opposite walls for periods of at least 24 hours to 7 Days after installation depending on setting and grouting materials used. Follow Product instructions for requirements.

3.6.5. Floors: Protect floors from foot traffic for at least 4 hours to 48 hours after installation depending on the setting and grouting materials used. In all cases prohibit heavy commercial and equipment traffic for at least 48 hours to 7 Days depending on setting and grouting materials used. Follow product instructions for requirements.

3.6.6. Fabricated Faced Panels: Do not disturb or move panels for at least 7 Days or 72 hours with fast- setting mortar system and allow setting mortar to cure for at least 7 Days to 28 Days before shipping and installing panels on Site depending on setting and grouting materials used. Follow product instructions for requirements.

3.6.7. Since temperature and humidity conditions during and after installation affect final curing time of cement based and epoxy materials, allow for extended periods of cure and protection when ambient and/or substrate temperatures drop below 15 deg C (60 deg F) and/or when relative humidity is higher than 70%.

3.6.8. Protect finished Work from damage by the Work of other Sections and general abuse until Substantial Completion and acceptance.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide acoustic tile ceilings including but not limited to following:

1.2.1.1. ceiling suspension systems.

1.2.1.2. lay-in acoustic ceiling panels.

1.2.2. Related Sections: the following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Provision of suspended gypsum board ceilings: Section 09 21 16 - Gypsum Board.

1.2.2.2. Provision of electrical, communication and security fixtures: Division 26, Electrical, Division 27, Communications, Division 28, Electronic Safety and Security.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. STC: Sound Transmission Class.

1.3.1.2. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.3. cUL: Underwriters Laboratories Inc.; www.ul.com.

1.3.2. Reference Standards:

1.3.2.1. ASTM C635/C635M-07 - Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

1.3.2.2. ASTM C636/C636M-08 - Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels

1.3.2.3. CAN/CGSB-92.1-M89 - Sound Absorptive Prefabricated Acoustical Units

1.3.2.4. CAN/ULC-S101-07 - Standard Methods of Fire Endurance Tests of Building Construction and Materials

1.3.2.5. CAN/ULC-S102-07 - Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.3.2.6. CAN/ULC-S114-05 - Standard Method of Test for Determination of Non-Combustibility in Building Materials

1.3.2.7. CAN/ULC-S702-97 - Standard for Mineral Fibre Thermal Insulation for Buildings

**1.4. SUBMITTALS**

1.4.1. Product Data: Submit Product data on ceiling grid system, acoustic tile panels; clearly indicate specific items proposed for use if manufacturer's catalogues are submitted.

1.4.2. Shop Drawings: Submit Shop Drawings for the Work of this Section in accordance with Section 01 30 00 – Administrative Requirements. In addition to minimum requirements indicate following:

1.4.2.1. reflected plans of ceilings, joint pattern, position of suspension grids, methods of suspension and termination at walls, partitions, bulkheads, lighting fixtures and mechanical fixtures.

1.4.2.2. Submit reflected ceiling plans detailed in measurement system (e.g. imperial or metric) to match the Drawings.

1.4.3. Samples: Submit samples in accordance with Section 01 30 00 – Administrative Requirements. Submit following samples in sizes indicated:

1.4.3.1. Submit 300 mm (12") long samples of suspension system parts, including trim.

1.4.3.2. Submit 300 mm x 300 mm (12" x 12") samples of acoustic panels.

1.4.4. Certificates:

1.4.4.1. Submit independent test data and certificate confirming system meets or exceeds specified STC rating.

1.4.4.2. Submit independent test data and design tables for each type of insert to be employed on this Project for hanger supports.

**1.5. CLOSEOUT SUBMITTALS**

1.5.1. Operational and Maintenance Data: Submit maintenance instructions to the Owner for recommended cleaning materials and methods for panels and trim. Include precautions for use of and composition of cleaning materials detrimental to acoustic materials and trim.

1.5.2. Extra Stock Materials:

1.5.2.1. Supply in addition to quantities required for work, extra materials and Products to be stored by the Owner as follows:

1.7.1.1.1. Provide 50 new ceiling tiles - uncut

1.5.2.2. Deliver extra stock to the Owner as soon as permanent, locking storage facilities are available. Place extra stock in designated storage area where directed.

**1.6. MAINTENANCE MATERIAL SUBMITTALS**

1.6.1. Spare Parts: provide 50 new of each type of ceiling panel specified for the Owner's future maintenance use. Supply spare panels from same production run as installed panels.

**1.7. QUALITY ASSURANCE**

1.7.1. Qualifications:

1.7.1.1. Installers: Provide the Work of this Section executed by competent installers with a minimum of 5 years' experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

**1.8. DELIVERY, STORAGE AND HANDLING**

1.8.1. Delivery and Acceptance Requirements: Deliver materials in original packages, containers and bundles, bearing brand and manufacturer's name and ULC or cUL labels.

1.8.2. Storage and Handling Requirements:

1.8.2.1. Store materials in a covered area, off ground, on flat, smooth, dry surfaces. Protect from moisture. Remove damaged or deteriorated materials from Site.

1.8.2.2. Comply with ceiling panel manufacturer's recommendations regarding temperature and humidity conditions before, during and after ceiling installation.

**1.9. SITE CONDITIONS**

1.9.1. Ambient Conditions: Continuously maintain rooms or areas scheduled to receive acoustical treatment at not less than 21 deg C (70 deg F) and at occupancy humidity, at least 3 Days prior to installation and 3 Days after Work is completed. Schedule Work to eliminate risk of damage to these materials due to adverse environmental conditions in rooms or areas when and after Work is installed.

**1.10. WARRANTY**

1.10.1. Manufacturer Warranty: Warrant Work of this Section for period of 2 years against defects and/or deficiencies in accordance with Article A-6 of the Contract and GC 37 of the General Conditions of the –Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of the Consultant and at no expense to the Owner.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, Schedules and Specifications:

2.1.1.1. Armstrong World Industries Canada Ltd.; www.armstrong.com

2.1.1.2. Or Equivalent

**2.2. MATERIALS**

2.2.1. Description:

2.2.1.1. Regulatory Requirements:

2.2.1.1.1. Pre-Start Health and Safety Review: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.2.2. Performance/Design Criteria:

2.2.2.1. Design suspension system to support safely and without distortion, superimposed loads of:

2.2.2.1.1. Lighting fixtures.

2.2.2.1.2. Air supply diffusers, boots, fire alarm grilles and exhaust and return air grilles.

2.2.2.1.3. Power grid system, where indicated.

2.2.2.2. Design suspension system to support lighting fixtures according to Ontario Hydro

regulations and submit certification in accordance with Rule 30-302 (1).

2.2.2.3. Prepare panels for sprinkler head penetrations.

2.2.2.4. Coordinate installation and cooperate with mechanical and electrical Subcontractors, to accommodate mechanical and electrical items, or any other Work required to be incorporated in or coordinated with the ceiling system.

2.2.2.5. Whenever possible, acoustical ceiling tiles, steel suspension system and framing used in the work of this Section are to contain recycled content.

2.2.2.6. System Description: 0.85 NRC acoustical mineral fiber ceiling panel, square lay-in with t-bar grid system.

2.2.3. Acoustic Lay-in Panels: CAN/CGSB-92.1-M, acoustical units, prefabricated, with white painted textured and/or smooth face, qualified for use in fire rated ceiling assembly; ULC or cUL labelled and meeting following performance criteria as determined by CAN/ULC-S101 and as specified:

2.2.3.1. Flame Spread Rating: 25 or under.

2.2.3.2. Smoke Developed: 50 or under.

2.2.3.3. Fuel Contributed: 25 or under.

2.2.4. ACT-1: 2’ x4’ x 7/8”, “Calla Square Lay-in #2821”, in White, by Armstrong or Equivalent.

2.2.5. Exposed Grid System: “Prelude 15/16” Exposed Grid” by Armstrong World Industries or Equivalent, factory finished satin white on hot dipped galvanized cold rolled steel.

2.2.6. Basic Steel Material and Finish: Commercial quality cold rolled steel 0.455 mm (26 ga) minimum thickness, galvanized to zinc coating designation Z275 (G90). Ensure exposed surfaces of metal products are factory finished in non-yellowing, low sheen satin white enamel to Consultant’s acceptance to match whiteness in panels. Provide paint formulation of grid system to lighting fixture, speaker grille, sprinkler and diffuser manufacturers to ensure consistency of colour, sheen and texture of all exposed metal components in the ceiling assemblies. Provide slip-on trim mouldings or metal mouldings with baked enamel finish, as standard with grid manufacturer, to trim around light fixtures.

2.2.7. Accessories for Suspension System: Complete with splices, clips and perimeter moulding of manufacturer's standard and aluminum types to suit the applicable conditions unless special conditions and access areas are shown or specified. In high humidity areas provide galvanized suspension system.

2.2.8. Hangers: Minimum 3.2 mm diameter to support 68 kg. per hanger, 4.0 mm diameter to support maximum weight of 138 kg. per hanger and 4.8 mm diameter to support a maximum weight of 250 kg. per hanger, zinc coated annealed steel wire to zinc coating designation Z275 (G90), meeting "Heavy-duty" classification of ASTM C635/C635M,

2.2.9. Hanger anchoring devices, expansion type eyebolt, T14 Eyebolt as manufactured Ramset of HCA 14 by Hilti Canada Ltd., Red Head TW-1614 anchors by Philips Drill Company, Division of ITT Industries of Canada Ltd, or Equivalent.

2.2.10. Hanger Isolators: Vibron VSK-1 or Equivalent to support the ceiling dead load with safety factor of 5.

2.2.11. Carrying Channels: 1.2 mm galvanized steel, 38 m x 13 mm.

2.2.12. Wall Moulding Around Ceiling Perimeters: “Shadow Molding #7871” in White by Armstrong or Equivalent, hemmed with prefinished exposed flanges.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. Verification of Conditions: Verify the actual Site dimensions and location of adjacent materials prior to commencing Work. Notify the Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

### 3.2. INSTALLATION

3.2.1. Do not start installation until exterior glazing has been completed and exterior openings are closed in. Ensure wet Work is completed and dried out to a degree acceptable to panel manufacturer before installation is commenced. Maintain uniform temperatures of at least 21 deg C (72 deg F) for 72 hours prior to commencement of Work and maintain temperature until 72 hours after completion.

3.2.2. Install ceiling panels and metal suspension system in accordance with applicable requirements of ASTM C636/C636M and manufacturer's directions. Where manufacturer's directions are at variance with the Contract Documents, notify the Consultant before proceeding with Work.

3.2.3. Do not commence installation until all Work above suspended ceiling has been completed, reviewed and accepted by Consultant.

3.2.4. Install supporting inserts for hangers of suspended ceiling system into concrete slab above.

3.2.5. Install acoustic ceilings using tradesmen skilled in this class of Work, in accordance with manufacturer's instructions and as specified herein.

3.2.6. Neatly and symmetrically install suspended ceiling to true lines, evenly balanced to pattern indicated on the Drawings.

