

PROJECT MANUAL – Volume 1

Issued for Construction

UofT Robarts 5th Floor MDL Renovation

Robarts Library

130 St. George Street, Toronto, Ontario, M5S 1A5

Superkül Inc.

101 - 35 Golden Avenue
Toronto, Ontario
M6R 2J5

Tel: 416-596-0700

Project No. 2322

December 3, 2024

Document Responsibility and Project Directory

1.1 Document Responsibility

- .1 Refer to Project Manual, Section 00 01 10 - Table of Contents, for indication of document responsibility (DR). Abbreviations for entity responsible for document preparation are as follows:
 - .1 A - Denotes documents prepared by Architect.
 - .2 AC - Denotes documents prepared by Acoustical Consultant.
 - .3 E - Denotes documents prepared by Electrical Engineer.
 - .4 H - Denotes documents prepared by Architectural Hinge Hardware Consultant.
 - .5 M - Denotes documents prepared by Mechanical Engineer.
 - .6 O - Denotes documents prepared by Owner.
 - .7 S - Denotes documents prepared by Structural Engineer.
- .2 Professional seals if applied next to company names in the project directory (below) govern only those specification sections and schedules identified by the corresponding document responsibility (DR) abbreviation in Section 00 01 10.

1.2 Project Directory

- .1 Owner:

University of Toronto

255 McCaul Street, 5th Floor
Toronto, Ontario
M5T 1W7

Robarts Library

130 St. George Street
Toronto, Ontario
M5S 1A5

- .2 Architect (the *Consultant*):

Superkül

35 Golden Avenue, Suite 101
Toronto, Ontario
M6R 2J5

Tel: 416-596-0700

- .3 Structural Engineer:

Entuitive Corporation

200 University Avenue, 7th floor
Toronto, Ontario
M5H 3C6

Tel: 416-309-5832

.4 Mechanical Engineer:

Smith and Andersen Consulting Engineering

1100 - 100 Sheppard Avenue East
Toronto, Ontario
M2N 6N5

Tel: 416-218-7019

.5 Electrical Engineer:

Smith and Andersen Consulting Engineering

1100 - 100 Sheppard Avenue East
Toronto, Ontario
M2N 6N5

Tel: 647-288-5479

.6 Costing Consultant:

Marshall & Murray Inc.

120 Carlton Street, Suite 413
Toronto, Ontario
M5A 4K2

Tel: 416-928-1993

.7 Code Consultant:

Jensen Hughes Consulting Canada Ltd.

2680 Skymark Avenue, Suite 411
Mississauga, Ontario
L4W 5L6

Tel: 416-762-3808

.8 Acoustics Consultant:

Aercooustics Engineering Limited

1004 Middlegate Road, Suite 1100
Mississauga, Ontario
L4Y 0G1

Tel: 647-951-1688

.9 Architectural Hardware Consultant:

Hinge Hardware Inc.

49 Fima Crescent, Unit C
Etobicoke, Ontario
M8W 3R1

Tel: 416-915-9960

END OF SECTION

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Engineered Submittal Procedures

PART 1 - GENERAL

1.1 General Requirements

- .1 Submit submittals as requested by the *Contract Documents*, in accordance with Section 01 30 00 and 01 33 00, as specified herein, and in accordance with the conditions of the *Contract*.
- .2 Engineered submittals:
 - .1 Submittals for items required to be sealed by professional engineer (engineered) shall be duly prepared, sealed, and signed under the direct control and supervision of a qualified professional engineer licensed in the jurisdiction in which the *Place of the Work* is located, having in force, professional liability insurance with minimum coverage limit of \$2,000,000 per claim and annual aggregate.
 - .2 Include with engineered submittal, proof of insurance identifying insurer, policy number, policy term, and limit of liability, on duly signed letterhead and / or certificate of insurance.
 - .3 Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, authorities having jurisdiction, and design requirements of the *Contract Documents*.
 - .4 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal.
 - .5 Professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review, including review of associated mock-ups where applicable, at locations wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the *Consultant*, to authorities having jurisdiction as required, and in accordance with the building code.
 - .6 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the *Contract Documents*, including reviewed shop drawings and design calculations.
 - .7 Upon completion of the parts of the *Work* covered by the engineered submittal, the professional engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall prepare and submit to the *Consultant* and authorities having jurisdiction, as required, a letter of general conformity for those parts of the *Work*, certifying that they have been provided in accordance with the requirements both of the *Contract Documents* and of the authorities having jurisdiction over the *Place of the Work*.
 - .8 Costs for such field reviews and field review reports and letters of general conformity are included in the *Contract Price*.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Manufacturer's Field Review

PART 1 - GENERAL

1.1 Related Requirements

- .1 Quality Control – under Section 01 40 00, 01 45 00, and 01 45 23.
- .2 Materials and workmanship quality, reference standards - under Section 01 60 00.
- .3 Balancing and testing of systems - under Divisions 21, 22, and 23 and Divisions 26, 27, and 28.

1.2 Manufacturer's Field Review

- .1 Where manufacturer's field review is specified, manufacturer's representative shall review the relevant parts of work at the *Place of the Work*, or wherever such affected work is in progress, to ensure that work is being executed in accordance with manufacturer's written recommendations and verify its product to be fit-for-purpose intended.
- .2 Manufacturer's field review is to ensure that the *Products* specified are being used in the *Work* and are being applied on surfaces prepared in accordance with their recommendations and the requirements of the *Contract Documents*.
- .3 Unless otherwise indicated, manufacturer's representative shall undertake a minimum of 1 field review, with additional reviews as deemed necessary by the manufacturer, to determine that the work of such sections is in accordance with the manufacturer's written recommendations.
- .4 Manufacturer's representative shall submit a type written report on manufacturer's letterhead within 2 *Working Days* after each field review. Report shall document manufacturer's representative's field observations and recommendations.
- .5 Manufacturer's field review reports to be prepared and distributed following the procedures specified for preparation and submittal of inspection and testing reports given in Section 01 40 00, 01 45 00, and 01 45 23.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Demolition and removal of selected non-structural portions of building.
 - .2 Salvage:
 - .1 Salvaging of designated items for reuse by *Owner*.
 - .2 Salvage of designated items to be reused or recycled.
 - .3 Removal of surplus materials from the *Place of the Work*.
 - .4 Related mechanical and electrical work and demolition requirements are covered under Divisions 21, 22, and 23 and Divisions 26, 27, and 28 respectively.
- .2 Section excludes:
 - .1 Demolition, removal, remediation, or abatement of designated substances or materials and toxic and hazardous substances.

1.2 Administrative Requirements

- .1 Pre-demolition meeting:
 - .1 Schedule a pre-demolition meeting following the procedures specified for pre-installation meetings in accordance with Section 01 30 00.
 - .2 Review existing conditions at the *Place of the Work* thoroughly to establish full extent of items to be removed and items to remain. Commencement of demolition work will be considered to be acceptance of existing conditions at the *Place of the Work* and removal of such items.
 - .3 Examine adjacent properties to determine extent of protection required.
- .2 Post-demolition meeting:
 - .1 Schedule a post-demolition meeting.
 - .2 Review post-demolition conditions with *Consultant* at the *Place of the Work* thoroughly to establish full extent of areas to be cleaned in accordance with Section 03 35 01.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 Demolition report:
 - .1 Prior to commencement of the work of this section at the *Place of the Work*, prepare and submit to the municipal building department having jurisdiction over the *Place of the Work* a report on the proposed demolition methods and procedures for the removal of indicated structures for the safe retention of structures to remain.

Demolition

- .2 Prepare report under the supervision, and bear the seal and signature, of a professional engineer licensed to practice engineering in the *Place of the Work*, experienced in this type of engineering, and in accordance with Section 01 30 00 and 01 33 00.
- .3 Submit a PDF of the demolition report to the *Consultant* for record purposes only: *Consultant* shall neither review nor accept any liability for the contents of the report.
- .4 Without limiting the requirements of authorities having jurisdiction, the demolition report shall include:
 - .1 *Drawings*, diagrams and details showing sequence of demolition work and supporting structures.
 - .2 Description, in detail, of the methods and procedures for working at the base of existing buildings to remain.
 - .3 Schedule of demolition activities indicating the following:
 - .1 Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
 - .2 Interruption of utility services.
 - .3 Coordination for shutoff, capping, and continuation of utility services.
 - .4 Location of temporary interior hoarding partitions, building interior partitions and means of egress.
 - .4 Written description of methods for removal and temporary bracing of structural members or supporting construction.
- .3 Obtain the demolition permit such that the engineer responsible for the preparation of the demolition report becomes the Engineer of Record for the demolition work. Prepare and submit reports, *Drawings*, and other documents required as part of the municipal permit process prior to, during, and upon completion of the demolition work. Copies of the permit with the name of the Engineer of Record shall be submitted to the *Consultant* prior to the commencement of demolition.
 - .1 If an application has been made, by or on behalf of the *Owner*, to the building department having jurisdiction at the *Place of the Work*, it is a requirement of this *Contract* that the *Contractor* obtain an amendment to this application/permit such that the engineer responsible for the preparation of the demolition report specified in Section 02 41 16 becomes the Engineer of Record for the demolition work.
- .4 Special procedures submittals:
 - .1 Existing conditions documentation:
 - .1 Document existing conditions of adjoining construction and site improvements, including pre-existing damage to finish surfaces that might be misconstrued as damage caused by demolition operations.
 - .2 Submit existing conditions documentation before demolition work begins.
 - .2 Inventory of items to be salvaged:
 - .1 Prepare typed inventory of units to be salvaged and cross-reference to drawing showing existing elevations.

Demolition

- .2 Submit inventory following procedures for submittal of *Shop Drawings* in accordance with Section 01 30 00 and 01 33 00.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*:
 - .1 Shall have 5 years' specialized demolition experience, minimum.
 - .2 Shall be able to deploy adequate equipment and skilled personnel to complete work expediently in an efficient and orderly manner.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that utilities have been disconnected and capped.
- .2 Observe existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- .3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- .4 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to *Consultant*.

3.2 Utility Services and Mechanical / Electrical Systems

- .1 Refer to Divisions 21, 22, and 23 and Divisions 26, 27, and 28 respectively.

3.3 Selective Demolition, General

- .1 Demolish and remove existing construction only to the extent required by new construction, and as otherwise indicated. Use methods required to complete the work within limitations of governing regulations and as follows:
 - .1 Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - .2 Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - .3 Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

Demolition

- .4 Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
- .5 Maintain adequate ventilation when using cutting torches.
- .6 Remove decayed, infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
- .7 Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- .8 Dispose of demolished items and materials promptly.
- .2 Dispose of demolished materials from *Project* site except where noted otherwise and in accordance with authorities having jurisdiction. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- .3 Do not sell demolished material at the *Place of the Work*.
- .4 Clean existing surfaces specified to receive new applied finishes or to remain exposed.
- .5 Where existing surfaces are to remain exposed:
 - .1 When a finish or material has been altered, the material or finish shall be repaired or replaced, and refinished to match existing quality and appearance to acceptance of *Consultant*, and that repaired or replaced and refinished *Work* shall not be discernible from existing materials or finishes when judged by the *Consultant* from a viewing distance of 1830 mm (6'), and that such work is included in the *Contract Price*.