3.2.7. Centre ceiling system on room axis unless otherwise thereon or directed leaving equal border panels not less than 1/2 a full width.

3.2.8. Recessed items shall replace or be centered on acoustical panels, except where shown otherwise on the Drawings. Consult with mechanical and electrical Divisions to co-ordinate Work. Provide additional supports where required.

3.2.9. Space hangers for suspended ceilings to support grillage independent of walls, columns, pipes and ducts at maximum 1220 mm (4') centres along support grillage and not more than 150 mm (6") from ends. Provide additional hangers at light fixtures and diffusers.

3.2.10. Attach hangers to inserts in overhead concrete slab. Bend top of hangers at right angles, turn down and securely fasten. Turn bottom of hangers upwards and securely wrap 3 times.

3.2.11. Suspension to Metal Deck: Punch lower part of metal deck with special puncher at required distances. Put hanger wire through holes, turn down, make a loop and securely wrap 3 times.

3.2.12. Provide written confirmations to Divisions 21, 22, 23, 26, 27 and 28, when requested by the Consultant, that suspended ceiling is capable of supporting additional weight of mechanical and electrical fixtures specified in Divisions 21, 22, 23, 26, 27 and 28.

3.2.13. Run main tees at right angles to length of light fixtures.

3.2.14. Space main tees 1220 mm (4') oc in 1 direction and securely tie to hangers.

3.2.15. Space cross tees 610 mm (2') oc at right angles to main tees and properly lock at intersections.

3.2.16. Level suspended systems with a maximum tolerance of 3 mm (1/8") over 3.66 m (12').

3.2.17. Use longest practical lengths of tees, furring and running channels to minimize joints. Make joints square, tight, flush and reinforced with concealed splines. Assemble framework to form a rigid and interlocking system.

3.2.18. Design suspension system to accommodate movement caused by thermal expansion or contraction.

3.2.19. Design and space hangers and carrying members to support entire ceiling system, including lighting fixtures, diffusers and equipment openings in locations indicated on the Drawings.

3.2.20. Use edge moulding where ceiling abuts vertical surface.

3.2.21. Use corner moulding along external edges at ceiling steps.

3.2.22. Exposed Grid Lay-in Panel Ceilings:

3.2.22.1. Install direct-hung exposed grid lay-in acoustic panel ceilings where shown. Install main tees, cross tees and wall mouldings so bottom flanges are in flat, level plane at finish ceiling elevations. Arrange grid so opposite wall edge panels are of equal width but not less than 1/2 panel width and lay out and erect grid system to provide following panel pattern as shown on the Drawings.

3.2.22.2. Install exposed ceiling grid per ASTM C636/C636M, reviewed Shop Drawings and specified in this Section.

3.2.22.3. Erect main beams parallel to main wall and to each other; space uniformly at centres Stop ends of main beams 13 mm (1/2") from walls allowing for expansion. Supply main beams in as long lengths as possible to minimize number of joints in a run. Join lengths of main beams together at hangers only; use special splice pieces. In ceilings having recessed lighting fixtures, modify grid framing to provide main beams along and parallel to both long sides of lighting fixtures; at each 300 mm (12") wide fixture, provide an additional main beam along the long side of fixture. At other items recessed in ceiling and designed to be framed by main beams, provide additional main beams necessary. Rest ends of main beams on horizontal leg of wall mouldings.

3.2.22.4. Support main beams with hangers along each run, spaced at not more than 1220 mm (48") centres; except in areas of steel framing, provide hangers at each intersection of main beam and framing. If ductwork or equipment located in ceiling plenum area interferes with hanger spacing, provide a trapeze or other arrangement reviewed by the Consultant to support main beams at proper spacing. Do not secure hangers to metal roof deck, ductwork, conduit, piping, equipment or support system for any of these. Provide an additional hanger at each corner of each opening to receive a recessed lighting fixture and each opening that has been framed by main beam members. Provide additional hangers at each diffuser, grille and other points of extra loading. Secure hangers to main beams to develop full strength of hangers and per manufacturer's published directions. Secure hangers to construction above per ASTM C636/C636M and following requirements:

3.2.22.4.1. Exposed Concrete Slab: Use anchors, cast-in hanger wires or inserts, specifically designed for hanger use.

3.2.22.4.2. Steel Beams: Use beam clips.

3.2.22.4.3. Steel Joists: Wrap hanger wire around lower chord member.

3.2.22.5. Install primary cross tees at right angles to main beam tees and space uniformly at centres. Join ends of cross tees to web of main beams with a positive interlock; except at light fixtures, secure members together with concealed steel clips and bolts. Install tees to produce fine-line joints between flanges of abutting members.

3.2.22.6. Install secondary cross tees at right angles to primary tees and space uniformly at centres. and secure in a manner similar to primary tees.

3.2.22.7. At locations where ceilings abut walls, columns and other vertical surfaces, install continuous wall moulding to trim ceiling edges. Install moulding with bottom horizontal leg at elevation required to support acoustic panel and to be flush with bottom flange of grid members, and with vertical leg concealed. Bolt mouldings to supporting construction at 610mm (24") on centres and within 150 mm (6") of end of each moulding piece. Provide tight, inconspicuous butt joints in moulding if several pieces are required in any 1 run.

**3.3. SITE QUALITY CONTROL**

3.3.1. Site Tests and Inspections: After interior finishing Work has been substantially completed, or when directed by the Consultant, inspect acoustical treatment Work.

3.3.2. Non-Conforming Work: Replace broken, chipped or damaged Work, reset loose units or units out of place and touch up marred surfaces with matching paint.

**3.4. CLEANING**

3.4.1. Upon completion of project, acoustical treatment finished surfaces shall be clean and free from dirt and other markings and in good condition acceptable to the Consultant.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide resilient flooring including but not limited to following:

1.2.1.1. underlayment.

1.2.1.2. rubber tile.

1.2.1.3. resilient base.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. MSDS: Material Safety Data Sheets.

1.3.1.2. PVC: Polyvinyl Chloride.

1.3.1.3. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.4. VOC: Volatile Organic Compound.

1.3.2. Reference Standards:

1.3.2.1. ASTM F1066-04 - Standard Specification for Vinyl Composition Floor Tile

1.3.2.2. ASTM F1344-04 - Standard Specification for Rubber Floor Tile

1.3.2.3. ASTM F1861-08 - Standard Specification for Resilient Wall Base

1.3.2.4. ASTM F1869-04 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

### 1.4. SUBMITTALS

1.4.1. Shop Drawings: Submit Shop Drawings for Work of this Section in accordance with Section 01 30 00.

1.4.2. Samples: Submit samples in accordance with Section 01 30 00. Submit following samples in sizes indicated:

1.4.2.1. rubber tile 900 mm (36") square.

1.4.2.2. resilient base 300 mm (12") long.

### 1.5. CLOSEOUT SUBMITTALS

1.5.1. Operational and Maintenance Data: Submit 3 copies of Product maintenance manual to the Consultant prior Substantial Completion of the Work. Ensure manual contains specific maintenance recommendations and gives specific warning of any maintenance practice or materials which may damage or disfigure resilient flooring and bases.

1.5.1. Extra Stock Materials:

1.5.1.1. Supply in addition to quantities required for Work, extra materials and Products to be stored by the Owner as follows:

1.6.1.1.1. Provide 10 extra tiles

1.5.1.2. Deliver extra stock to the Owner as soon as permanent, locking storage facilities are available. Place extra stock in designated storage area where directed by Owner.

## 1.6. MAINTENANCE MATERIAL SUBMITTALS

1.6.1. Extra Stock Materials: Leave 5% of total installation including any partially used cases of each colour of resilient tile installed, for Owner's future use. Label cartons as to contents and indicate areas where tiles were used.

1.6.1.1. Supply 2440 mm (96”) of each resilient accessories of each material and colour specified.

1.6.1.2. Supply 5% of all types and finishes of transition strips specified in the Contract Documents.

## 1.7. QUALITY ASSURANCE

1.7.1. Qualifications:

1.7.1.1. Installers: Provide the Work of this Section executed by competent installers with a minimum of 5 years’ experience in application of Products, systems and assemblies specified and with approval and training of Product manufacturers.

## 1.8. DELIVERY, STORAGE AND HANDLING

1.8.1. Delivery and Acceptance Requirements: Deliver materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact.

1.8.2. Storage and Handling Requirements:

1.8.2.1. Store materials undamaged in original wrappings or containers, with manufacturer's labels and seals intact. Store materials in a warm, dry area.

1.8.2.2. Prevent damage to materials during handling and storage. Stack material not over 2 cartons in height, nor in excess of allowable floor loading. Store materials on smooth surfaces only, in an area designated by the Consultant.

## 1.9. SITE CONDITIONS

1.9.1. Ambient Conditions:

1.9.1.1. Provide each flooring Product in accordance with manufacturer's recommended tolerances for:

1.9.1.1.1. substrate moisture content.

1.9.1.1.2. temperature and ventilation.

1.9.1.2. Do not provide flooring under ambient and surface temperatures less than 20 deg C (68 deg F) in any instance for 48 hours before, during and 7 Days after installation.

## 1.10. WARRANTY

1.10.1. Provide five (5) year warranty against manufacturing defects, excessive wear, discoloration, delamination, wrinkling, failure of adhesive, opening of seams, splitting or blistering commencing on date of Substantial Performance of Work.

1.10.2. Warranty shall include the removal and replacement of ay defective areas, disposal of defective material including moving and replacing of equipment, furniture and other such items to allow installation of replacement material.

# PART 2 - PRODUCTS

## 2.1. MANUFACTURERS

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, schedules and Specifications:

2.1.1.1. Johnsonite; www.johnsonite.com

2.1.1.2. Or Equivalent

## 2.2. MATERIALS

2.2.1. Description:

2.2.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1,Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.2.2. Provide Products free from blisters, cracks, chipped edges and corners, embedded foreign matter or other defects.

2.2.3. All Materials under Work of this section, including but not limited to, primers, and adhesives are to have low VOC content limits.

2.2.4. Concrete Moisture Emission Reducer: Provide “Flextech 300” by Flextile Ltd. or Equivalent..

2.2.5. Underlayment: Latex/cement/sand patching compound compatible with resilient flooring and associated adhesives; “Latax Filler, S-194" by Armstrong World Industries Canada Ltd., Ultra/Plan by Mapei Canada Inc., “Flextile Patch” by Flextile Ltd. or if acceptable to Product manufacturer Sureflo, hydraulic cement based self-levelling floor underlayment manufactured by Gemite Products Inc. or Equivalent.

2.2.6.. Resilient Sheet Flooring (RS-1):

2.2.6.1. ASTM F1913, non-backed, non-layered, homogenous vinyl composition composed of polyvinyl chloride resin, stabilizers, fillers and pigments for use on approved slab on grade and suspended floors.

2.2.6.2. To be Tarket Style: PLWD Latitude Wood, Colour: 4692 Brined.( note: tile area to be in kitchen Areas. Refer to plans.)

2.2.7. Generally vulcanized PVC-free rubber base is better quality than vinyl as rubber doesn’t shrink over time whereas vinyl has the potential to shrink.

2.2.8. Resilient Base (RB): 3 mm (1/8") thick x 100 mm (4") high in accordance with ASTM F1861, Type TS, Group 1, Style B, PVC-free vulcanized rubber, in coil lengths, colour selected from manufacturer's standard range. Provide “Rubber Wall Base” by Johnsonite or Equivalent.

2.2.8.1. Flooring material to extend 102 mm (4”) onto wall surface.

2.2.9. Reducing Strips (RS): Vinyl, thickness to suit adjacent flooring; Johnsonite, American Biltrite (Canada) Ltd., Flexco or Roppe Corporation, USA or Equivalent.

2.2.10. Primers and Adhesives: Waterproof, as required for surfaces involved as recommended and supplied by the tile manufacturer used.

## PART 3 - EXECUTION

### 3.1. EXAMINATION

3.1.1. Verification of Conditions: Verify the actual Site dimensions and location of adjacent materials prior to commencing Work. Notify the Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Preinstallation Testing:

3.1.2.1. Perform calcium chloride test through an independent testing organization in accordance with requirements of ASTM F1869 immediately prior to installation of resilient flooring for moisture on concrete floors around perimeter of areas, at columns and where moisture may be anticipated. Conduct 3 tests for first 93 $m^2$ (1000 sq ft) and 1 additional test for every 93 $m^2$ (1000 sq ft) of flooring. Ensure moisture emission from concrete floor does not exceed 1.36 kg/93 $m^2$ (3 lbs/1000 sq ft) in 24 hours unless otherwise stated in flooring Product instructions and limitations. Do not proceed with installation until moisture problem has been corrected. Provide results to the Consultant prior to commencement of installation.

3.1.2.2. When concrete moisture emission is between 1.36 kg/93 $m^2$ (3 lbs/1000 sq ft) and 4.53 kg/93 $m^2$ (10 lbs/1000 sq ft) in 24 hours use concrete moisture emission reducer.

3.1.2.3. Conduct pH test through an independent testing organization to ensure alkali salt residue is within the limitation acceptable to manufacturer and to avoid adhesive failure, discoloration, shrinkage and softening of the floor covering. If the pH results are higher than 10, report to the Consultant or the Owner for investigation and remedial. Also refer to manufacturer for ways to neutralize floor prior to beginning of installation. Neutralize by sanding, vacuuming and/or by water plus mild sulfuric or sulfamic acid application as recommended by manufacturer. Retest to assure pH has been neutralized.

3.1.3. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

### 3.2. PREPARATION

3.2.1. Surface Preparation:

3.2.1.1. Clean resilient flooring substrates free of loose and adhered material perfectly clean and in accordance with the resilient flooring manufacturer's instructions.

3.2.1.2. Perform bond test over floors where paint, varnish and other foreign agents are removed.

3.2.1.3. Ensure concrete substrates are dry after performing tests as specified herein before using methods recommended by resilient flooring and adhesive manufacturers and that they exhibit no alkalinity, carbonization, dusting or scaling.

3.2.1.4. Remove subfloor ridges and bumps to flush with adjacent subfloor.

3.2.1.5. Stripping:

3.2.1.5.1. Remove and dispose of existing resilient flooring. Remove existing adhesives and prepare substrate as recommended by resilient flooring manufacturer.

3.2.1.5.2. Test existing substrate for soundness and remove unsound substrates.

3.2.1.6. Underlayment:

3.2.1.6.1. Fill depressions, dished areas, low spots, voids, gaps, cracks, joints, holes and other substrate defects with underlayment, flat, even and flush with adjacent substrate.

3.2.1.6.2. Floor fills, toppings and underlayment shall have minimum compressive strength of 24 MPa (3500 psi). Do not install underlayment, leveler, patching and skim coat over expansion joints.

3.2.1.6.3. Provide underlayment to achieve a flat substrate to within the following tolerances:

3.2.1.6.3.1. 3 mm (1/8") total maximum deviation +/- along a 3000 mm (10') straight edge applied omni-directionally over entire floor area.

3.2.1.6.4. Provide a flat, smooth 610 mm (24") wide underlayment strip at the junction of resilient flooring with other finish flooring materials for a flush transition at the meeting edge. Feather strip edges to conceal its perimeter.

## 3.3. INSTALLATION

3.3.1. Scribe resilient flooring materials accurately around floor outlets, pipes, drains and projections through the floor.

3.3.2. Scribe non-coved resilient flooring materials accurately around their perimeters including at walls, columns and kickspaces of architectural woodwork.

3.3.3. Locate junctions of dissimilar flooring between rooms (i.e. same material but different colour, or different material) at door opening centrelines.

3.3.4. Provide resilient flooring flush with floor plates, cleanout covers and other fitments in the floor.

3.3.5. Do not provide resilient flooring beneath permanently concealed portions of work of Section 06 40 00 unless indicated otherwise.

3.3.6. Do not install flooring across expansion joints. Coordinate expansion joint covers for use with resilient flooring.

3.3.7. Where resilient flooring terminates at exterior doors with thresholds or transition trim, feather flooring as required to achieve maximum allowable distance of 13 mm (1/2") between flooring and top of threshold or transition trim. Extend resilient flooring a minimum of 13 mm (1/2") under threshold and apply sealant to perimeter of threshold.

3.3.8. Rubber Tile:

3.3.8.1. Spread primer evenly over floor surfaces. Permit primer to dry. Apply adhesive evenly over floor surfaces. Allow adhesive to become tacky before laying tile.

3.3.8.2. Lay tile with joints straight, in true plane, butted to moderate contact, symmetrical with and parallel to axes of rooms to provide equal size perimeter tile on each side. Distribute variations in shade or pattern to obtain a uniform effect. Abrupt variations will not be acceptable. Lay in pattern as directed by the Consultant.

3.3.8.3. Roll after laying with a polished, clean roller weighing at least 45 kg (100 lbs).

3.3.8.4. Prevent traffic over newly laid rubber tile floor for 48 hours after installation.

3.3.9. Resilient Base:

3.3.9.1. Provide resilient base to substrate surfaces in accordance with the manufacturer's recommendations.

3.3.9.2. Apply adhesive evenly and continuously for full base adhesion and contact. Do not apply adhesive in a manner which promotes induced waviness in resilient base.

3.3.9.3. Provide base in longest lengths possible with top and bottom edges installed straight and true. Provide preformed inside and outside corners.

3.3.9.4. Provide resilient bases to walls, partitions, columns and items of architectural woodwork.

3.3.10. Reducing Strips: Protect exposed edges of resilient flooring, where finished and unfinished area adjoin, by means of reducing strips butting to and flush with finished surface of floor covering material.

3.3.11. Promptly remove and replace flooring showing bumps from underlying dirt, discolouration, excessive wear, shrinkage or adhesion failure. Remove and replace base showing shrinkage or adhesion failure.

## 3.4. CLEANING

3.4.1. Remove adhesive from surface of flooring as Work progresses.

3.4.2. After vinyl composite tile floors have been cleaned and dried, apply 1 coat of wax of a type acceptable to Owner and polish to a hard surface with mechanical buffers. Do not wax sheet flooring.

3.4.3. Do not wash newly laid floor covering for minimum 7 Days after installation to allow adhesive to set and dry.

## 3.5. PROTECTION

3.5.1. Protect this Work and Work of other trades at all times.

3.5.2. Protect newly laid flooring from construction traffic for a period of 7 Days to allow flooring to bond firmly. Then thoroughly clean surfaces in accordance to manufacturer's directions using cleaners as recommended by material manufacturer.

3.5.3. Provide and maintain necessary protection of finished resilient flooring and bases. Replace damaged resilient flooring and bases with new materials without cost to the Owner.

**END OF SECTION**

it

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide carpet tile including but not limited to following:

1.2.1.1. carpet tile.

1.2.1.2. carpet base.

1.2.1.3. resilient accessories.

1.2.1.4. metal edge strips.

1.2.2. Related Sections: the following description of Work is included for reference only and shall not be presumed complete:

1.2.2.1. Supply of resilient base: Section 09 65 00 - Resilient Flooring.

### 1.3. REFERENCES

1.3.1. Abbreviations and Acronyms:

1.3.1.1. CRI: Carpet and Rug Institute; www.carpet-rug.com.

1.3.1.2. MSDS: Material Safety Data Sheets.

1.3.1.3. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.4. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.5. VOC: Volatile Organic Compound.

1.3.2. Reference Standards:

| | | |
|---|---|---|
| 1.3.2.1. | CAN/CGSB-4.129-93 | - Carpet for Commercial Use |
| 1.3.2.2. | CAN/ULC-S101-07 | - Standard Methods of Fire Endurance Tests of Building Construction and Materials |
| 1.3.2.3. | CAN/ULC-S102.2-07 | - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies |

### 1.4. SUBMITTALS

1.4.1. Shop Drawings: Submit carpet tile layout Drawings in accordance with Section 01 30 00 – Administrative Requirements. Do not install carpet tile until layout Drawings have been approved.

1.4.2. Samples:

1.4.2.1. Prior to ordering carpet tile, submit samples of carpet tile and accessories to Consultant for approval, minimum 450 mm x 450 mm (18" x 18"), for each type and colour of carpet to be used.

1.4.2.2. The Consultant may take random samples of carpet tiles as installation progresses

for comparison with approved samples. If, in opinion of the Consultant, such samples fail to meet standard of approved samples, remove tiles and replace with approved tiles as required at no cost to the Owner.

1.4.3. Operational and Test Reports: Submit test reports to show Product meets Specifications.

**1.5. CLOSEOUT SUBMITTALS**

1.5.1. Operational and Maintenance Data: Submit maintenance instructions in triplicate for insertion in maintenance manuals in accordance with Section 01 30 00 – Administrative Requirements. Ensure instructions give specific warning of maintenance or cleaning practices or materials which may damage carpeting.

1.5.1. Extra Stock Materials:

1.5.1.1. Supply in addition to quantities required for Work, extra materials and Products to be stored by the Owner as follows:

1.5.1.1.1. Provide 20 extra boxes - unused.

1.5.1.2. Deliver extra stock to the Owner as soon as permanent, locking storage facilities are available. Place extra stock in designated storage area where directed by Owner.

**1.6. MAINTENANCE MATERIAL SUBMITTAL**

1.6.1. Extra Stock Materials: Deliver to the Consultant and store where directed 5% of each colours selected suitably labelled in boxes. Identify Product name, colour, quantity and locations where used in the Project (Room Name and Nos).

**1.7. QUALITY ASSURANCE**

1.7.1. Qualifications:

1.7.2. Installers: Provide Work of this Section executed by competent installers with a minimum of 5 years' experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.7.3. Mock-Ups: In area designated by the Consultant, provide sample installation of each colour of at least 9 $m^2$ (100 sq ft) showing colour matching. Make changes as required until approved by Consultant. When approved, sample area represents minimum acceptable standard for work. Remove sample installation when directed unless sample area can be satisfactorily incorporated into Work.