3.4 Selective Demolition Procedures for Specific Materials

- .1 Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
- .2 Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- .3 Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

3.5 Salvage

- .1 Remove and store items indicated or directed for salvage. Remove, handle and transport such items to storage area designated in the *Contract Documents*, to an area within the *Place of the Work* designated by *Consultant*, or to an area away from the *Place of the Work* as directed by the *Consultant*. Perform such work to prevent damage to the items during removal and in storage.
- .2 The *Owner* shall review *Place of the Work* prior to commencement of demolition and instruct the *Contractor* of the items to be retained for re-use or be turned over to the *Owner*.

Demolition

- .3 Remove and store indicated items for future use by *Owner*. Remove, handle and transport such items to storage area indicated in the *Contract Documents* or to an area within the *Place of the Work* designated by *Consultant*. Perform such work carefully and with diligence to prevent any damage to the items during removal and in storage.

3.6 Field Quality Control

- .1 Field walkthrough:
 - .1 After demolition work is complete, do a field walkthrough of the *Place of the Work* with the *Contractor* and point out locations that require remediation to be made good, as defined above in 3.3.5.1.

3.7 Protection

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades and parts of existing building to remain. Make good damage caused by demolition.
- .2 Take precautions to support affected structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify demolition engineer, *Contractor* and *Consultant*.
- .3 Prevent debris from obstructing active services and drainage systems.
- .4 Protect work to remain against damage. Repair or replace damaged work at no additional cost to the *Owner*.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Architectural concrete cleaning.
 - .1 Removal of adhesive from existing concrete surfaces, such as wall base locations, and as indicated on drawings.
 - .2 Removal of dirt from existing concrete surfaces, such as concrete guards, and as indicated on drawings.

1.2 Quality Assurance

- .1 Qualifications:
 - .1 Execute the work of this section only by a *Subcontractor*, with minimum 5 years experience, who has adequate equipment and skilled workers to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified.

1.3 Field Conditions

- .1 Provide suitable control for collecting grit, dust and water from the cleaning operation and be fully responsible for damage or claims resulting from this operation.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 Preparation

- .1 Mask or protect adjacent dissimilar surfaces from cleaning procedures.

3.2 Cleaning

- .1 Conduct cleaning of concrete in accordance with requirements and methods stipulated in the MPI Manual – latest edition. Methods used may be at *Contractor's* discretion provided the following requirements are met:
 - .1 Cleaning of concrete surfaces shall not cause damage to any adjacent surfaces.
 - .2 Localized cleaning of adhesive residue from existing concrete columns and walls:
 - .1 The scope is to remove the signage if present, and to remove the adhesive.
 - .2 Care must need to be taken not to stain the surrounding concrete with the dissolved adhesive.
 - .3 The result should be concrete that is uniform in colour and texture with no ghosting of the adhesive.

Architectural Concrete Cleaning

- .3 Cleaning of existing concrete stair guards to remove staining and dirt:
 - .1 Clean only the visibly dirty area, not the entire guard.
 - .2 The result concrete that is uniform in colour and texture. The cleaned area should appear the same at adjacent un-soiled existing areas of concrete. There should be no change in the texture of the concrete (i.e. avoid etching or sand-blasting).

3.3 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

3.4 Adjusting and Cleaning

- .1 During the course of the work of this section and upon satisfactory completion, clear away from the building and *Place of the Work* excess or waste materials and debris and leave the premises in a condition acceptable to *Consultant*.

END OF SECTION

Cementitious Underlayment

PART 1 – GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Cementitious underlayment in locations as indicated, to achieve flush and level floor finishes as specified in Division 09.

1.2 Administrative Requirements

- .1 Cooperation:
 - .1 Verify that concrete supplied for slabs contains no admixtures that would be incompatible with concrete topping.
- .2 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit for approval a list of the system materials intended for use in the *Work* for each condition before installation commences.
- .3 Certificates:
 - .1 Manufacturer's certification that the *Product* is Portland cement-based having an inorganic binder content which is a minimum 80% Portland cement when tested per ASTM C150/C150M-22 - Standard Specification for Portland Cement.
 - .2 Manufacturer's certification that *Product* specified is suitable for intended use when installed in accordance with manufacturer's written installation requirements.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 Applicators:
 - .1 Shall have 5 years' experience, minimum, in application of *Products* specified and with approval and training of *Product* manufacturer.

PART 2 - PRODUCTS

2.1 Materials

- .1 Self-levelling cementitious underlayment system:
 - .1 Description: Primer and mix of special cements and binders which, when mixed with water, become highly liquid cement compound that seeks its own level and produces flat, smooth surfaces.

Cementitious Underlayment

- .2 Compressive strength: 5000 psi, minimum, at 28 days, to ASTM C109/C109M-21 (air cure only).
- .3 Aggregate: well graded, washed gravel 3 mm to 6 mm (1/8" to 1/4") or larger for use when underlayment is installed over 38 mm (1-1/2") thickness.
- .4 Each material used in the application of self-levelling cementitious underlayment shall be as approved or manufactured by *Supplier* of cementitious underlayment.
- .5 Colour: Natural cement grey.
- .6 Thickness:
 - .1 Filling in trenched areas from the existing raceway to new power and data stub-ups or floor-boxes: 76 mm.
 - .2 Levelling out irregularities in existing floor: 6 mm.
- .7 Acceptable *Products*:
 - .1 Ardex Engineered Cements 'ARDEX K-15 Self-Levelling Underlayment Concrete'.
 - .1 Primer: 'ARDEX P-51' for standard absorbent concrete, and as recommended by cementitious underlayment manufacturer for other concrete porosities.
 - .2 Substitutions: in accordance with Section 01 60 00.

2.2 Mixing

- .1 Mix in accordance with manufacturer's written requirements.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that specified field conditions are achieved before commencing work of this section.
- .2 Surfaces to receive cementitious underlayment shall be smooth, sound, dry, and free from conditions that will adversely affect execution, permanence, or quality of the work of this section and in accordance with manufacturer's written requirements.
- .3 Defective work resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.

3.2 Preparation

- .1 Substrate shall be sound, dry, and free of dust, dirt, paint, grease, oil or other foreign substances.
- .2 Fill voids that allow the mix to run through the substrate.
- .3 Keep other *Subcontractors* from area to be poured during day of pour. Keep heavy work off of cementitious underlayment for at least 2 to 4 hours following pour, in accordance with cementitious underlayment manufacturer's written requirements.

Cementitious Underlayment

- .4 Protect adjacent surfaces from damage resulting from work of this section. If necessary, mask and/or cover adjacent surfaces, fixtures, equipment, and the like by suitable means.
- .5 Concrete substrates shall be cured a minimum of 28 days.
- .6 Erect barriers to prevent entry and presence of personnel not performing work of this section during application of cementitious underlayment.
- .7 Mechanically roughen and clean substrate, by shot blasting in accordance with cementitious underlayment manufacturer's written requirements.

3.3 Applications

- .1 Verify that cementitious underlayment manufacturer's required conditions have been met at the *Place of the Work* prior to commencing application.
- .2 Prime prepared substrate and apply cementitious underlayment in accordance with manufacturer's written requirements.
- .3 Finished surface shall be true to plane within ± 3 mm ($1/8$ ") in a 3m ($10'-0$ ") as described in ACI 117-10, straightedge in accordance with CAN/CSA A23.1/A23.2-14.
- .4 Apply cementitious underlayment such that no laps, voids, or other marks or irregularities are visible and may telegraph through to finished flooring installed under Division 09.
- .5 Do not cover or bridge expansion joints or control joints. Provide 3 mm ($1/8$ ") wide sawcut joints over concrete slab control joints.
- .6 Feather cementitious underlayment to level with adjacent finished floor heights to within 3 mm ($1/8$ ").

3.4 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.
 - .1 Field tests and inspections:
 - .1 Test for moisture vapour transmission in accordance with ASTM F710-22 and ASTM F1869-22 or ASTM F2170-19a in accordance with manufacturer's written flooring installation requirements. Results must not exceed $170 \mu\text{g}/\text{m}^2$ ($3 \text{ lb per } 1,000 \text{ ft}^2$) in 24 hours when tested to ASTM F1869-22, or exceed 75% when tested to ASTM F2170-19a.
 - .2 Test for surface pH. Levels of pH shall not exceed the written recommendations of the flooring manufacturer and adhesive manufacturer. Test in accordance with ASTM F710-22.
 - .3 For each test type: Conduct 3 tests for flooring applications up to 93 m^2 (1000 ft^2) in area, and 1 additional test for each additional 93 m^2 (1000 ft^2) of flooring area.

3.5 Adjusting and Cleaning

- .1 Remove promptly as work progresses spilled or spattered cementitious underlayment materials from surfaces. Clean floors upon completion of the work of this section.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Work of this section includes architectural metal fabrications and related metals identified on the drawings (MT-1, MT-2, MT-3a and MT-3b).
 - .2 Corner guards (MT-4): Steel corner guards; painted steel.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit a list of fabrications to be provided as part of the work of this section.
 - .2 Include plans, sections and large scale details, exposed-to-view edge conditions.
 - .3 Indicate materials, including material characteristics, profiles of each metal fabrication member, methods of assembly and joinery, fittings, fastenings, finishes, anchorages, welds, solders, brazing, and their structural characteristics relative to their purpose, accessory items, and other fabrication information required.
 - .4 Indicate proposed *Place of the Work* connections and methods.
 - .5 Submit coordination drawings indicating locations of concealed grounds, cutouts, plates, and other required fabrications.
 - .6 Show relation to adjoining construction, details of outside and inside corners and door openings.
- .4 Samples:
 - .1 Submit 4 sets of 200 mm x 200 mm (8" x 8") samples of architectural metals, with specified finish, or 200 mm (8") long samples of the profiles shown in drawings.
 - .2 Submit 4 sets of samples of shop finished materials, show each type of finish and colour, 200 mm x 200 mm (8" x 8") size.
 - .3 Provide samples of welded joints showing quality of workmanship.
 - .4 Provide fastener samples for each type required.
- .5 Certificates: mill certificates signed by manufacturers of stainless steel certifying that products furnished comply with requirements.

Architectural Metal Fabrications

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Manual shall include detailed maintenance and cleaning procedure for materials and finishes requiring specific care, noting particularly those procedures or materials which will cause damage to finished surfaces.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 *Subcontractor*, shop foreperson, and *Place of the Work* installation foreperson:
 - .1 Have adequate plant, equipment, and skilled tradespersons to perform work expeditiously.
 - .2 Has successfully completed installations similar to that specified during a period of at least the immediate past 10 years.
 - .3 Fabricators shall have experience working with all metal types specified in this section.
 - .2 Provide separation of stainless steel or non-ferrous metals fabrication areas from mild steel fabrication areas.
 - .3 Grinders, wire brushes, and tools used on stainless steel or non-ferrous metals shall be free of materials which will leave or produce dissimilar material or metal oxides deposits. Tools previously used on mild steel shall not be used on stainless steel or non-ferrous metal work.
 - .4 Do not bring iron or mild steel surfaces into contact with stainless steel or non-ferrous metals, including lifting tools, steel tables, storage racks, and other storage and handling equipment.
 - .5 Cutting or grinding debris from iron or mild steel materials shall not be permitted to settle on stainless steel or non-ferrous materials and fabrications.
 - .6 Perform water-wetting and drying tests during finishing indicating free iron on finished stainless work in accordance with ASTM A380-06.
 - .2 Aspects of the work of this section are required to be prepared by a professional engineer. Refer to Section 01 30 00 and 01 33 00 for specific details and requirements in this regard.
- .2 Mock-ups:
 - .1 Provide mock-ups, per the following list:
 - .1 MET-3; full sized ceiling shroud for light fixtures at locations indicated by *Consultant* and in accordance with electrical documents. Accepted mock-up to remain as a part of the completed work.
 - .2 Provide full sized mock-up of MT-4 corner guard. Accepted mock-up to remain as a part of the completed work.
 - .2 Refer to Section 06 40 00 for millwork mock-ups containing metal fabrications.

Architectural Metal Fabrications

- .3 Mock-up may be incorporated in the completed work upon acceptance of *Consultant*.

1.6 Delivery, Storage, and Handling

- .1 For aluminum fabrications comply with AAMA CW-10 – Care and Handling of Architectural Aluminum from Shop to Site.
- .2 Label, tag or otherwise mark work supplied for installation by other sections to indicate its function, location in building and shop drawing designation.
- .3 Metals subject to corrosion during handling and storage shall be protected from exterior and adverse conditions to preserve finish.
- .4 Deliver work to location at the *Place of the Work* designated by *Contractor* and to meet requirements of construction schedule.
- .5 For metalwork items which are susceptible to damage from construction activities provide strippable temporary protective film on factory finished or prefinished surfaces before shipping.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Design, fabricate, and install work of this section in accordance with the building code and requirements of authorities having jurisdiction.
- .2 Welding/brazing:
 - .1 Steel: Weld components to conform to requirements of CSA W59-18, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA W47.1-19 and CSA W55.3-08 (R2018) as applicable.
 - .2 Stainless steel: Weld components to conform to requirements of CSA W59-18 and ANSI/AWS D1.6/D1.6M-2007 as applicable, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA W47.1-19.
 - .3 Aluminum: Weld components to conform to requirements of CSA W59.2-18, and by a fabricator certified by the Canadian Welding Bureau to conditions of CSA W47.2-11(R2020).
 - .4 Brazing of bronze materials: braze components to conform to the requirements of AWS BRH-2007 Brazing Handbook.
- .3 Design assemblies and connections to withstand own dead load, super-imposed dead loads, live load, and fabrication forces, without permanent distortions or deformation, to maximum allowable deflection of L/360, within the following construction tolerances:
 - .1 Edges and surfaces shall be uniform for like metalwork.
 - .2 Limit inconsistencies in edge and surfaces to those which can be identified when viewed from distance of not greater than 300 mm (12").
 - .3 Surfaces of panels shall be flat and free of distortion when viewed from any distance or angle from surface.
 - .4 Finish shall be uniform when viewed from any distance from surface or from like surfaces which are viewed from within the same viewing area.

Architectural Metal Fabrications

- .5 Limit variations from plumb and level:
 - .1 3.2 mm in 6096 mm (1/8" in 20'-0") vertically and horizontally.
 - .2 6.4 mm in 12192 mm (1/4" in 40'-0") either direction.
- .6 Limit offsets in theoretical end-to-end and edge-to-edge alignment:
 - .1 1.6 mm (1/16") where surfaces are flush or less than 12.7 mm (1/2") out of flush and separated by not more than 50 mm (2").
 - .2 3.2 mm (1/8") for surfaces separated by more than 50 mm (2").
- .7 Step in face: 1.6 mm (1/16") maximum.
- .8 Jog in alignment: 1.6 mm (1/16") maximum.
- .9 Location: 6.4 mm (1/4") maximum deviation of any member at any location.
- .10 Tolerances are not cumulative.
- .4 Comply with NAAMM AMP 555-92 – Standard Practice for the Architectural Metal Industry (Including Miscellaneous Iron).

2.2 Materials

- .1 General:
 - .1 Unless detailed or specified otherwise, standard *Products* will be acceptable if construction details and installation meet requirements of the *Contract Documents*.
 - .2 Include materials, *Products*, accessories, and supplementary parts necessary to complete assembly and installation of work of Section 05 50 10.
 - .3 Incorporate only metals that are free from defects that are visible, or that impair strength or durability. Install only new metals that are of best quality, free from rust or waves and buckles, clean, straight, with sharply defined profiles.
- .2 Steel:
 - .1 Structural shapes, plate, bars: hot-rolled, in accordance with CSA G40.21-13, Grade 300W.
 - .2 Hollow structural sections: hot-formed, seamless, in accordance with CSA G40.21-13, Grade 350W, Class H.
 - .3 Mild steel sheet and strip: hot rolled, in accordance with ASTM A1011/A1011M-14, Commercial.
 - .4 Cold rolled sheet: stretcher levelled, fully pickled, in accordance with ASTM A1008/A1008M-13, Grade CS Type A exposed, matte finish, oiled, unless otherwise indicated.
 - .5 Steel pipe: in accordance with ASTM A53/A53M-12, Type E or S, Grade A or B, standard weight, Schedule 40 seamless black or AISI MT 1010/1015.
- .3 Stainless steel:
 - .1 Type 304L unless otherwise indicated.
 - .2 Stainless steel tubing: in accordance with ASTM A269/A269M-15a, Commercial Grade, seamless welded.

Architectural Metal Fabrications

- .3 Stainless steel sheet and plate: in accordance with ASTM A167-99(2009).
- .4 Stainless steel bar and angle: in accordance with ASTM A276/A276M-23.
- .5 Stainless steel seamless pipe: in accordance with ASTM A312/A312M-17.
- .4 Aluminum:
 - .1 Aluminum extrusions: Alloy 6063-T5 or T6 to ANSI H35.1/H35.1M-2017.
 - .2 Aluminum sheet: Aluminum alloy 5005H14 to ANSI H35.1/H35.1M-2017. Exposed sheet shall be machine flattened free of distortions, resquared sawcut edges.
 - .3 Cast aluminum: 710 Series Aluminum, formed by casting process (wax or plaster), sandblasted and Class 1 clear anodized finish.
- .5 Bronze:
 - .1 Interior architectural bronze; Alloy 38500 and 28000, and as follows:
 - .1 Shapes: in accordance with ASTM B455/455M-20, temper M31.
 - .2 Bar and strip: in accordance with ASTM B36/B36M-18, temper M31.
 - .3 Plate and sheet: in accordance with ASTM B36/B36M-18, temper M31.

2.3 Accessories

- .1 Fasteners:
 - .1 Exposed fasteners to match the material surface on which they occur.
 - .2 For fastening steel: Zinc plated screws and bolts, and in accordance with ASTM A307-21, Type 304 stainless steel where exposed to exterior.
 - .3 For fastening stainless steel: same metal as that being fastened. Match finish of exposed heads with material being fastened.
 - .4 For fastening aluminum: Stainless steel 300 Series, stainless steel 400 Series, cadmium plated or aluminum.
 - .5 For fastening bronze: Same metal as that being fastened or other non-corrosive metal as recommended by manufacturer. Match finish of exposed heads with material being fastened.
 - .6 Other types of fasteners as appropriate to meet design requirements.
 - .7 Fasteners shall be tamperproof where exposed. Exposed fasteners shall be countersunk, installed flush with the material surface.
- .2 Welding materials:
 - .1 Steel: in accordance with CSA W59-18.
 - .2 Aluminum: in accordance with CSA W59.2-18.
 - .3 Stainless steel: in accordance with ANSI/AWS D1.6/D1.6M-2017.
 - .4 Bronze:
 - .1 Solder: in accordance with ASTM B32-08, composition 50/50 tin/lead except 60/40 tin/lead for lead coated metal.

Architectural Metal Fabrications

- .2 Flux: muriatic acid neutralized with zinc or manufacturer's approved brand of soldering flux.
- .3 Grout:
 - .1 Epoxy grout; non-shrink, non-expanding.
 - .1 Acceptable *Products*:
 - .1 Hilti 'HY-200'.
 - .2 Sika 'Sika AnchorFix 3001'.
 - .3 W.R. Meadows 'REZI-WELD 3/2 EPOXY GROUT/PATCH'.
 - .2 Cementitious grout: non-shrink, non-expanding to ASTM C1107/C1107M-20:
 - .1 Acceptable *Products*:
 - .1 Sika 'Sika Grout 212' or 'Sika M-Bed Standard'.
 - .2 W.R. Meadows 'Sealtight CG-86 Construction Grout'.
 - .3 Substitutions: in accordance with Section 01 60 00.
 - .4 Dielectric separator: Best grade, quick drying non-staining alkali resistant bituminous paint in accordance with CAN/CGSB 1.108-M89, or membrane type to acceptance of *Consultant*.

2.4 Finishes

- .1 Shop primer; premium quality:
 - .1 Acceptable *Product*:
 - .1 Sherwin Williams 'Pro Industrial Pro-Cryl Universal Primer', 0.0076 mm (3 mils) DFT.
- .2 Stainless steel:
 - .1 Bronze appearance finish, to match *Consultant's* control sample.
- .3 Bronze:
 - .1 Brushed light bronze patina, waxed finish to match *Consultant's* control sample.
- .4 Powder paint:
 - .1 Tiger Drylac, Solid Colour series, polyester powder paint finish, one coat, smooth matte finish. Colours:
 - .1 MT-3a: as indicated on drawings.
 - .2 MT-3b: as indicated on drawings.
- .5 Site painting (MT-4): in accordance with Section 09 91 00.

2.5 Fabrication

- .1 General:
 - .1 Fabricate architectural metal fabrications with machinery and tools specifically designed for the intended manufacturing processes and by skilled tradesmen.