**1.8. DELIVERY, STORAGE AND HANDLING**

1.8.1. Delivery and Acceptance Requirements: Deliver cartons of carpet tile to Site clearly tagged to show installation location.

1.8.2. Storage and Handling Requirements:

1.8.2.1. Store adhesive, carpet tapes and similar items in heated area maintained at minimum temperature of 10 deg C (50 deg F) or at such temperature as recommended by Product manufacturer.

1.8.2.2. Comply with adhesive and carpet tile manufacturer's directions for use of adhesive. Observe open time limits for adhesives and place lids on open cans when not being used. Under no circumstances contaminate or thin adhesives with water or solvents, unless specifically directed by manufacturer in writing.

**1.9. SITE CONDITIONS**

1.9.1. Ambient Conditions: Provide ventilation system in area to be carpeted to ensure adequate (min 1 air change each hour) extraction of VOC's or other contaminants. In occupied buildings, existing ventilation system may not be used for this purpose.

**1.10. WARRANTY**

1.10.1. Manufacturer Warranty: Warrant Work of this Section for a period of 2 years against defects and/or deficiencies in accordance with the General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of the Consultant and at no expense to the Owner. Defects include but are not limited to; buckling, opening of seams, bond failure, extensive colour fading and loss of more than 10% of pile fibre in any area.

**PART 2 - PRODUCTS**

**2.1. MATERIALS**

2.1.1. Description:

2.1.2. Carpet Tile: Provide tiles uniform in colour and texture, supplied from same dye batch, conforming to CAN/ULC-S101 and CAN/CGSB-4.129, having flame spread rating and smoke developed classification tested in accordance with CAN/ULC-S102.2 for floor surface covering and certified by ULC or WH and having following minimum properties and characteristics:

2.1.2.1. Fibre: 100% nylon fibre, antistatic (Dupont DSDN) (Dupont Antron Lumina) (and Dupont Antron Legacy) (BASF Zeftron Nylon).

2.1.2.2. Yarn Construction: 2 or 3-ply, Bulked Continuous Filament (“BCF’) construction.

2.1.2.3. Method of Colouration: Space and/or solution dyed (min 50% solution dyed).

2.1.2.4. Face Weight: min 814 g/m$^2$ (24 oz) or 882 g/m$^2$ (26 oz).

2.1.2.5. Total Mass (Weight): min 4610 g/g/m$^2$ (136 oz/sq yd) or 4984 g/g/m$^2$ (147 oz/sq yd).

2.1.2.6. Carpet Construction: (level) (tip sheared) (patterned) (tip sheared patterned) (tufted patterned) (tufted tip sheared patterned) loop.

2.1.2.7. Gauge: min 1/10" gauge.

2.1.2.8. Stitch Count: 10 per inch.

2.1.2.9. Density: min 10.5 kilotex.

2.1.2.10. Tile Size: min 450 x 450 mm (18 x 18").

2.1.2.11. Carpet Backing: PVC, urethane, bitumen.

2.1.2.12. Colour: Custom colour selections may be made by the Consultant at no extra cost to the Owner.

2.1.2.13. Static Control: < 2 kilovolts at 20% relative humidity and at 21 deg C (70 deg F).

2.1.2.14. Adhesive: Non-toxic, providing total VOC emission not exceeding 0.5 mg/m$^2$ per hour. Vinyl-compatible, quick release adhesive recommended by carpet manufacturer.

2.1.3. CP-1 Provide 18” x 18” “Custom Applause #03064” colour shall be “#86353 Custom by Tandus or Equivalent. Installation method to be monolithic.(note: location of CP-1 is in the office area as distinct from the public corridor / open area.)

2.1.4. CP-2 Provide 18” x 18” Tarket Light Shift / Colour: Shadow Zone.

2.1.4. Tools: Paint roller and tray, seam roller, steel measuring tape, chalk line (use white chalk) and carpet knife.

2.1.5. Thresholds: Aluminum, screw-down type as recommended by carpet manufacturer, colours selected by the Consultant from manufacturers' standard range.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

3.1.1. Verification of Conditions: Verify the actual Site dimensions and location of adjacent materials prior to commencing Work. Notify the Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of Work implies acceptance of previously completed work.

**3.2. PREPARATION**

3.2.1. Surface Preparation:

3.2.1.1. Ensure floor is clean and free of cracks and protrusions. Remove dirt, paint, debris, grease, oil and loose toppings or finishes.

3.2.1.2. Fill gaps or cracks more than 2 mm (1/16") wide and minor depressions with Latex compound. Grind protrusions smooth.

3.2.1.3. Vacuum clean floors prior to installation.

**3.3. INSTALLATION**

3.3.1. Commencement of Work: Refer to the Drawings and Room Finish Schedule for areas where carpet is to be installed. Install the Work of this Section after all Subcontractors have completed their Work and just prior to completion of the Work, unless otherwise instructed by the Consultant.

3.3.2. Measuring: Determine centre of room using standard tile-laying methods. Resulting quadrants should meet at right angles. Offsetting centre chalk line may become necessary to insure that perimeter tiles will be at least half-size or larger.

3.3.3. Pile Direction: Install carpet tiles to achieve monolithic appearance with arrows on back pointing in same direction.

3.3.4. Laying Out: To prevent movement of tiles during initial stages and to insure straight lines and square corners, create an anchor line by laying strips of adhesive alongside each centre chalk line. Lay tiles accurately and firmly along centre lines in selected quadrant. Additional tiles within quadrant should be installed by "stair-step" technique. In some cases, due to partitions, "starting" point is centre of the room. Carpet tiles are to be installed up to partitions, not under partition.

3.3.5. Checking Tightness: Measure areas to insure tight installation. Measure over 11 tiles to attain cumulative space "gained" over 10 joints. The gain must not be greater than 6 mm (1/4"). Utilize this method in continual check of installation.

3.3.6. Alignment: As tiles are butted against each other, frequently check at joints with your fingers to see that they are properly aligned. Do not install tiles that seem out of true more than 1.5 mm (1/32").

3.3.7. Control Grid: To prevent tiles from shifting in larger areas, about every 6 m (20') to 9 m (30') both in length and width directions, anchor row of tiles. Use texturing paint roller to apply narrow strip of

adhesive under "control" tiles.

3.3.8. Joints: Take care when butting 1 tile against another. Avoid too much pressure on joining tiles, as it will cause tiles to "peak" or "buckle". Face pile should be brushed back and tile "tipped" into place, to avoid any pile being caught in joint.

3.3.9. Perimeter Tiles: Adhere to floor unless noted on the Drawings. Lay last whole tile closest to wall and perimeter cuts on adhesive. Perimeter cuts must then be accurately cut and tightly fitted against vertical fixed surface such as wall. In event of an open perimeter design, a fixed reducer strip anchored to floor is necessary to lock tile area in place.

3.3.10. Cutting: Cuts are best made from back, whether using template for fitting around columns or at room perimeter. Activation of electrical floor outlets will follow carpet installation. Affected tiles must be surface-marked with tape.

3.3.11. Trimming and Gluing: Whenever tile is cut or trimmed, it must always be adhered to floor.

**3.4. SITE QUALITY CONTROL**

3.4.1. Non-Conforming Work: Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of the Consultant at no cost to the Owner.

**3.5. CLEANING**

3.5.1. Immediately following installation, inspection and approval of Work by the Consultant, vacuum clean carpet using pile lifter and remove debris.

3.5.2. Waste Management: Comply with Government of Ontario Waste Management requirements. Ensure surplus tile and waste is accumulated daily and at completion of Work remove such materials to suitable recycling facility. Where Work of Contract is for replacement of existing carpet, ship removed carpet to suitable recycling facilities.

**3.6. PROTECTION**

3.6.1. Restriction of Traffic: Restrict traffic during installation. Upon completion of installation, do not allow traffic or movement of furniture onto carpet surface until installed area has been anchored at perimeter.

3.6.2. Cover entire carpeted area with plastic covering held in place by masking tape at seams and stay- tacking around perimeter, if required by the Consultant.

3.6.3. Do not remove carpet protection until directed by the Consultant.

3.6.4. Hand over work to the Owner free of blemishes and in perfect condition.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including Division 1 requirements and documents referred to in this Section.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide painting including but not limited to following:

1.2.1.1. surface preparation of substrate: abrasive blasting, cleaning and preparation of surfaces for application of paint systems.

1.2.1.2. interior priming and painting of:

1.2.1.3. exterior or interior sealing, staining and coating of:

1.2.1.3.1. gypsum board ceiling.

1.2.1.3.2. Doors and Frames

1.2.1.4. provision of materials, labour and equipment required to complete painting Work and ancillary Work described and implied herein to full intent of the Drawings and Schedules.

1.2.1.5. waste management and disposal of paint, stain and wood preservatives and other related hazardous materials.

1.2.2. Section Excludes:

1.2.2.1. Painting of:

1.2.2.1.1. pre-finished metal siding, fascia and soffit, coping cap flashing and similar components. Refer to dedicated Specification Sections for special finishes and their effects on the Work of this Section.

1.2.2.1.2. chrome, stainless steel, vinyl, plastic laminate and aluminum surfaces throughout unless specified otherwise on the Drawings.

1.2.2.1.3. internal surfaces of steel tanks and stacks.

1.2.2.1.4. sprayed fire-resistive materials.

1.2.2.1.5. wallcoverings.

1.2.2.1.6. primed and finish painted equipment furnished by manufacturer unless required to be field painted in 1 common corporate colour as identified in finish schedule.

1.2.3. Related Sections: Following description of Work is included for reference only and shall not be presumed complete:

1.2.3.1. Wood preservative or fire retardant treatment for rough carpentry: Section 06 10 00 - Rough Carpentry.

1.2.3.2. Priming and/or back painting of wood: Section 06 10 00 - Rough Carpentry.

1.2.3.3. Coordination of paint for application on suspended acoustic ceilings: Section 09 51 00 - Acoustic Tile Ceilings.

1.2.3.4. Instructions on painting, stenciling and banding of mechanical and electrical Work: Division 22, Plumbing, Division 23, Heating, Ventilating and Air Conditioning and Division 26, Electrical.

1.2.3.5. Factory assembled pre-finished roof mounted air handling and air conditioning equipment: Division 23, Heating, Ventilating and Air Conditioning.

1.2.3.6. Prime and finish coats applied by other Sections. Read carefully other Sections of Specifications to determine extent thereof.

**1.3. REFERENCES**

1.3.1. Abbreviations and Acronyms:

1.3.1.1. DFT: Dry Film Thickness.

1.3.1.2. MPI: The Master Painters Institute; www.mpi.net.

1.3.1.3. MSDS: Material Safety Data Sheets.

1.3.1.4. OPCA: Ontario Painting Contractors Association; www.ontpca.org.

1.3.1.5. SCAQMD: South Coast Air Quality Management District; www.aqmd.gov.

1.3.1.6. SRA: Slip Resistant Additive

1.3.1.7. SSPC: The Society for Protective Coatings (formerly known as Steel Structures Painting Council); www.sspc.org.

1.3.1.8. TSP: Tri-sodium Phosphate.

1.3.1.9. ULC: Underwriters' Laboratories of Canada; www.ulc.ca.

1.3.1.10. VOC: Volatile Organic Compound.

1.3.2. Definitions:

1.3.2.1. Exposed: Visible in completed Work. In case of closets, cabinets and drawers, it includes their interiors. Exposed surfaces in underground parking areas are considered "Exterior" for purpose of this Contract. Exposed surfaces in aboveground parking areas are considered "Interior" for the purpose of this Contract.

1.3.2.2. Hazardous Waste: Construction and demolition materials that are regulated for disposal by local, city, county, province or federal Authorities Having Jurisdiction.

1.3.2.3. Gloss or Sheen: Capacity of a finish on a surface to reflect light at specific angles as tested in accordance with ASTM D523. Following are gloss or sheen types as defined by MPI:

1.3.2.3.1. Flat (G1): Lusterless or matt finish.

1.3.2.3.2. Velvet (G2): High side flat sheen finish.

1.3.2.3.3. Eggshell (G3): Low sheen finish.

1.3.2.3.4. Satin (G4): Low-medium sheen finish.

1.3.2.3.5. Semi-Gloss (G5): Medium sheen finish.

1.3.2.3.6. Full Gloss (G6): High sheen finish.

1.3.2.3.7. High Gloss (G7): Ultra high sheen finish.

1.3.2.4. Painting: In this Section refers to application of various types of paint, stain, varnishes and lacquers, etc.

1.3.2.5. Surface Preparation: Cleaning or treating of surface to be painted to ensure best possible bond between surface and painting to be applied to surface; remove surface contaminants that will affect performance of painting, without limitations such as oil, grease, salts, dust, dirt, rust, rust scale, mill scale and old coatings where applicable; remove surface imperfections without limitation including but not limited to such as weld spatter, sharp edges, burrs, slivers, laminations, pits, porosities and crevices; prepare surfaces to provide anchor profile or surface profile which improve mechanical bonding of coating to prepared surface by increasing surface area.

1.3.3. Reference Standards:

| | | |
|---|---|---|
| 1.3.3.1. | ASTM D523-89(08) | - Standard Test Method for Specular Gloss |
| 1.3.3.2. | CAN/CGSB-1.500-75 | - Methods of Test of Toxic Trace Elements in Protective Coatings |
| 1.3.3.3. | CAN/CGSB-85.100-93 | - Painting |
| 1.3.3.4. | MPI Painting Manual-07 | - The Master Painters Institute – Architectural Painting Specification Manual by PDCA |
| 1.3.3.5. | MPI Approved Products List-09 | – The Master Painters Institute – Approved Products List (Includes United States, Canada and International Editions), 2009 |
| 1.3.3.6. | SSPC-05 | - Systems and Specifications - Steel Structures Painting Manual, Volume 1 & 2 |

## 1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Pre-installation Meetings:

1.4.1.1. Review the Drawings, details and Schedules, determine intent, extent, materials, types of surfaces, locations and be fully cognizant of intent of Work. Review Product literature, MSDS, related safety data, proper disposal requirements and inform those involved in Work of this Section.

1.4.1.2. Review Specifications and Drawings for the Work of other Sections regarding provisions for prime and finish coats and ensure compatibility with each other and substrate prior to application.

1.4.1.3. Prior to start of Work, arrange for the project Site meeting of parties associated with the Work of this Section. Presided over by the Contractor, include the Consultant, Subcontractor, manufacturer's representative, any Subcontractors whose Work will be painted (including mechanical and electrical Subcontractors) or whose Work is adjacent to, or whose Work or schedule may be affected by the Work of this Section.

1.4.1.4. Review Specification for the Work included under this Section and determine complete understanding of requirements and responsibilities relative to Work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, the project staffing, restrictions on areas requiring painting and other matters affecting

construction, to permit compliance with intent of this Section.

1.4.2. Scheduling:

1.4.2.1. Painting Schedule: Provide within 30 Days of award of the Contract, together with proposed manufacturer of materials to be used, a Schedule comprised of locations, types of surfaces, types of painting materials (and manufacturer's names) and number of coats to be used.

1.4.2.2. Schedule painting operations to prevent disruption of and by other trades. Ensure painting is completed for locations requiring application of finishes by other trades in a timely fashion to prevent delays.

1.4.2.3. Schedule painting operation in occupied facilities to prevent disruption of occupants in and about the Project. Carry out painting during working hours in accordance with the Owner's operation requirements. Schedule Work such that painted surfaces will have dried before occupants are affected. Obtain written authorization from the Consultant or the Owner for changes in Work schedule.

**1.5. SUBMITTALS**

1.5.1. Product Data:

1.5.1.1. Submit Product data conforming to Section 01 70 00 – Execution and Closeout Requirements and submit a Schedule of Finishes listing manufacturer's Product name, colour, textures, MSDS and test reports requested for each paint system. Submit test reports for odourless, low or zero VOC Products when specified.

1.5.1.2. Painting Subcontractor shall receive written confirmation of specific surface preparation procedures and primers used for fabricated steel items from fabricator/supplier to ensure appropriate and manufacturer compatible finish coat materials prior to commencement of painting.

1.5.1.3. Painting Subcontractor shall receive written Product data regarding chemical composition of coatings or treatments applied by others (pressure preservatives, admixtures and sealers etc.) and their paintability.

1.5.1.4. Submit Product data for concrete and concrete block primers.

1.5.2. Samples: Submit samples 30 Days before materials are required in accordance with Section 01 30 00 - Administrative Requirements. Submit following samples in sizes indicated:

1.5.2.1. 2 copies of brushouts minimum 200 mm x 250 mm (8" x 10") of each finish including colour, sheen and texture required at least 30 Days prior to commencement of application. Identify each sample with job, finish, colour name, number, sheen and gloss values, substrate to be applied to, date and name of Subcontractor.

| | **Substrate** | **Sample, Base Material** |
|---|---|---|
| 1.5.2.1.1. | Gypsum Board | Face of typical unit |
| 1.5.2.1.2. | Doors and frames | face of typical unit |

1.5.2.2. Sample panels of stain, varnish, lacquer or other wood finish on each species of wood specified, minimum 300 mm (12") square and of specified thickness.

1.5.3. Certificates:

1.5.3.1. Surface Preparation: Submit manufacturer's representative's written approval of surface preparation methods and any specific recommendations for alternative methods.

1.5.3.2. Materials: Submit list of proposed materials prepared by paint manufacturer, for approval at least 60 Days before materials are required. Ensure list bears manufacturer's official certification that materials listed meet or exceed requirements specified herein, are compatible with respective substrates and primer coats, including those applied by the Work of other Sections.

1.5.4. Site Quality Control Submittals:

1.5.4.1. Submit Site instruction reports in accordance with Section 01 30 00 – Administrative Requirements containing information required by this Section.

1.5.4.2. Progress Reports:

1.5.4.2.1. Submit in accordance with Section 01 30 00 – Administrative Requirements.

1.5.4.2.2. Arrange to have paint manufacturer's representative inspect Work of this Section on a regular basis and prepare weekly job progress reports. Submit copy of reports to the Consultant.

1.5.5. Operation and Maintenance Data: Submit 4 copies of list of materials used, together with MSDS for each Product for incorporation into maintenance manuals. Include maintenance information such as cleaning and full pigment information for future touch up.

**1.6. MAINTENANCE MATERIAL SUBMITTALS**

1.6.1. Extra Stock Materials: Submit to the Owner 4 extra litres of the field colour and 1 extra litre of the trim colour can of each different type and colour and degree of gloss of paint used (batch mix) on this Project for touch-ups. Ensure paint is boxed and in sealed, unopened cans in undamaged condition, with name of manufacturer, contents, type and colour clearly indicated on a label securely adhered to can. Give to the Consultant at time of final inspection.

**1.7. QUALITY ASSURANCE**

1.7.1. Qualifications:

1.7.1.1. Applicators:

1.7.1.1.1. Execute the Work of this Section by a firm which has adequate plant, equipment and skilled workers to perform Work expeditiously and which is known to have been responsible, during immediate past 5 years, for installations similar to Work contained herein. Firm to be fully conversant with applicable laws, bylaws, codes, fire, health and safety regulations and other regulations which govern.

1.7.1.1.2. Provide the Work of this Section executed by competent applicators who have a minimum of 5 years' experience in application of the Products, systems, coatings and assemblies specified and with approval and training of Product manufacturers.

1.7.1.1.3. Ensure materials, preparation and workmanship conforms to requirements of MPI Painting Manual.

1.7.2. Certifications: Ensure paint manufacturers and Products used are listed under Approved Product List section of MPI Painting Manual.

**1.8. DELIVERY, STORAGE AND HANDLING**

1.8.1. Delivery and Acceptance Requirements:

1.8.1.1. Deliver to the Site, materials manufacturer's original, sealed and labeled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, degree of gloss, batch number, standard compliance, materials content as well as mixing, reducing and application requirements.

1.8.1.2. Manufacturer to certify, materials delivered to site conform to approved list and are of top quality Product range.

1.8.2. Storage and Handling Requirements:

1.8.2.1. Store on the Site, materials in manufacturer's sealed and labeled containers.

1.8.2.2. Comply with applicable local fire and building code requirements during storage and application.

1.8.2.3. Store containers of paint, thinner and other volatile materials in secure, well ventilated location, heated to minimum 10 deg C (14 deg F), where they will not be exposed to excessive heat or direct solar radiation. Keep tightly closed when not in actual use.

1.8.2.4. Presence of any unauthorized materials or containers on Site is sufficient cause for rejection of paint materials on the Site at that time.

1.8.2.5. Protect floor and wall surfaces in storage areas from paint drips and splatters.

1.8.2.6. Be totally responsible for prevention of fire or explosion caused by improper storage of paints, solvents, rags and similar items. Store fire hazardous materials in location and in manner approved by local fire authority. Post "No Smoking" signs in areas of storage and mixing and strictly enforce this requirement. Provide and maintain $CO_2$ fire extinguishers of minimum 9 kg (20 lb) capacity. Repair damage to storage area or surrounding area at no cost to the Owner.

1.8.2.7. Where toxic, volatile, explosive, flammable materials are used, provide adequate fireproof storage lockers and take necessary precautions and post adequate warnings (e.g. "No Smoking" signs) as required.

1.8.3. Packaging Waste Management: Leave storage areas clean and free from evidence of occupancy. Dispose of packaging in appropriate method as required by Authorities Having Jurisdiction, and in an environmentally responsible manner in accordance with LEED® guidelines and local requirements.

**1.9. SITE CONDITIONS**

1.9.1. Ambient Conditions:

1.9.1.1. Paint and finish in clean, dust-free, properly ventilated and adequately lit areas minimum 323 Lx (30 ft candles) on surfaces to be painted or decorated.