Architectural Metal Fabrications

- .2 Fit and assemble architectural metal fabrications in shop. When this is not possible, make a trial shop assembly.
- .3 Incorporate means for fastenings of other work secured to work of this section.
- .2 Construction:
 - .1 Fabricate with materials, component sizes, metal thicknesses (gauges), reinforcing, anchors, and fasteners of adequate strength to withstand intended use, and within allowable design factors imposed by jurisdictional authorities. Fabricate items from steel unless otherwise noted.
 - .2 Architectural metal fabrications shall remain free of warping, buckling, opening of joints and seams, distortion, and permanent deformation to expansion and contraction forces and loads.
- .3 Assembly:
 - .1 Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
 - .2 Corners shall be mitred unless otherwise noted.
 - .3 Fasten work with concealed methods unless otherwise indicated.
 - .4 Weld connections where possible, bolt where not possible, and cut off bolts flush with nuts. Countersink bolt heads, and provide method to prevent loosening of nuts. Ream holes drilled for fastenings.
 - .5 Allow for differential movements within assemblies and at junctions of assemblies with surrounding work.
 - .6 Incorporate holes and connections for work installed under other sections.
 - .7 Cleanly and smoothly finish exposed edges of materials including holes.
 - .8 Cap open ends of sections exposed to view, such as pipes, channels, angles, and other similar work.
- .4 Shop prime painting; premium quality:
 - .1 Clean loose mill scale, rust, dirt, weld flux and spatter from work after fabrication.
 - .2 Clean and prepare surfaces to meet specified requirements of SSPC SP-6 and paint manufacturer's installation requirements.
 - .3 Apply primer in accordance with paint manufacturer's installation requirements.
- .5 Powder painting:
 - .1 Apply powder paint in accordance with the manufacturer's requirements and recommendations and as follows.
 - .2 Clean surfaces to be coated as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping dry with clean cloths or compressed air.
 - .2 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .3 Allow surfaces to drain completely and allow to thoroughly dry.

Architectural Metal Fabrications

- .3 If the above procedures do not clean the substrate surfaces, clean the surfaces with high pressure water washing.
- .4 Apply pretreatment as soon as possible after cleaning and before surface deterioration occurs.
- .5 Pre-treat iron phosphate for steel, zinc phosphate for galvanized or steel structures, and yellow or green chromating, or approved chrome-free for aluminum substrates.
- .6 Spray application:
 - .1 Apply coating to requirements of coating manufacturer's written application requirements.
 - .2 Method of application: as recommended by paint system manufacturer.
 - .3 Spray application.
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly fluidizing powder coating to be applied.
 - .2 Apply coating materials to clean surfaces to minimum 2.5 - 3.5 mil dry film thickness or as specified by manufacturer.
 - .3 Coating shall adhere to internal corners and recessed areas.
 - .4 Allow surfaces to cure for minimum time period as required by manufacturer.
 - .5 Cure in accordance with manufacturer's cure curves.
- .6 Fabrications exposed to view:
 - .1 Fabrications exposed to view shall be of the highest architectural quality, free of scratches, pitting, roughness, marring, discolouration, seams, staining and other imperfections with the quality of workmanship conforming to the workmanship classifications of Class 1 as defined in NAAMM-AMP 555-92, paragraph 8.3 of Section 8, Quality Control or Assurance and as follows:
 - .1 Exposed surfaces are finished smooth with pits, mill marks, nicks and scratches filled or ground off. Defects shall not show when painted or polished. Remove sharp corners and edges.
 - .2 Conceal welds where possible. Where exposed, grind welds to small radius with uniform sized cove. Welds shall appear continuous in appearance. When painted or polished welds shall be undetectable.
 - .3 Use only flat head countersunk bolts in exposed locations unless indicated otherwise.
 - .4 Distortions shall not be visible to the eye.
 - .5 Exposed joints shall be fitted to hairline finish.
 - .2 Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

Architectural Metal Fabrications

- .3 Form decorative metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
- .4 Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the work.
- .5 Form simple and compound curves in bars, pipe, tubing, and extruded shapes by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.
- .6 Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1 mm (0.040") unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- .7 Mill joints to a tight, hairline fit. Cope or mitre corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.
- .8 Surface preparation; non-ferrous metals: Remove tool and die marks and stretch lines, or blend into finish. Grind and polish surfaces to produce uniform finish, free of cross scratches. Run grain of directional finishes with long dimension of each piece.

PART 3 - EXECUTION

3.1 Examination

- .1 Take measurements at the *Place of the Work* to verify that architectural metal fabrications fit surrounding construction, around obstructions and projections in place, or as indicated, and to suit service locations.
- .2 Inspect surfaces on which work of this section is dependent for any irregularities detrimental to installation and performance of the work of this section. Confirm conditions are satisfactory before proceeding.

3.2 Installation

- .1 Install work plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding Work and as required for proper performance.
- .2 Supply and install anchor bolts, high tensile bolts, washers and nuts, expansion bolts, toggles, straps, sleeves, brackets, clips, and other items necessary for secure installation as required by loading and jurisdictional authorities.
- .3 Countersink holes at wood screws where wood is attached to work of this section.
- .4 Attach metal fabrications to interior concrete and masonry with corrosion resistant expansion bolts to support load with a safety factor of 3.
- .5 Grout metal posts, pickets, balusters, and the like, in metal sleeves cast into concrete, with non-shrink quick setting epoxy anchor cement, unless detailed otherwise. Fabricate sleeves of 75 mm (3") minimum depth.
- .6 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

Architectural Metal Fabrications

- .7 Erect members and component parts plumb, level and true to building lines, in correct relation to work of other sections and established lines, curves and levels indicated.
- .8 Securely anchor metal framing to concrete by means of anchor rods with epoxy adhesive, shim and pack to true straight lines and levels.
- .9 Field welding:
 - .1 Comply with applicable specification for procedures of manual shielded metal arc welding and requirements for welding and for finishing welded connections given above in this section.
 - .2 Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

3.3 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

3.4 Adjusting and Cleaning

- .1 After erection, touch up primed surfaces that are burned, scratched or otherwise damaged with prime paint to match shop paint.
- .2 Repair areas of bare metal and welds on galvanized surfaces with zinc rich paint.
- .3 Remove damaged, dented, defaced, defectively finished, or tool marked components and replace with new.
- .4 Clean and polish surfaces after installation is complete. Use only materials that will not scratch or mar finished surfaces and as approved by material manufacturers.

3.5 Protection

- .1 Protect finished surfaces from damage from time of installation until final finishes are applied or to final cleanup.

END OF SECTION

Rough Carpentry

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 The work of this section includes, but is not necessarily limited to, the following:
 - .1 Plywood backing panels.
 - .2 Wood grounds, nailers, blocking and sleepers.

1.2 Delivery, Storage, and Handling

- .1 When it is required that wood maintain dimensional stability and tolerances to ensure accurate installation of later work, store and install it only in dry areas, and where no further installation of moist materials is contemplated.

PART 2 - PRODUCTS

2.1 Wood Materials

- .1 General requirements:
 - .1 Except as indicated or specified otherwise lumber shall be softwood, S4S, moisture content not greater than 19% at time of installation, in accordance with following standards:
 - .1 CSA O141-05.
 - .2 NLGA-2014 Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds:
 - .1 Use S2S material.
 - .2 Dimension lumber sizes: in compliance with Section 12 of the NLGA-2014.
 - .3 Dimension lumber species and grades:
 - .1 Spruce-Pine-Fir.
 - .2 Light framing in accordance with NLGA-2014 Construction grade, S-Dry.
 - .3 Planks in accordance with NLGA-2014 No. 2 grade, S-Dry.
 - .4 Boards in accordance with NLGA-2014 No. 4 Common grade, S-Dry.

2.2 Panel Materials

- .1 Softwood plywood (CSP): in accordance with CSA O151-09.
- .2 Douglas Fir plywood (DFP): in accordance with CSA O121-08.

2.3 Fastenings and Hardware

- .1 General:

Rough Carpentry

- .1 Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 38 mm (1-1/2") into wood substrate.
- .2 Anchors to concrete and unit masonry: Capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing according to ASTM E488/E488M-22.
- .3 Use surface fastenings of following types, except where specific type is indicated.
 - .1 To hollow masonry, plaster and panel surfaces use 9 mm (11/32") expansion bolts or other acceptable anchor.
 - .2 To solid masonry and concrete use expansion bolts.
 - .3 To structural steel use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws, or welded stud-bolts.
 - .4 To steel deck use bolts through drilled hole or power driven self-drilling screws.
- .4 Fastener materials:
 - .1 Hot-dip galvanized fasteners: in accordance with ASTM A153/A153M-09 Class A or B1 G185 and connectors meeting ASTM A653/A653M-13 Class G-185 sheet or better.
- .5 Hardware materials:
 - .1 Hot-dipped galvanized in accordance with ASTM A153/A153M-09, Class A or B1, and connectors in accordance with ASTM A653/A653M-13, Class G185.

2.4 Source Quality Control

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

2.5 Finishing

- .1 Finishing of exposed blocking: to be painted in accordance with Section 09 91 00, as indicated on architectural drawings.

PART 3 - EXECUTION

3.1 General

- .1 Layout work to accommodate work of others. Cut and fit accurately. Erect in position indicated. Align, level, square, plumb, and secure work permanently in place.
- .2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolt head and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .3 Include in work of this section rough hardware such as nails, bolts, nuts, washers, screws, clips, and connectors required for complete and proper installations; and operating hardware required on work of this section for temporary use.
- .4 Do not attach work by wood plugs or blocking in concrete or masonry.

Rough Carpentry

- .5 Do not regard nailers, blocking, and such other fastening provision indicated as exact or complete. Install required provisions for fastening, located and secured to suit *Place of the Work* conditions, and adequate for intended support.
- .6 Verify that grounds required for fastening of components and equipment are located correctly, and sized for adequate support.

3.2 Equipment Backboard

- .1 Provide backboards for mounting equipment as required. Use 19 mm (3/4") Softwood Plywood.
- .2 Refer to Divisions 21, 22, and 23 and Divisions 26, 27, and 28 for requirements for electrical backboards.

3.3 Miscellaneous Plywood Blocking

- .1 Provide minimum 19 mm (3/4") softwood plywood blocking for attachment of miscellaneous fitments as indicated.
- .2 Wood blocking within gypsum board metal stud assemblies under work of Section 09 22 00.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

.1 Section includes:

- .1 Work of this section includes architectural woodwork including, but not limited to, the following:
 - .1 Standing and running trim.
 - .2 Cabinetry and hardware.
 - .3 Plastic laminate fabrications.
 - .4 Wood blocking / MDF filler pieces.
 - .5 Linoleum desktop surfacing.
 - .6 Upholstery and banquettes.
 - .7 Wood wall panels.
 - .8 Custom solid wood edge trims for prefabricated wood panels specified in Section 09 77 13.
 - .9 Factory and site finishing of architectural woodwork.

.2 Section excludes:

- .1 Prefabricated wood panels: in accordance with Section 09 77 13.
- .2 Factory finishing of architectural metalwork and trim: in accordance with Section 05 50 10.

1.2 Administrative Requirements

.1 Coordination:

- .1 Coordinate with other work for satisfactory and expeditious completion of the work of this section. Coordinate with partition accessories, electrical, communications, audio-visual, and finish components to ensure that proper provisions are made for the installation of the work of this section and for work by others.
- .2 Where woodwork is to be fitted to other construction, check actual dimension of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delays in the *Work*.
- .3 Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the work of this section and set in place. Instruct applicable *Subcontractors* as to their locations.
- .4 Provide cut-outs for raceways, sleeves, grommets and other manufactured accessories which are required for the work of this section and for work by others.