1.9.1.2. Provide each paint materials in accordance with the manufacturer's recommended tolerances for:

1.9.1.2.1. Substrate Moisture Content: Perform tests with a properly calibrated electronic moisture meter to ensure compliance with manufacturer's recommendations. Without limitation, maximum moisture content as follows:

1.9.1.2.1.1. Gypsum Based Board and Plaster: Maximum 12 - 14%.

1.9.1.2.1.2. Wood: Maximum 15%.

1.9.1.3. Temperature and Ventilation:

1.9.1.3.1. Do not provide paint under ambient and surface temperatures less than those required below in any instance for 24 hours before, during and 7 Days after installation.

1.9.1.3.2. Provide ventilation to remove odours, evaporating solvents and moisture. Maintain adequate ventilation at all times to control excessive humidity.

1.9.1.3.3. Ensure adequate temporary ventilation is provided under Section 01 50 00 - Temporary Facilities and Controls for protection of workers from toxic fumes.

1.9.1.3.4. Interior Paint:

1.9.1.3.4.1. Water Based Paints: Maintain minimum interior surface and ambient air temperature of between 18 deg C (65 deg F) and 32 deg C (90 deg F) during application and drying of paint and maintain until building occupancy occurs.

1.9.1.3.4.2. Solvent Based Paints: Maintain minimum interior surface and ambient air temperature of between 7 deg C (45 deg F) and 35 deg C (95 deg F) during application and drying of paint and maintain until building occupancy occurs.

1.9.1.3.4.3. Do not undertake interior painting on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.

1.9.1.3.5. Exterior Paint:

1.9.1.3.5.1. Do not undertake exterior painting if air and surface temperature are expected to fall below 10 deg C (50 deg F) before coating has dried. Avoid painting during winds, weather conditions which may affect paint application or following rain. Wait until frost, dew or condensation has evaporated. Avoid painting surfaces exposed directly to hot summer sun.

1.9.1.3.5.2. Do not apply paint in snow, rain, fog or mist or when relative humidity exceeds 85% or dew point is less than 3 deg C (5 deg F) difference between air and surface temperature, or damp or wet surfaces unless surface to be painted is enclosed and conditioned to required temperatures and ambient conditions required for application.

1.9.1.3.5.3. Where required, suitable weatherproof covering and sufficient heating facilities are to be provided which will enable required ambient and surface temperatures.

## 1.10. WARRANTY

1.10.1. Manufacturer Warranty: Warrant the work of this Section for a period of 2 years against defects and/or deficiencies in accordance with Article A-6 of the Contract and GC 37 of the General Conditions of the –Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of the Consultant and at no expense to the Owner. Defects include but are not limited to material and workmanship defects such as: improper cleaning and preparation of surfaces, entrapped dust and dirt, material shrinkage, cracking, splitting and defective workmanship including but are not limited to failure in bubbling, drips, runs, blistering, uneven coverage, misses, poor cutting in and delamination.

## PART 2 - PRODUCTS

### 2.1. MANUFACTURERS

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of the Drawings, Schedules and Specifications:

2.1.1.1. Benjamin-Moore & Co., Limited; www.benjaminmoore.com

2.1.1.2. Dulux PPG www.dulux.com

2.1.1.3. Para Paints; www.para.com

2.1.1.4. Pittsburgh Paints; www.pittsburghpaints.com

2.1.1.5. The Sico Inc. Company; www.sico.com

2.1.1.6. The Sherwin-Williams Company; www.sherwin-williams.com

2.1.1.7 Or Equivalent

2.1.2. Source Limitations: Provide primers for each coating system from same manufacturer as finish coats.

### 2.2. MATERIALS

2.2.1. Description:

2.2.1.1. Regulatory Requirements:

2.2.1.1.1. Provide a Pre-Start Health and Safety Review in accordance with *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1*)*, Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 – Quality Requirements for further requirements.

2.2.1.1.2. Conform to latest edition of Industrial Health and Safety Regulations issued by applicable Authorities Having Jurisdiction in regard to Site safety (ladders, scaffolding, ventilation, etc.)

2.2.1.1.3. Comply with more stringent of applicable laws, bylaws, codes, fire regulations, health and safety regulations of Authorities Having Jurisdiction or requirements of this Specification. Ensure standards used for Work of this Section is considered a minimum.

2.2.1.1.4. Where required, ensure paints and coatings meet flame spread and smoke developed ratings designated by local code requirements and/or Authorities Having Jurisdiction.

2.2.1.1.5. Comply with toxic trace limitations stipulated by Authorities Having Jurisdiction as tested in accordance with CAN/CGSB-1.500.

2.2.1.1.6. Conform to requirements of local Authorities Having Jurisdiction in regard to storage, mixing, application and disposal of paint and related waste materials. Refer to requirements in Section 01 50 00 – Temporary Facilities and Controls.

2.2.2. Performance/ Design Criteria:

2.2.2.1. Provide best practices specified or recommended in CAN/CGSB-85.100 and MPI Painting Manual.

2.2.2.2. The Consultant reserves right to refuse any paint or finishing material if in his/her opinion it is not suitable or adequate for proposed use.

2.2.2.3. Provide paint and finishing materials of highest grade, top quality line of Products from manufacturer. Paint material containers not displaying manufacturer's Product identification will not be acceptable. Ensure paint is not diluted.

2.2.2.4. Use brand of paint chosen throughout the Work of this Section. As far as practical, factory mix paint for immediate application without thinning or alteration at Site.

2.2.2.5. Provide primers in recommended DFT/coat.

2.2.2.6. Provide other materials such as linseed oil, shellac, thinners, solvents, etc. of highest quality Product of an MPI listed manufacturer and be compatible with paint materials being used as required.

2.2.3. Finishes:

2.2.3.1. Typical Paint PT1:

2.2.3.1.1. Manufacturer: Dulux PPG Color: 70YY 83/037(A0071) Colour name: Wedding White Finish: Eggshell

2.2.3.2. Doors and Frames Paint PT2:

2.2.3.2.1. Manufacturer: Dulux PPG Color: 1OYY 54/034(A1782) Colour name: Roma Haze Finish: Semi-Gloss

2.2.3.3. Accent Paint PT3:

2.2.3.3.1. Manufacturer: Dulux PPG Colour: #90BG 17/090 Colour name: Connecticut Blue Finish: Eggshell

2.2.3.4. GWB Ceiling Paint PT4:

2.2.3.4.1. Manufacturer: Benjamin Moore Ceiling Paint Colour: 2126-70 Colour name: Chalk White Finish: Flat or Equivalent.

2.2.3.5. Additional Field Colour PT5:

2.2.3.5.1. Manufacturer: Dulux PPG Colour to Architect's later selection

2.2.4. Paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes or sags. .

2.2.5. Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by building code requirements and/or Authorities Having Jurisdiction.

2.2.6. Paint finishes shall be as selected by the Consultant. Locations as indicated or scheduled in the Contract Documents.

2.2.7 Colours: Prior to beginning painting Work, Subcontractor will be furnished with copy of colour schedule. Colours as selected by the Consultant.

2.2.8. Gloss /Sheen Ratings

2.2.8.1. Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

2.2.8.1.1. Flat (G1): Lusterless or matt finish.

2.2.8.1.2. Velvet (G2): High side flat sheen finish.

2.2.8.1.3. Eggshell (G3): Low sheen finish.

2.2.8.1.4. Satin (G4): Low-medium sheen finish.

2.2.8.1.5. Semi-Gloss (G5): Medium sheen finish.

2.2.8.1.6. Full Gloss (G6): High sheen finish.

2.2.8.1.7. High Gloss (G7): Ultra high sheen finish.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

3.1.1. Verification of Conditions:

3.1.1.1. Do Work only when surfaces and conditions are satisfactory for production of quality Work. Report to the Consultant in writing any surfaces which are found to be unsatisfactory.

3.1.1.2. Ensure temperature of surfaces to be finished are as required for application of finish. Refer to “Temperature and Ventilation” article specified herein. Ensure surfaces are dry and free of dirt, grease or other contaminants that may affect applied finish.

3.1.1.3. Verify moisture content of surfaces with electronic moisture meter. Do not proceed without written directions if moisture reading is higher than as required for application. Refer to “Ambient Conditions” article specified herein for substrate moisture content requirements.

3.1.1.4. If substrate is steel, do not apply coatings over moisture or when surface temperature is within 3 deg C (5 deg F) of dew point.

3.1.1.5. If substrate is wood, do not stain or paint if moisture reading is higher than 15%. Inspect Work to assure surfaces are smooth, free from machine marks and nail heads have been countersunk.

3.1.1.6. If substrate is cast-in-place concrete, allow to cure for 60 to 90 Days before proceeding with priming.

3.1.1.7. If substrate is precast prestressed concrete, inspect and accept or reject filled-in surface blow holes.

3.1.1.8. If substrate is new plaster or masonry, allow to cure for 30 to 90 Days. Ensure moisture content is between 12% and 14% and test for alkalinity and neutralize (pH 6.5 - 7.5) before proceeding with priming.

3.1.1.9. If substrate is gypsum board, inspect to ensure joints are completely filled and sanded smooth. Inspect surfaces for "nail popping", screw heads not recessed and taped, breaks in surface or other imperfections and have repaired as required.

3.1.1.10. Verify each substrate is dry and not frozen and free from tool and sandpaper marks, dust, rust, insects, grease and other foreign matter liable to impair finished Work.

3.1.2. Evaluation and Assessment:

3.1.2.1. Prior to commencement of Work of this Section, ensure the Subcontractor thoroughly examines (and tests as required) conditions and surfaces scheduled to be painted and reports in writing to the Contractor and Consultant any conditions or surfaces that will adversely affect Work of this Section.

3.1.2.2. Do not commence painting Work until adverse conditions and defects have been corrected and surfaces and conditions are acceptable to the Subcontractor

3.1.2.3. Commencement of Work does not imply acceptance of surfaces except as qualified in this Section. Such surfaces as concrete, masonry, structural steel and miscellaneous metal, wood, gypsum board and plaster, are not responsibility of a Subcontractor responsible for the Work of this Section. Commencement of Work implies acceptance of previously completed work.

**3.2. PREPARATION**

3.2.1. Protection of In-Place Conditions:

3.2.1.1. Provide scaffolding, staging, platforms and ladders, as required for execution of Work. Erect scaffolding to avoid interference with Work of other trades. Comply with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1..

3.2.1.2. During the Work of this Section, provide drop cloths, plastic, plywood or metal sheets to protect floors in areas assigned for storage and mixing of paints. Cover finished floors, walls, ceilings and other Work in vicinity and protect from paint and damage.

3.2.1.3. Protect Work of other trades against paint splattering and Make Good at own expense any such damage.

3.2.1.4. Protect exterior surfaces and areas, including landscaping, walks, drives, adjacent building surfaces (including glass, aluminum surfaces, etc.) and equipment and any door and frame labels and signage from painting operations and damage by drop cloths, shields, masking, templates, or other suitable protective means and Make Good any damage caused by failure to provide such protection at own expense.