Architectural Woodwork

Section revised and reissued by Addendum

- .5 Architectural woodwork specified under this section includes woodwork items which are closely integrated with both prefinished and field painted architectural metalwork, stonework, and built-in electrical components, and consequently requires close coordination with such allied trades. This section is responsible for ensuring correct installation procedures and results.

- .2 Conduct a pre-fabrication meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.

- .2 *Product* data sheets:

- .1 Submit manufacturer's *Product* data for each type of *Product* and process proposed for use in the work of this section and incorporated into items of architectural woodwork.

- .3 Certificates:

- .1 Fire retardant pressure treated lumber or panel materials and water resistant panel materials shall be accompanied by supplier's certificate of conformance with this specification.

- .2 Include manufacturer's written requirements for finishing treated material.

- .4 Shop drawings:

- .1 Submit shop drawings for the work of this section complying with the North American Architectural Woodwork Standards 4.0 requirements.

- .2 Submit engineered shop drawings for the following architectural woodwork assemblies:

- .1 Wall hung or suspended millwork.

- .2 Desks requiring steel supports to achieve large spans, as indicated on drawings.

- .3 Indicate quality standards and grades.

- .4 Include full scale drawings of exposed-to-view edge conditions.

- .5 Include plans, sections and large scale details, and indicate components and methods of assembly, fastenings, and other fabrication information required for the work of this section. Indicate assembly joint lines.

- .6 Include materials and their characteristics and finishes as applicable including the following:

- .1 Panel core and material types, thicknesses, compliance with specified standards, special treatments.

- .2 Adhesive types to be used and locations.

- .3 Finishing requirements including North American Architectural Woodwork Standards 4.0 finish system number, sheen, and required application steps.

- .7 Submit coordination drawings indicating locations of concealed grounds, cut-outs, plates, and other required fabrications.

Architectural Woodwork

Section revised and reissued by Addendum

- .8 Show relation to adjoining construction, details of outside and inside corners and door openings.
- .9 Provide flame spread ratings of walls and ceiling finishes to meet building code requirements, tested and listed by accredited listing agency.
- .5 Selection samples:
 - .1 Submit 3 sets of samples for initial selection purposes of actual veneers showing full range of grain and colour variation, colour and matching, natural characteristics reflecting wood cut and species, manufacturing characteristics, and for each wood species specified. Submit samples as many times as required until approved by *Consultant*. First submission to include one set of samples per *Consultant* request plus one set lighter in tone and one set darker in tone. Basis of design for colour selection will be PLAM-1.
 - .1 Solid wood with factory finish, and each type of edge trim: set of 3 pieces, 50 mm x 19 mm x 450 mm (2" x 3/4" x 18"), for each colour and finish and installed condition, finished on one side and one edge, complete with plastic laminated end as applicable.
 - .2 Veneered panels, with each type of edge trim with factory finish: 3 finished samples, minimum 450 mm x 450 mm (18" x 18") or larger size for each finish and installed condition, four piece matched veneer cut and colour as specified to fully illustrate natural characteristics, manufacturing characteristics, colour and matching, and special characteristics.
 - .3 Solid wood slats, with custom edge profile.
 - .4 Linoleum desktop surfacing.
 - .2 Casework hardware, one unit of each type and finish.
 - .3 Upholstery foam: Submit minimum 200 mm x 200 mm (8" x 8") samples in thickness to be used for project accompanied by product data information indicating density/weight of foam, compression/softness or firmness of the foam.
 - .4 Upholstery cushion: Submit 1 set of samples showing typical outer radius / flat condition, and 1 set of samples showing inner radius condition with stitching throughout entire cushion.
- .6 Verification samples:
 - .1 Submit samples for purpose of verification of compliance with specified requirements.
 - .2 Submit 3 sets of 200 mm x 200 mm (8" x 8") samples, or 200 mm (8") long as applicable, of each specified *Product*, material and finish, including but not limited to the following:
 - .1 Shop finished materials, showing each type of finish and colour.
 - .2 Samples of each specified *Product*, in each specified colour and finish.
 - .3 Plastic laminates, in each specified colour and finish including solid wood edging profiles shown in drawings.

Architectural Woodwork

Section revised and reissued by Addendum

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit maintenance and cleaning instructions for finishes requiring specific care, noting particularly those procedures or materials which will cause damage to finished surfaces to be included in maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers:
 - .1 Architectural woodwork shall be manufactured by a firm having 5 years' experience, minimum, on work of similar size and quality.
 - .2 Shall be a member in good standing of the Architectural Woodwork Institute or the Architectural Woodwork Manufacturers Association of Canada or the Woodwork Institute.
 - .3 Solid surfacing fabricator: Fabrication to be performed by a solid surface manufacturer's certified fabricator. Submit certification letter prepared by the solid surfacing manufacturer.
 - .2 Installers:
 - .1 Has successfully completed 2 architectural woodwork projects similar in scope, materials and design to this *Project* within the last 5 years.
- .2 Quality standard:
 - .1 Work shall be in accordance with the North American Architectural Woodwork Standards 4.0, Premium Grade, or the highest grade available for performance and appearance characteristics of materials in Sections 3 – 5 used that apply to *Product* fabrication and installation requirements governed by Sections 6 – 12.
- .3 Mock-ups:
 - .1 Provide mock-ups of the following millwork fabrications as indicated on the drawings:
 - .1 M001A – 4' x 4' section of the inner radius corner of the banquette, including upholstery (will be used, subject to approval).
 - .2 M001A – 4' x 4' section of the outer radius corner of the banquette, including upholstery (will be used, subject to approval).
 - .3 M002B – minimum 4' section including banquette, upholstery, and arm rest (will be used, subject to approval).
 - .4 M007B – one column with opening for digital display (will be used, subject to approval). Provide custom wood trim together with panels specified in Section 09 77 13.
 - .5 M008 – T-shaped end section of partial height wall with wood slats and trims, as indicated (will be used, subject to approval).

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- .6 M010 – one corner with 2' x 2' section of perimeter trim (will not be used).
Provide custom wood trim together with panels specified in Section 09 77 13.
- .7 M011 – refurbish one full table (will be used, subject to approval).
- .2 Coordinate provision of mock-ups with project schedule. Mock-ups to be provided well in advance of fabrication to allow time for mock-up review. Allow for 2 weeks for review.

1.6 Delivery, Storage, and Handling

- .1 Protect architectural woodwork during transit, delivery, storage and handling to prevent damage, spoilage, and deterioration.
- .2 Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate architectural woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified under paragraph 1.7 Field Conditions.
- .3 The architectural woodwork manufacturer and the *Contractor* shall be jointly responsible to make certain that architectural woodwork is not delivered until the building and storage areas are sufficiently dry so that the architectural woodwork will not be damaged by excessive changes in moisture content.

1.7 Field Conditions

- .1 Environmental conditions:
 - .1 During storage and installation: Obtain and comply with North American Architectural Woodwork Standards 4.0 for optimum temperature and relative humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained. Woodwork shall be acclimatized for a minimum of 72 hours prior to commencing woodwork installation.
 - .2 During finishing: Comply with Architectural Woodwork Standard's temperature and humidity requirements before, during, and after application of finishes.
 - .3 During service life of woodwork: Obtain and comply with woodwork manufacturer's advice for optimum temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Casework integrity shall meet the minimum acceptance levels in accordance with SEFA 8-1999 as outlined in the North American Architectural Woodwork Standards 4.0 and additional or greater loading capacities as specified throughout the North American Architectural Woodwork Standards 4.0.
- .2 Maximum allowable adjustable shelf lengths shall comply with shelves assembly rules per the North American Architectural Woodwork Standards 4.0 based on shelf thickness indicated or scheduled.

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2.2 Wood Materials

.1 Lumber:

- .1 Hardwood for concealed blocking and framing: Custom grade, any species that, when painted, will not show any defects.
- .2 Hardwood for exposed blocking: species and grade to match panel veneer.
- .3 Moisture content: Provide kiln-dried (KD) lumber with moisture content range between 6% to 12% for interior architectural woodwork. Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation do not exceed 5% to 10%.
- .4 Solid hardwood for transparent finish (WD-4).
 - .1 Species: White Oak.
 - .2 Cut: Rift.

.2 Wood veneers:

- .1 Allowable wood veneer face grade characteristics shall comply with North American Architectural Woodwork Standards 4.0 referenced grade and referenced standards.
- .2 Hardwood veneer; for transparent finish:
 - .1 WD-2:
 - .1 Species: White Oak.
 - .2 Veneer thickness: Minimum 1.02 mm (0.040") thick after sanding.
 - .3 Veneer cut: Rift.
 - .4 Veneer leaf matching: Slip.
 - .5 Veneer assembly matching: Balance and Centre.
 - .6 Veneer end matching: Architectural.

2.3 Panel Materials

.1 Panel material schedule; except where indicated otherwise:

- .1 Thickness: 19 mm (3/4") minimum.
- .2 Core panels:
 - .1 At veneered work: MDF, except at shelving use veneer core plywood.
 - .2 At plastic laminate: MDF.
- .3 Maximum moisture content at time of installation: 10% to 12%.

.2 Plywood:

- .1 Veneer core plywood non telegraphing grain: Sanded good one side or good two sides (when both sides exposed or to receive applied finish materials) plywood:
 - .1 Hardwood plywood: in accordance with ANSI/HPVA HP-1-2009.

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- .2 Softwood plywood: to US Plywood Standard APA PS-1-19 Structural Plywood (with Typical APA Trademarks).
- .2 Marine grade plywood: 19 mm (3/4") nominal thickness, in accordance with CSA O121-08, marine grade DFP, sanded both sides.
- .3 Fire rated plywood shall be pressure impregnated with fire-retardant chemicals in accordance with CAN/CSA O80 and have Flame Spread Value (FSV) of not more than 25 to CAN/ULC-S102-10.
- .3 Medium density fibreboard (MDF):
 - .1 To ANSI A208.2-2022, 720 kg/m³ (45 lbs/ft³) minimum density and as follows:
 - .1 Grade:
 - .1 Grade 130.
 - .2 Formaldehyde emission: F21 for panel thicknesses greater than 8 mm (5/16") and F13 for panels equal to or thinner than 8 mm (5/16").
 - .2 Fire retardant medium density fibreboard (MDF) shall comply with the following requirements in addition to the above requirements:
 - .1 No Ammonium Polyphosphate used in composition.
 - .2 Maximum values in accordance with CAN/ULC-S102-10:
 - .1 Flame Spread Value (FSV): Maximum 25.
 - .2 Smoke Developed Value (SDV): Maximum 50.

2.4 Prefabricated Tambour Panels

- .1 Acceptable *Product*:
 - .1 Algoma Wood Products 'Tambour Panels' as supplied by Print International.
 - .1 WT-1: profile WT-19.
 - .2 WT-2: profile WT-21.
 - .2 Finish: to match PLAM-1.