3.2.1.5. Remove and securely store miscellaneous and finish hardware and surface fittings, electrical switch and outlet covers, receptacle plates, louvres, fittings and fastenings, to protect from paint splatter. Mask items not removable. Use sufficient drop cloths and protective coverings for full protection of floors, furnishings, mechanical, electrical and special equipment, other components of building which do not require painting or to be removed, from paint spotting and other soiling. Carefully clean and re-install items when paint is dry. Clean any components that are paint spotted or soiled. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (e.g. lacquer finishes).

3.2.1.6. Prohibit traffic, where possible, from areas where painting is being carried out and until paint is cured. Post “wet paint” or other warning signage during and on completion of Work. Provide also warning signs at points of entry to areas where painting is applied and drying.

3.2.2. Surface Preparation:

3.2.2.1. Prepare defective surfaces to obtain a satisfactory substrate and in accordance with paint manufacturer's instructions.

3.2.2.2. Ensure exterior Work is not performed during or immediately following rain, frost or dew.

3.2.2.3. Prior to painting, sweep areas dust-free.

3.2.2.4. Clean soiled surfaces to be painted.

3.2.2.5. Remove efflorescence, chalk, dust, dirt, oil, grease, rust, form oil, release agents, loose mill scale and other extraneous matter from surfaces (except rust occurring on items specified to be primed under other Sections be removed and work re-primed under those Sections). Vacuum insulation covering surfaces. Vacuum floors clean before painting; wipe clean adjacent surfaces and surfaces to be painted before Work is commenced to prevent dust and debris damage to wet paint.

3.2.2.6. Remove mildew by scrubbing affected area with solution of 150 g (5.3 oz) TSP and 125 g (4.4 oz) bleach in 3.5 l (0.92 gal) water. Rinse well with clean water and allow to dry. If condition is serious, source out finishes with extra mildew resistance.

3.2.2.7. Be responsible for surface preparation to suit surface condition and conform to level of cleaning based on SSPC recommended metal cleaning procedures most commonly used to suit Site conditions.

3.2.2.7.1. Woodwork for Clear Finish or Stain: Sand smooth woodwork to be finished using 150 grit paper followed by a second sanding using 220 grit paper and clean surfaces free of dust using brush, compressed air or tack rags before applying first coat. Abrade surfaces with stiff brush to remove loose fibers and splinters. Fill nail holes, splits and scratches with non-shrinking filler tinted to match local grain condition after first coat is dry. Sand lightly between coats with No. 220 sandpaper and remove dust.

3.2.2.7.2. Remove salt deposits that may appear on wood surfaces treated with fire retarder.

3.2.2.7.3. Wood Doors: Remove doors before painting to paint bottom and top edges and re-hang once dry. Paint or finish top and bottom edges of doors to be painted or stained. Touch-up or refinish tops and edges after fitting.

3.2.2.8. Previously Finished Surfaces: Clean existing interior and exterior surfaces to be repainted or varnished to provide bond. Remove rust, scale, oil, grease, mildew, chemicals and other foreign matter. Remove loose paint and fill flush with suitable patching material. Clean off bubbled, cracked, peeling or otherwise defective paint by stripping with suitable environmental strippers or by burning. Do not burn off paints suspected of having lead content. Treat residue from stripping as Hazardous Waste. Flatten gloss paint and varnish with sandpaper and wipe off dust. If previous coatings have failed so as to affect proper performance or appearance of coatings to be applied, remove previous coatings completely and prepare substrates properly and refinish as specified for new work. Leave entire surface suitable to receive designated finishes and in accordance with finish manufacturer's instructions.

3.2.2.9. Gypsum Board:

3.2.2.9.1. Examine and ensure gypsum board surfaces are without defects or deficiencies and suitable to receive painting applications. Commencement implies acceptance of gypsum board Work. Examine surfaces after for imperfections showing through and fill small nicks or holes with patching compound and sand smooth. Examine surfaces after priming for imperfections showing through.

3.2.2.9.2. Clean surfaces dry, free of dust, dirt, powdery residue, grease, oil, wax or any other contaminants. Sand and dust as necessary prior to painting and between coats to provide an anchor for next coat and to remove defects visible from a distance up to 1 m (39”).

3.2.2.10. Fire Resistive Coatings: Coordinate with coating manufacturer for surface preparation requirements to ensure proper adhesion of finish.

**3.3. APPLICATION**

3.3.1. Safety Precautions: When handling solvent coating materials, wear approved vapour/particulate respirator as protection from vapors. Dust respirators do not provide protection from vapours.

3.3.2. Material Compatibility: Provide primers and finish coat materials compatible with each other and substrate including fillers.

3.3.3. Mixing and Tinting:

3.3.3.1. Unless otherwise specified in this Section paint to be ready and factory tinted. Re- mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment and colour and gloss uniformity.

3.3.3.2. Mix and prepare paint materials including paste, powder or catalyzed paint mixes in strict accordance with manufacturer's directions for particular material and coat to be applied to produce a mixture of uniform density. If reducing is required, do so in accordance with recommendations of manufacturer for particular material and coat.

3.3.3.3. Where thinner is used, addition is not to exceed manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

3.3.3.4. Mix primer-sealer with a certain amount of colour coat in proportions recommended by manufacturer of material actually used. Tint undercoats and each finish coat with correct type colours, for identification of each succeeding coat.

3.3.3.5. Thoroughly mix materials before application. Apply materials evenly, under adequate illumination, free from sags, runs and other defects. Do cutting-in neatly.

3.3.4. Obtain colour chart giving colour schemes and gloss value for various areas from the Consultant. Ensure colour chart gives final selection of colours and surface textures of finishes and whether finishes are transparent (natural) or opaque (paint).

3.3.5. Provide finish uniform in sheen, colour and texture, free from streaks, shiners and brush or roller marks or other defects.

3.3.6. Apply materials in accordance with manufacturer's directions and specifications paying particular attention to appropriate time frame after cleaning when environmental conditions encourage flash- rusting, rusting, contamination or manufacturer's paint specifications require earlier applications. Do not use adulterants. Do any reduction of coating's viscosity in accordance with manufacturer's directions.

3.3.7. Use paints within period of shelf life recommended by paint manufacturer.

3.3.8. Ensure successive coatings are harmonious chemical compositions and materials of same manufacturer.

3.3.9. Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1 m (39").

3.3.10. Ensure each coat is dry and hard before a following coat is applied.

3.3.11. Continue through paint finish behind wall-mounted items (e.g. chalk and tack boards).

3.3.12. Finish listed surfaces indicated on the Drawing(s) and as specified in the Contract Documents. Refer to the Drawings for type, location and extent of finishes required and include all touch-ups and field painting necessary to complete Work shown, scheduled or specified.

3.3.13. Finishes and number of coats specified in this section are intended as minimum requirements guide only. Refer to manufacturer's recommendations for exact instructions for thickness of coating to obtain optimum coverage and appearance. Some materials and colours may require additional coats and deeper colours may require use of manufacturers' special tinted primers. Provide Premium Grade finish as defined by MPI as minimum finish.

3.3.14. Paint entire plane of areas exhibiting incomplete or unsatisfactory coverage and of areas which have been cut and patched. Patching is not acceptable. Vary each coat slightly in successively darker tones to permit supervision identity.

3.3.15. Do not paint baked paint surface, chrome plated, stainless steel, aluminum or other surfaces finished with final finish in factory. Finish paint primed surfaces.

3.3.16. Advise the Consultant when each applied paint coat can be inspected. Do not recoat without inspection. Tint each coat slightly to differentiate between applied coats.

3.3.17. Apply additional paint coats, beyond number of coats specified for any surface, to completely cover and hide substrate and to produce a solid, uniform appearance.

3.3.18. Apply primer coat soon after surface preparation is completed to prevent contamination of substrate.

3.3.19. Primer/Sealers: Apply primer-sealer coats by brush or roller. Permit to dry in accordance with manufacturer's recommendations before applying succeeding coats. Touch up suction spots and sand between coats with No. 120 sandpaper.

3.3.20. Metals: Apply primer coat to unprimed ferrous metal surfaces. Where sandblast preparation is specified, apply specified primer immediately after blast cleaning.

3.3.21. Woodwork:

3.3.21.1. Fill open grain woods with filler tinted to match wood and work well into grain. Wipe excess from surface before filler sets.

3.3.21.2. Sand smooth paint and varnish undercoats prior to recoating.

3.3.21.3. Prime woodwork designated for painting as soon as possible after delivery to site and before installation. Prime cut surfaces, whether exposed or not, i.e. 6 edges of wood doors, before installation. Prime cut surfaces of woodwork to receive transparent finish with 1 coat of transparent finish reduced 25% or as directed by manufacturer.

3.3.21.4. Apply final coats on smooth surfaces by roller or brush. Hand brush wood trim surfaces.

3.3.22. Allow each coat of paint to cure and become dry and hard before application of succeeding coats (unless manufacturer's directions require otherwise).

3.3.23. Before finishing paint coats are applied, inspect and touch-up shop coats of primers previously applied by other Subcontractors or fabricators.

3.3.24. Provide paint coating thicknesses indicated, measured as minimum DFT.

3.3.25. Apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.

3.3.26. Ledges: Finish projecting ledges, both above and below sight lines, as specified for adjacent surfaces.

3.3.27. Light Coves: Paint light coves white whether a light lens is installed or not.

3.3.28. Interior Columns: Finish interior columns same as walls of room unless otherwise indicated.

3.3.29. Existing Spaces:

3.3.29.1. Refinish existing surfaces of rooms or areas which have been damaged, altered or otherwise affected by Work. Also finish "new" Work occurring thereon unless otherwise specified. Use same procedure as for new Work but primer (or filler, stain and sealer in case of varnish finish) may be omitted. Prepare existing surfaces as specified in this Section. Ensure finish matches previous finish.

3.3.29.2. Paint or repaint rooms or areas where noted on the Room Finish Schedule and/or as indicated on the Drawings.

3.3.29.3. Repaint surfaces entirely between changes of plane.

3.3.29.4. Use finish coat of respective new surface paint system for minor repair of existing finishes. Use system primer where existing finishes are damaged down to bare surface.

3.3.29.5. Extend painting to a suitable boundary to avoid a “patched” effect. Sand, wire-brush, or scrape such existing finished surfaces to remove loose paint and to reduce gloss. Also, clean existing films of dirt, grease or wax. If metallic surfaces are rusted, remove loose scale to provide a firm surface. Patch and sand cracks and other imperfections.

3.3.29.6. Provide paint to interior existing spaces effected by alterations in accordance with following:

3.3.29.6.1. Paint walls to nearest inside and outside corners for full wall height.

3.3.29.6.2. Paint columns floor to ceiling.

3.3.29.6.3. Paint full ceilings to nearest wall or bulkhead.

3.3.29.6.4. Unless indicated otherwise match existing colour.

3.3.30. Mechanical and Electrical Services:

3.3.30.1. Unless otherwise specified or noted in the Contract Documents, paint “unfinished” conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and texture to match adjacent surfaces, in following areas:

3.3.30.1.1. where exposed-to-view in exterior and interior areas.

3.3.30.1.2. in interior high humidity interior areas.

3.3.30.1.3. in boiler room, mechanical and electrical rooms.

3.3.30.2. Read Divisions 21, 22, 23, 26, 27 and 28 for their requirements and further instruction on painting mechanical and electrical work and perform such work under supervision of respective mechanical and electrical Divisions.

3.3.30.3. Finish paint primed mechanical equipment: heaters, convectors, radiators, wall fin perimeter induction units, fan coil units and similar items. Ensure use of heat resistant paint on surfaces where operating surface temperature will exceed 65 deg C (150 deg F).

3.3.30.4. Prime and paint exposed, unfinished electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items.

3.3.30.5. Take steps to protect gauges, identification plates and similar items from being painted over or paint splattered.

3.3.30.6. Remove grilles, covers, access panels for mechanical and electrical systems from installed location and paint separately, if these items are not factory finished. Paint adjacent surfaces after removal and reinstall when surfaces are dry.

3.3.30.7. Paint Work to match surfaces they are seen against unless directed otherwise by the Consultant.

3.3.30.8. Paint interior surfaces of air ducts visible through grilles and louvres, with 1 coat of flat black metal paint to limit of sight line.

3.3.30.9. In unfinished areas leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

3.3.30.10. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

3.3.30.11. Do not paint over nameplates.

3.3.30.12. Paint behind louvres grilles and diffusers for minimum of 460 mm (18”) or beyond sight line, whichever is greater, to be painted with primer and 1 coat of matte black (non-reflecting) paint.

3.3.30.13. Paint each surface inside of light valances.

3.3.30.14. Paint disconnect switches for fire alarm system and exit light systems in colour as required by Authorities Having Jurisdiction.

3.3.30.15. Paint or band fire protection piping and sprinkler lines in accordance with mechanical requirements. Keep sprinkler heads free of paint.

3.3.30.16. Paint or band all natural gas piping in accordance with mechanical requirements

3.3.30.17. Back prime and paint face and edges of plywood service panels for telephone and electrical equipment before installation gray, semi-gloss. Leave equipment in original finish except for touch-up as required and paint conduits, mounting accessories and other unfinished items.

**3.4. SITE QUALITY CONTROL**

3.4.1. Site Tests and Inspections:

3.4.1.1. Provide and coordinate Site inspection service by manufacturer’s representative in advance of Work commencing and during progress of Work to ensure correct use and application of each specified material. Manufacturer’s representative to review and submit approval of surface preparation methods in Specifications or obtain specific recommendations for alternative methods. Report such conditions to the Consultant.

3.4.1.2. As Work progresses and upon completion of Work, submit written reports and manufacturers’ confirmation that materials and application methods conform to manufacturers’ requirements.

3.4.1.3. Inspect surfaces, preparation and paint applications.

3.4.2. Non-Conforming Work:

3.4.2.1. Replace damaged Work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction to the Consultant at no cost to the Owner. Touch up small affected areas, repaint large affected areas or areas without sufficient DFT of paint. Remove runs, sags of damaged paint by scraper or by sanding prior to application of paint. Following are considered nonconforming qualities:

3.4.2.1.1. Lack of Uniformity:

3.4.2.1.1.1. b rush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas and foreign materials in paint coatings.

3.4.2.1.1.2. evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.

3.4.2.1.1.3. damage due to touching before paint is sufficiently dry or any other contributory cause.

3.4.2.1.1.4. damage due to application on moist surfaces or caused by inadequate protection from weather.

3.4.2.1.1.5. damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

3.4.2.1.2. Aesthetic Problems: If following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:

3.4.2.1.2.1. visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1 m (39”).

3.4.2.1.2.2. visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1 m (39”).

3.4.2.1.2.3. visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.

3.4.2.1.2.4. when final coat on any surface exhibits a lack of uniformity of colour, sheen, texture and hiding across full surface area.

3.4.3. Manufacturer Services: Arrange for manufacturer’s representative to visit Site at intervals during surface preparation and paint coating application to ensure proper specified surface preparation is being performed, specified Product are being used, appropriate number of coats are being applied and specified finishing procedures are being carried out.

**3.5. CLEANING**

3.5.1. Keep waste rags in covered metal drums containing water and remove from building at end of each Day. Remove other combustible rubbish materials and empty paint cans each Day from Site and safely dispose of same in accordance with requirements of Authorities Having Jurisdiction.

3.5.2. Clean equipment and dispose of wash water/solvents as well as other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with safety requirements of authorities having jurisdiction.

3.5.3. Clean containers used for storage, mixing and application of materials free of foreign materials and residue.

3.5.4. Keep Work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

3.5.5. Clean adjacent surfaces which have been painted, soiled or otherwise marred. Remove spilled, splashed, splattered or sprayed paint as Work progresses using means and materials that are not detrimental to affected surfaces.

3.5.6. Remove masking and other protection provided under this Section.

3.5.7. Remove temporary protective wrappings provided by others for protection of Work after completion of painting operations.

3.5.8. Painting work will not be considered complete until spatters, drippings, smears and overspray have been cleaned and removed to satisfaction of the Consultant.

3.5.9. Make Good any damage to structure building surfaces or furnishings resulting from painting operations at no cost to the Owner.

3.5.10. Waste Management:

3.5.10.1. Disposal of Paint Waste:

3.5.10.1.1. Be responsible for removal and disposal of material and waste generated by the Work of this Section.

3.5.10.1.2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are hazardous Products and are subject to regulations for disposal. Obtain information on these controls from applicable Authorities Having Jurisdiction.

3.5.10.1.3. Separate and recycle waste materials. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility. Treat materials that cannot be reused as hazardous waste and dispose of in an appropriate manner.

3.5.10.1.4. Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

3.5.10.1.5. To reduce amount of contaminants entering waterways, sanitary/storm drain systems or into ground adhere to following procedures:

3.5.10.1.5.1. Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case clean equipment using free draining water.

3.5.10.1.5.2. Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

3.5.10.1.5.3. Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

3.5.10.1.5.4. Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

3.5.10.1.5.5. Dry empty paint cans prior to disposal or recycling (where available).

3.5.10.1.5.6. 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.

3.5.10.2. Set aside and protect surplus and uncontaminated finish materials not required by the Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

**END OF SECTION**

## PART 1 - GENERAL

### 1.1. GENERAL INSTRUCTIONS

1.1.1. Read and conform to the Contract Documents including~~:~~

~~1.1.1.1. Stipulated Price Contract CCDC 2 – 2008 - Agreement between the Owner and Contractor, the General Conditions and Supplementary Conditions.~~

~~1.1.2. Comply with~~ Division 1 requirements and documents referred to herein.

### 1.2. SUMMARY

1.2.1. Section Includes: Provide miscellaneous specialties including but not limited to following:

1.2.1.1. Waste paper baskets.

1.2.1.2. Toilet accessories

1.2.1.3. 3M Window Film

### 1.3. SUBMITTALS

1.3.1. Samples: Submit samples in accordance with Section 01 30 00. If requested by Consultant submit samples of Products.

### 1.4. CLOSEOUT SUBMITTALS

1.4.1. Operational and Maintenance Data: Submit maintenance instructions in accordance with Section 01 70 00.

## PART 2 - PRODUCTS

### 2.1. ASSEMBLY

2.1.1. Description:

2.1.1.1. Regulatory Requirements: Provide a Pre-Start Health and Safety Review in accordance with the *Occupational Health and Safety Act,* R.S.O. 1990, c. O.1~~Occupational *Health and Safety Act (Ontario),*~~ Regulation 851, Industrial Establishments, as amended. Refer to Section 01 40 00 for further requirements.

### 2.2. MANUFACTURED UNITS

2.2.1. Provide waste paper baskets and bins by Swish Maintenance Products Ltd. Systems or equivalent. Refer to Drawings.

2.2.1.1. Rubbermaid 23GAL WASTE BIN AND LID #3540-60-B & #SP42189

2.2.1.2. Rubbermaid 23GAL RECYCLING BIN AND LID #3540-BLU & #SP42189

2.2.1.3. Rubbermaid 23GAL ORGANICS BIN AND LID #3540-GRN & SP42189

2.2.1.4. Busch Systems Battery Bin #BATBIN-24B0

2.2.1.5. Swish Blue Recycling Bin #2956-BLU

2.2.1.6. Busch Systems hanging waste caddy with lid #BC1500-23

2.2.1.7. Swish soft waste basket #2956-BK

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2.2.1.8. Swish soft recycling basket #2956-BLU

2.2.1.9. Swish soft recycling receptacle #3450-BLU with Lid #2703

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2.2.2. Frost paper towel dispenser (wall mounted) #5050 or equivalent

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2.2.3. Swish soap dispenser (wall mounted) #9330 or equivalent

2.2.4. Swish 4 Roll Toilet Tissue Dispenser # SKU 884

2.2.5. Stainless Steel Grab Bar, Frost L-shaped 1003-NP 30x30 1-1/2"

2.2.6. Toilet Paper Dispenser (AODA), Frost double Roll W/Hood #158S

2.2.7. Toilet Paper Dispenser, Swish 884-Black

2.2.8. Stainless Steel Grab Bar, 24" Frost 1001-NP 1-1/2" Diameter

2.2.9. Coat/Purse Hook, Richelieu Contemporary Stainless Steel Hook-1483. Product # RH1483011170. Discuss exact placement with Architect prior to supply/install (Allow for 24 hooks in total). Determine exact placement with Architect on site

2.2.10. Flip Up Safety Rail, Frost Stainless Steel 1055-S-Wall Bracket in White

2.2.11. Recessed Double Napkin Vendor, Frost 615-5 Stainless Steel. Determine exact placement on site with Architect

2.2.12. Fip-Up Shelf, Frost Stainless Steel Code 955 (or equal). Allow for a total of 12 Flip-Up Shelves. Determine exact placement with Architect on site

2.2.13. Dyson HU02 White. Determine exact placement with Architect on site.

2.2.14. Disposal Unit – Frost 337: Stainless Steel. Determine placement with Architect on site

2.2.15. Provide appliances by Whirlpool and Panasonic or equivalent as follows:

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2.2.15.1. 16.6-cu ft. Freezerless Refrigerator. Colour shall be white. Manufacturer to be Whirlpool or ~~approved~~ equivalent.

2.2.15.2. Panasonic 1.6 cu.ft. Countertop Microwave Oven with Inverter Technology – White – #NN-SN736W or equivalent.

**Commented [FS7]:** See above

2.2.16. 3M Window Film:

2.2.16.1. Supply and install 3M Fasara Window Film where indicated on the drawings. Product to be 3M Privacy Control Window Film, type: 3M Illumina Window Film.

**PART 3 - EXECUTION**

**3.1. EXAMINATION**

3.1.1. Verification of Conditions: Verify actual Ssite dimensions and location of adjacent materials prior to

commencing Wwork. Notify Consultant in writing of any conditions which would be detrimental to the installation.

3.1.2. Evaluation and Assessment: Commencement of Wwork implies acceptance of previously completed Wwork.

**3.2. PROTECTION**

3.2.1. Cover finished surfaces and protect exposed corners and areas vulnerable to damage by persons or by movement of materials, tools or equipment.

**END OF SECTION**