2.5 Plastic and Composite Materials

- .1 High pressure decorative laminate:
 - .1 Post forming grade: in accordance with ANSI/NEMA LD 3-2005, Horizontal Performable Grade (HGP).
 - .2 Colours, finishes, and patterns:
 - .1 PLAM-1:
 - .1 Colour: ~~Hamilton Oak 11123-38~~ as indicated.
 - .2 Acceptable manufacturer: ~~Wilsonart~~ as indicated.
 - .2 PLAM-2:
 - .1 Colour: Woodvine S-5052.
 - .2 Acceptable manufacturer: Nevamar.

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.3 PLAM-3:

- .1 Colour: Frosty White 1573-60.
- .2 Acceptable manufacturer: Wilsonart.

.2 Linoleum desktop (LN-1):

- .1 Linoleum sheet: in accordance with ASTM F2034-18, meeting or exceeding performance characteristics of LF-475A, colours and pattern detail shall be dispersed throughout the thickness of the wear layer.
- .2 Thickness: 2.0 mm (1/12").
- .3 Acceptable *Product*: Forbo 'Furniture Linoleum'.
 - .1 Colour: Olive 4184.
- .4 Substitutions: in accordance with Section 01 60 00.
- .5 Primers and adhesives: as recommended by linoleum sheet manufacturer.

2.6 Upholstery Fabric and Foam

.1 Fabric (FB-1):

- .1 Colour: as indicated on drawings.
- .2 Basis of design:
 - .1 Wolf Gordon 'Piave'.

.2 Fabric (FB-2):

- .1 Colour: as indicated on drawings.
- .2 Basis of design:
 - .1 Momentum Textile 'Silica Leather'.

.3 Foam:

- .1 Heavy duty polyurethane foam, 32 kg/m³ fire retardant interlayer: Dupont Vonar 3.
- .4 Custom stitching: at curved inner radius of banquette, as indicated on drawings.

2.7 Fasteners and Adhesives

- .1 Fasteners shall comply with North American Architectural Woodwork Standards 4.0.
- .2 Upholstery staples: Type, size, to provide sufficient strength to hold upholstered fabric taut and in place without sagging and not visible in finished work.
- .3 Industrial strength Velcro for attaching upholstery to millwork.
- .4 Concealed panel hanging strips: extruded aluminum interlocking strips. Strips and fasteners/anchors to be capable of supporting 2.5 times dead load of panels in both vertical and horizontal panel applications.
- .5 Adhesives: Shall be used for intended purpose and manufacturer materials applications and installation, applied in accordance with manufacturer's written requirements and shall comply with the "adhesive usage guidelines" recommendations of North American Architectural Woodwork Standards 4.0.

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2.8 Hardware

- .1 Casework hardware; to be furnished and installed by the architectural woodwork manufacturer.
 - .1 Where casework hardware is not specified or indicated on drawings or scheduled, casework hardware shall comply with ANSI/BHMA Standards, latest edition, minimum grades, loading and other basic rules per the North American Architectural Woodwork Standards 4.0.
 - .2 Hinges: as noted on drawings.
 - .3 Locks: as noted on drawings.
 - .4 Grommets: as noted on drawings.
 - .5 Custom brackets for mating with existing shelf standards: to be custom fabricated as a part of the work of this section.

2.9 Finishes - Interior Architectural Woodwork

- .1 General: The entire finish of interior architectural woodwork is specified in this section, regardless of whether factory applied or applied after installation.
- .2 Preparations for finishing:
 - .1 Prior to finishing, exposed portions of woodwork shall have handling marks or effects of exposure to moisture removed with a thorough final sanding over surfaces of the exposed portions, using appropriate grit sandpaper, and shall be cleaned prior to applying sealer or finish. Sanding shall be completed just prior to stain or finishing application.
 - .2 Concealed surfaces of woodwork that might be exposed to moisture, such as those adjacent to exterior concrete or masonry walls, shall be back-primed.
 - .3 Comply with referenced quality standard in Part 1 for sanding, filling countersunk fasteners, sealing concealed surfaces and similar preparations for finishing of architectural woodwork, as applicable to each unit of work.
- .3 Finish for veneer and solid wood:
 - .1 Comply with requirements indicated below for finish system, staining, and sheen.
 - .1 Sheen: Satin. Sheen range measurements in accordance with North American Architectural Woodwork Standards 4.0.
 - .2 Factory finish with transparent, Post Catalyzed Lacquer in accordance with the North American Architectural Woodwork Standards 4.0, Section 5.
 - .1 Transparent finish:
 - .1 Tint to match PLAM-1.

2.10 Fabrication

- .1 Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises pre-cut, where possible, to receive hardware and other items of work.

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- .2 Complete fabrication, assembly, finishing, hardware application, and other work before shipment to maximum extent possible. Trial fit in shop and disassemble components only as necessary for shipment and installation. Where necessary, provide ample allowance for scribing, trimming, and fitting. Reassemble with concealed fasteners.
- .3 Provide woodwork, solid tops and other indicated materials with pre-cut openings, where possible, for hardware, appliances, plumbing fixtures, electrical work, telephone cut-outs and similar items. Locate openings accurately and provide proper size and shape. Smooth edges of cut-outs and, where located in countertops, seal edges of cut-outs with a water-resistant coating.
- .4 Provide framing for architectural woodwork, complete with bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.
- .5 Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Take responsibility for the stability of furniture and fitments.
- .6 Provide balancing sheets as required, and specified, complying with the North American Architectural Woodwork Standards 4.0.
- .7 Provide surface mount blocking and strapping necessary to support the work of this section. Such blocking shall not be exposed upon completion of work.
- .8 Prefinish work at the factory, except where specified or indicated otherwise.
- .9 Solid wood edging: No end grain shall be visible; mitre external corners; house internal corners.

2.11 Fabrication - Wood Wall and Ceiling Panels

- .1 Fixings, hangers, suspension system: Concealed, manufacturer's standard to suit wall and ceiling installations and as indicated.
- .2 Finish:
 - .1 The complete assembly, including exposed edges, ends, and faces, of wood wall panels, ceiling and matching veneer panels are to be factory pre-finished.
 - .2 The completed wood wall assembly to have a maximum flame spread rating of 25 in accordance with CAN/ULC-S102-10.

2.12 Fabrication – Refurbishment of Existing Millwork Items

- .1 Performance requirements:
 - .1 Perform restoration, refurbishing, and refinishing work in accordance with North American Architectural Woodwork Standards 4.0 Part 12.
 - .2 Re-facing requirements:
 - .1 HPDL facing to be removed using techniques which will not damage the substrate.
 - .2 After removal of HPDL facing, residual adhesive must be removed and surface made smooth to receive new laminate facing.
 - .3 Removal of laminate must be done such that application of new laminate creates a flush transition between new laminate and edges of piece.
- .2 Refurbish existing millwork items where indicated on the drawings.

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- .1 Re-facing:
 - .1 HPDL shall be removed with any damaged core areas repaired and core surface suitably prepared for proper adhesion of the new surface material.
 - .2 Once substrate is prepared for installation of new HPDL finish, apply new HPDL finish in accordance with the requirements of this section.
- .2 Refinishing:
 - .1 Remove existing finish.
 - .2 Repair or patch physical defects.
 - .3 Apply new finish as specified above.

PART 3 - EXECUTION

3.1 Preparation

- .1 Condition woodwork to field conditions in installation areas before installing. Ensure that field conditions have been provided as requested and specified.
- .2 Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.
- .3 Provide grounds, nailers and other required fabrications which are to be built into other work when required.
- .4 Ensure that wall and ceiling variations are not in excess of 6.4 mm (1/4") in 3658 mm (144") and that floors are not in excess of 12.7 mm (1/2") in 3658 mm (144") of being plumb, level, flat, straight, square, of the correct size. Variations shall be corrected prior to installation of work of this section.
- .5 Report conditions contrary to requirements preventing proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

3.2 Installation

- .1 Install woodwork to comply with North American Architectural Woodwork Standards 4.0 for same grade specified in Part 1 of this section for type of woodwork involved.
- .2 Install woodwork plumb, level, true, and straight with no distortions.
- .3 Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- .4 Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
- .5 Complete the finishing work specified in this section to whatever extent not completed at shop or before installation of woodwork.

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3.3 Installation - Wood Wall and Ceiling Panels

- .1 Install wood wall panels using 'Z' clips at panels backs and trim to locations noted. Fit to wall and ceiling types; where necessary only the exposed fixings to be counter sink finishing nails, fill with matching wood filler and sand smooth and touch up finish to match. Casing/trim to have mitred corner joints; frames to be securely fixed, plumb and align with adjacent wall construction.
- .2 Check wood panels items delivered to ensure that they conform to the reviewed shop drawings. Examine reviewed shop drawings and *Contract Documents* for correct quantities of material required, their exact location, function and operation, and check delivered items to ensure that requirements are met.
- .3 Install finish panels on walls in accordance with manufacturer's requirements and templates. Fit accurately, using full complement of fixings and attachments; draw up tight.
- .4 Hang panels as and where indicated, with uniform margins and requisite allowances. Readjust and check panels upon completion of work, correcting alignment problems caused by paint, moisture or improper fixing.
- .5 Field cutting shall be kept to a minimum and performed as recommended by manufacturer.
- .6 Clean wood strips and panels after installation, removing dust, dirt and fingerprints.

3.4 Installation - Tolerances

- .1 Install to a tolerance of 3 mm in 2400 mm (1/8" in 8'-0") for plumb and level (including tops) and with no variations in flushness of adjoining surfaces unless otherwise acceptable in accordance with the North American Architectural Woodwork Standards 4.0.

3.5 Adjusting and Cleaning

- .1 Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork.
- .2 Clean, lubricate, and adjust hardware.
- .3 Clean woodwork on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.6 Protection

- .1 Protect architectural woodwork during remainder of construction period to ensure that work will be without damage or deterioration at time of acceptance.
- .2 Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that woodwork is without damage or deterioration at time of *Substantial Performance of the Work*.

END OF SECTION

Joint Firestopping and Smoke Seals

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Materials installed in joints to restrict the spread of fire and smoke.
 - .1 Joints in or between fire-resistance-rated constructions.
- .2 Section excludes:
 - .1 Firestopping and smoke seals, for mechanical, electrical and communications penetrations of fire resistant assemblies, and firestopping and smoke seals within their respective assemblies. Refer to Divisions 21, 22, and 23 and Divisions 26, 27, and 28.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordinate with other sections to assure that pipes, conduit, cable, and other items that penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
 - .2 Schedule the *Work* to assure that penetrations and other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.
- .2 Conduct a pre-installation meeting in accordance with Section 01 30 00.
 - .1 Representatives for mechanical and electrical work and independent inspection and testing company shall attend pre-installation meeting.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets: Submit data and installation instructions for *Products* providing descriptions sufficient for identification at the *Place of the Work*.
 - .1 Materials list of *Products* proposed for use in the work of this section; complying with listed systems designs.
 - .2 Listing agency's detailed drawing showing joint assemblies and firestopping materials, identified with listing agency's name and number or designation, fire rating achieved, and date of listing.
 - .3 Certificates:
 - .1 Submit the following certification documents with closeout submittals:
 - .1 Manufacturer's certification: Submit manufacturer's certification that installed firestopping and smoke seal *Products* are suitable for the use indicated and comply with specified requirements.
 - .2 Installation certification: Installer shall submit certification that all joint firestopping system installations are completed and that installations comply with listed systems designs.

Joint Firestopping and Smoke Seals

- .4 Submit fire resistance rating test listings for firestopping and smoke seal systems.
- .3 Shop drawings:
 - .1 Submit drawings indicating fire resistance rated assembly number, required temperature, hose stream, and flame rating, material thicknesses, installation methods and materials of firestopping and smoke seals, primers, supports, damming materials as applicable, reinforcements, anchorages, fastenings and methods of installation for each condition to be encountered.
 - .2 Designate on shop drawings static and dynamic joint systems, relative positions, expansion and control joints in rated slabs and walls, and firestopping details.
 - .3 Engineered shop drawings; for engineering judgements:
 - .1 Where *Project* conditions require modification to an accredited third party testing agency's listed system design to address a particular firestopping condition that is not covered by a listed system, submit engineered shop drawings detailing the modifications to the listed system design as an engineering judgment or equivalent fire-resistance-rated assembly, for each *Project* location and condition.
 - .2 Submit the manufacturer's engineering judgment identification number and shop drawing details prepared by a professional engineer. The engineering judgment submittal shall include both *Project* name, *Project* location, and *Subcontractor's* name who will install firestop system as described in engineering judgement shop drawings.
 - .3 Provide complete details of specific application of listed system and its modifications upon which the engineered judgement is based upon.
 - .4 For perimeter fire barrier systems:
 - .1 Submit engineered shop drawings for engineering judgements covering perimeter fire barrier systems. Identify each cladding assembly type in contact with each perimeter fire barrier system.
- .4 Manufacturers' instructions:
 - .1 Manufacturer of *Products* proposed for use in work of this section shall prepare firestopping manual scheduling products to be used for each assembly and installation required in the *Work*.
 - .1 Coordinate with project firestopping manual specified under Section 01 30 00 and 01 33 00.
 - .2 Manual shall include manufacturer's *Product* data sheets as specified under paragraph 1.3.2.
 - .3 Firestopping manual shall be submitted within 4 weeks of *Contract* award.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval, training and certification of *Product* manufacturers.

Joint Firestopping and Smoke Seals

- .1 Submit proof of manufacturer's installer certification for each installer of firestopping and smoke sealant systems.
 - .1 Manufacturer's willingness to sell its firestopping *Products* to the *Contractor* or to an installer engaged by the *Contractor* does not in itself confer qualification on the buyer.
- .2 Applicator shall designate a single individual as *Project* foreperson who shall be present at the *Place of the Work* at all times throughout the work of this section when the work of this section is being performed.

1.5 Delivery Storage, and Handling

- .1 Deliver materials to *Place of the Work* in manufacturer's unopened containers, containing classification label, with labels intact and legible at time of use.
- .2 Store materials in accordance with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
- .3 Do not use damaged or adulterated materials and materials exceeding their expiry date.

1.6 Field Conditions

- .1 Comply with manufacturer's requirements relative to temperature and humidity conditions, before, during and after installation.

PART 2 - PRODUCTS

2.1 Manufacturers

- .1 General: Manufacturers of firestopping and smoke seal system *Products* and installation specialists for the work of this section are limited to applicable assemblies as required for the *Work* and having listing mark on packaging.
- .2 Subject to compliance with requirements, provide products by one of the following:
 - .1 3M Canada Inc.
 - .2 Hilti Canada Corp.
 - .3 NUCO Inc.
 - .4 STI Firestop.
 - .5 Tremco Commercial Sealants & Waterproofing.

2.2 Performance/Design Requirements

- .1 Firestop and smoke sealant systems shall consist of material, or combination of materials installed to retain integrity of fire-rated construction by effectively impeding spread of flame, smoke, and/or hot gasses through perimeter joint or gaps, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers.
- .2 Smoke sealants applied over firestopping materials or combination smoke seal/firestop seal material shall form air tight barriers to prevent passage of gas and smoke.
- .3 Fire-resistance rating of firestopping system shall be equivalent to rating of adjacent floor, wall or other fire separation assembly.

Joint Firestopping and Smoke Seals

- .4 Firestopping system at fire rated assemblies with assembly STC rating requirements shall provide STC rating equal to STC rating of fire rated assembly.
- .5 Confirm locations of exposed/non-exposed firestopping/smoke seal surfaces with *Consultant* prior to application.
- .6 Provide movement capability at movement joints in accordance with design requirements for movement joint.
- .7 Head-of-wall joints; with dynamic designation:
 - .1 Joint assemblies shall permit vertical movement allowing wall to move independent of structure due to forces including, but not limited to, live loads, dead loads, thermal expansion/contraction, and wind sway. Such movement shall not damage the wall assembly or its fire protection components.
 - .1 Provide head-of-wall joints with dynamic designation.
- .8 Regulatory requirements:
 - .1 Joint firestop systems shall be listed in accordance with CAN/ULC-S115-11 and shall achieve required fire resistance rating in accordance with building code.
 - .2 Proposed firestopping and smoke seal materials and methods shall conform to applicable governing codes having local jurisdiction.

2.3 Materials

- .1 Single source responsibility for firestopping and smoke seal materials:
 - .1 Obtain firestopping and smoke seal materials from single manufacturer for each different *Product* required.
 - .2 Manufacturer shall instruct applicator in procedures for each material.
- .2 Firestopping and smoke seal systems shall conform to the following:
 - .1 VOC content not to exceed 250 gm/litre minus water.
 - .2 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gasses in compliance with requirements of CAN/ULC-S115-11 and not to exceed opening sizes for which they are intended.
 - .3 Provide firestopping materials and systems with fire-resistance rating not less than the fire-resistance rating of applicable adjacent assembly.
 - .4 Listed in accordance with CAN/ULC-S115-11.
 - .5 Use only joint firestop systems that have been tested by an accredited third party testing agency for specific fire-rated construction conditions conforming to construction assembly type, joint type and fire-rating requirements for each separate instance.
 - .1 Where there is no specific third party tested and classified firestop system for a particular firestop configuration, submit engineered shop drawings.
 - .6 For joints in fire-separations, provide listed systems designs for the joint firestop and smoke seal systems as required by building code to maintain the integrity of the fire separations.

Joint Firestopping and Smoke Seals

- .7 *Products* shall be compatible with abutting dissimilar membranes, architectural coatings, finishes at floors, walls and ceilings. Check with requirements of *Contract Documents* and manufacturer of selected materials being installed.
- .3 Smoke sealants for overhead and vertical joints shall be non-sagging; sealants for floors shall be self-levelling.
- .4 Smoke seal sealant colour at exposed locations: Grey.

PART 3 - EXECUTION

3.1 Preparation

- .1 Examine sizes, anticipated movement and conditions to establish correct thickness and installation of back-up materials.
- .2 Prepare surfaces in accordance with manufacturer's written specifications and to requirements of listed system designs.

3.2 Installation

- .1 Install joint firestopping and smoke seal systems in accordance with manufacturer's written requirements and in compliance with listed system designs. Products and installation requirements must comply with listed system designs.
- .2 For materials that will remain exposed after completing the *Work*, finish to achieve smooth, uniform surfaces. Tool or trowel exposed surfaces.
- .3 Notify *Consultant* when random completed installations are ready for review, as directed by *Consultant*, prior to concealing or enclosing firestopping and as applicable, smoke seals.
- .4 Protect materials from damage on surfaces subjected to traffic.

3.3 Identification and Documentation

- .1 Provide documentation for each joint firestop system application addressed. This documentation is to identify each joint location on the entire Project.
- .2 Documentation for installed joint firestop systems is to include:
 - .1 Sequential location number.
 - .2 Project name.
 - .3 Date of installation.
 - .4 Detailed description of joint firestop system location.
 - .5 Listed firestop system design number or engineered judgment number.
 - .6 Type of joint.
 - .7 Width of joint.
 - .8 Overall length of joint.
 - .9 Number of sides addressed.
 - .10 Hourly rating of firestop joint system to be achieved.
 - .11 Installers name.

Joint Firestopping and Smoke Seals

3.4 Field Quality Control

- .1 Conduct quality control to be in accordance with Section 01 40 00, 01 45 00, and 01 45 23.
 - .1 Field tests and inspections:
 - .1 Examine completed firestop joint installations to ensure proper installation before concealing or enclosing areas. Keep areas of work accessible until inspections are completed.
 - .2 Inspection consultant to review installation of the work of this section and to perform random tests to verify its completion in accordance with the requirements of the *Contract Documents*.
 - .3 Give at least 48 hours notice before operations commence, and arrange for a pre-job conference with *Contractor*, installer, independent inspection and testing company, manufacturer, and *Consultant* present.
 - .4 Independent inspection and testing company shall examine installed firestopping in accordance with ASTM E2174-20a and ASTM E2393-20a. Independent inspection and testing company shall examine firestopping and shall determine, in general, that firestopping has been installed in accordance with requirements of the *Contract Documents* and in compliance with each listed firestop system design.
 - .5 Representatives of the manufacturer(s) shall have access to the *Work*. *Contractor* shall provide assistance and facilities for such access in order that the manufacturer(s) representative(s) may properly perform its function.
- .2 Manufacturer's field review to be in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

END OF SECTION

Joint Sealants

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Joint sealants – interior locations.
- .2 Section excludes:
 - .1 Glazing system assembly sealants.
 - .2 Mechanical and electrical sealants.
 - .3 Acoustic sealants.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 30 00.
 - .1 The following items shall be addressed at the pre-installation meeting:
 - .1 Analysis of the work and weather conditions.
 - .2 Shape factor of the joint.
 - .3 Recommendations for priming joints.
 - .4 Inspection of surfaces and joints.
 - .5 Compatibility of materials.
 - .6 Backing materials.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit manufacturer's and *Product* name for each sealant which will be used in the *Work* prior to commencing the *Work*.
- .3 Samples:
 - .1 Submit "wet sample" sealant colour samples for each sealant *Product* and colour.
- .4 Test and evaluation reports:
 - .1 Test sealant in contact with samples of materials to be sealed to verify adhesion will be achieved and no staining of the material will result. Prepare sample joints at the *Place of the Work* of each type of sealant for each joint condition.
 - .1 Submit test results to *Consultant* prior to application of sealants.
 - .2 Test sealant in contact with samples of porous materials to be sealed to ensure that no staining of the material will result in accordance with ASTM C1248-22.
 - .1 Submit test results to *Consultant* prior to application of sealants.

Joint Sealants

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
 - .1 Include manufacturer's warranties.
- .2 Maintenance instructions:
 - .1 Submit maintenance instructions for all items for incorporation into the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor:*
 - .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified.
 - .2 Installer to comply with quality assurance articles referenced in ASTM C1193-16(2023) for installation of joint sealants.

1.6 Field Conditions

- .1 Conform to sealant manufacturer's specifications and recommendations.
- .2 Do not proceed with installation of joint sealants under the following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer, or are below 5° C (40° F).
 - .2 When joint substrates are wet.
 - .3 Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
 - .4 Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Interior sealants shall have a VOC limit of 50 g/L maximum, unless otherwise specified, and comply with South Coast Air Quality Management District (SCAQMD) Rule 1168, Adhesive and Sealant Applications.
- .2 Joint sealants:
 - .1 Shall perform as air tight and water-tight joints.
 - .2 Defects shall include, but are not limited to:
 - .1 Staining from abutting materials or filler.
 - .2 Migrating, bleeding into, or staining abutting materials.

Joint Sealants

- .3 Unsightly surface deformation.
- .4 Excessive colour change, chalking, or dust pick-up.
- .5 Failing adhesively or cohesively where maximum elongation is less than 25% of designed width of exposed joints.
- .6 Hardening to more than 25% over specified hardness.

2.2 Sealants

.1 General:

- .1 Single source responsibility: Obtain joint sealant from a single manufacturer for each joint sealant type.
- .2 Colours: Sealant colours shall match colours of adjacent materials, as selected and approved by *Consultant*.
 - .1 Colours shall be custom colour where indicated.
- .3 In accordance with ASTM C920-14 and other requirements indicated for each liquid-applied chemically curing sealant, including those referencing ASTM C920-14 classifications for type, grade, class, and uses.
- .4 For sealants to be applied to porous substrates:
 - .1 Provide products that have undergone testing in accordance with ASTM C1248-22 and have not stained porous joint substrates indicated for *Work*.
- .5 Sealant supplied shall not exude any material(s) which travel into adjacent materials, or travel onto surfaces of adjacent materials; causing damage, or attracting soiling, which becomes apparent during the service life of the building.

.2 Interior general sealants:

- .1 VOC limit: Maximum 50 g/L, unless otherwise indicated.
- .2 Interior sealant; at joints with painted gypsum board: one-component paintable acrylic in accordance with ASTM C834-10 Type OP; or polyurethane in accordance with ASTM C920-14 Type S, Grade NS, Class 35.
 - .1 Acceptable *Products*:
 - .1 Acrylic sealants:
 - .1 Master Builders Solutions Canada 'MasterSeal NP 520'
 - .2 Tremco, Inc. 'Tremflex 834'.
 - .2 Polyurethane sealants:
 - .1 Sika 'Sikaflex 1A'.
 - .3 Substitutions: in accordance with Section 01 60 00.
- .3 Interior sealant; gap filler: at movement paintable joints in vertical surfaces: One-component polyurethane sealant in accordance with the following: ASTM C920-14, Type M or S, Grade NS, Class 25.
 - .1 Acceptable *Products*:
 - .1 Master Builders Solutions Canada 'MasterSeal NP100'.

Joint Sealants

- .2 Sika 'Sikaflex 15LM'.
- .3 Substitutions: in accordance with Section 01 60 00.
- .3 Specialty sealants:
 - .1 Preformed expanding foam secondary (or concealed) sealant:
 - .1 General description: Watertight, 100% free of wax or asphalt compounds, thermal insulating, conforms to gap irregularities, high density open-cell polyurethane foam with microsphere-modified acrylic impregnation technology, sealant sizing in accordance with manufacturer's joint sizing chart.
 - .2 Movement performance, including tension and shear: +25%, -25% (50% total) of nominal material size.
 - .3 Acceptable *Products*:
 - .1 Emseal Joint Systems, Ltd. 'Backerseal'.
 - .2 Substitutions: in accordance with Section 01 60 00.

2.3 Accessories

- .1 General: Provide joint sealants, primers, backings, and fillers that are compatible with one another and with joint substrates and other sealants or joint fillers specified and approved for applications indicated under joint sealant scheduled and under conditions of service and application as demonstrated by joint sealant manufacturer based on proven test results and field experience. When incompatible, inform *Consultant* and change to compatible type acceptable to *Consultant*.
- .2 Cylindrical sealant backings: Provide joint backings that meet ASTM C1330-02, Type O (open-cell polyurethane), or Type B (non-absorbent bi-cellular backing materials with surface skin), sized 25 percent or greater than joint opening with proper density to control sealant depth and profile. Follow joint sealant manufacturer's recommendations with backing selections for optimum joint sealant performance, in accordance with the following schedule:
 - .1 Use open cell foam with non-absorbing closed cell skin (Sof-Rod) for vertical joints; round shape for open joints and triangular shape for angular joints.
 - .2 Use closed cell foam for horizontal joints.
- .3 Bond-breaker tape: Polyethylene tape or other approved plastic tape as recommended by joint sealant manufacturer to prevent 3-sided joint adhesion to rigid, inflexible joint fillers or joint surfaces at back of joint where such adhesion would restrict proper sealant movement or result in sealant failure.
- .4 Masking tape: Non-staining, non-absorbent and compatible with joint sealants and adjacent surfaces.
- .5 Sealant primers: Use primers only as recommended by sealant manufacturer where required to enhance adhesion of sealant to specific joint substrates indicated and as determined for use from pre-construction mock-up testing. Select primers in consultation with sealant manufacturer and manufacturer of substrate material which do not have a detrimental effect on sealant adhesion or in-service performance.

Joint Sealants

.6 Cleaners for nonporous surfaces:

- .1 Provide non-staining, chemical cleaners of type which are acceptable to manufacturer of sealant and sealant backing material, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.
- .2 Provide cleaner conditioner required for glass and glazed surfaces as recommended by sealant manufacturer.

PART 3 - EXECUTION

3.1 Manufacturer's Recommendations

- .1 Unless specified otherwise herein, comply with the recommendations and directions of the manufacturer whose materials are being used in the work of this section.

3.2 Preparation

- .1 Protect adjacent work areas and finished surfaces from damage during joint sealant installation.
- .2 Clean and prepare joint surfaces and substrates of substance that could impair the bond of joint sealants immediately before installing joint sealants.
- .3 Provide a dry, dust-free and cleaned substrate for optimum results.
- .4 Clean porous joint surfaces by using heavy-duty brushing, light abrasive, mechanical abrading or combination of these methods to produce a clean, sound surface for optimum bond with joint sealants per manufacturer's recommendations.
- .5 Clean non-porous surfaces using the two-cloth wipe method as referenced in ASTM C1193-16(2023) and outlined by joint sealant manufacturer's written requirements.
- .6 Prepare rusting or scaling surfaces using abrasive cleaning methods as recommended by joint sealant manufacturer prior to joint sealant installation. Remove and neutralize efflorescence, mould, mildew and algae prior to joint sealant installation.
- .7 Prepare finish-coated surfaces per joint sealant manufacturer's specific recommendations.
- .8 Test materials for indications of staining or poor adhesion before any sealing is commenced. Submit reports in writing to *Consultant* of results.

3.3 Masking

- .1 Where necessary to prevent contamination or marring surfaces of adjacent materials, mask areas adjacent to joints with masking tape prior to priming or sealing application. Remove tape immediately after joint has been completed and an initial set achieved.

3.4 Installation

- .1 Install in accordance with joint sealant manufacturer's installation written requirements for products, primers and applications indicated unless more stringent project-specific instructions or requirements apply.

Joint Sealants

- .2 Apply joint sealants for continuous waterproof sealant joint protection. Lap vertical joints over horizontal joints as recommended by sealant manufacturer. Comply with installation recommendations in ASTM C1193-16(2023) for use of joint sealants as applicable to each specific sealant installation.
- .3 Install sealant primers only when recommended by sealant manufacturer and demonstrated at pre-construction tests after joint surface preparation has been completed and when surfaces are verified as clean and dry. Allow any primer installation to completely dry or cure prior to installation of backing or joint sealants. Primer is mandatory for gun applied sealants.
- .4 Install joint sealants using proven techniques that comply with the following and in proper sequence with installation of primers and backings.
 - .1 Using proper joint sealant dispensing equipment, place sealants by pushing sealant beads into opening to fully wet-out joint sealant substrates. Fill sealant joint opening to full and proper configuration.
 - .2 Provide uniform cross-sectional shapes and depths in relation to joint width for optimum sealant movement capability per joint sealant manufacturer's written requirements.
- .5 Joint sealant tooling is required for non-sag joint sealant installations. Immediately after placing fresh sealants and before skinning or curing begins, tool sealants using metal spatulas designed for this purpose in accordance with manufacturer's recommendations. Provide a smooth, uniform sealant finish, eliminating air pockets and ensuring good contact for optimum sealant adhesion within each side of the joint opening.
 - .1 Provide concave joint configuration as indicated per figure 5-A in ASTM C1193-16(2023) unless otherwise indicated.
 - .2 Use tooling agents that are approved in writing by sealant manufacturer and that do not discolour sealants or adjacent surfaces.
 - .3 Remove excess sealant from surfaces adjacent to joint openings using metal spatula, promptly cleaning any sealant residue from adjacent finished surfaces. Remove masking after joint sealant is installed.
- .6 Allow single-component sealants to fully cure before adhesion testing is performed as recommended by joint sealant manufacturer.
- .7 Match approved sealant mock-up for colour, finish and overall aesthetics. Remove, refinish or re-install work not in compliance with the *Contract Documents*.
- .8 When surfaces of adjacent materials are to be painted, perform sealant work before these surfaces are painted.
- .9 Check form release agent used on concrete for compatibility with primer and sealant. If they are incompatible inform *Consultant* and change primer and sealant to compatible type, or clean concrete to sealant manufacturer's acceptance.
- .10 Install joint backing material, filler strips, gaskets, bond breakers and similar type material of comparable performance characteristics. Install bond breaker tape or packing over asphalt impregnated fibre board as recommended by sealant manufacturer.

Joint Sealants

- .11 Where joints are 12.7 mm (1/2") or deeper, insert backing material in continuous uniform compression with setback from finished face of adjoining materials equal to required depth of sealant (width/depth ratio) as specified herein.
- .12 On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.
- .13 Install bond breaker tape in bottom of joints in lieu of sealant backing where proper depth cannot be obtained when backing is installed.
- .14 Maintain correct sealant depth. Sealant depth shall be 1/2 the width of the joint, maximum depth shall be 12.7 mm (1/2"), minimum depth shall be 6 mm (1/4"). Comply with manufacturer's written recommendations.
- .15 Fillet bead sealant joints to be sized to provide proper contact area with substrates, in accordance with manufacturer's written recommendations.
- .16 Apply sealants using pressure-operated guns fitted with suitable nozzles in accordance with manufacturer's directions. Apply sealants in such manner as to ensure good adhesion to sides of joints and to completely fill voids in joints.
- .17 Apply sealants so that surfaces of joints are smooth, full bead, free from ridges, wrinkles, sags, air pockets and embedded impurities. Tool sealant surfaces to produce a smooth surface.
- .18 Install sealant with exterior face of sealant set back 10 mm (3/8") from face of adjacent materials at building movement joints, unless otherwise indicated.
- .19 Do not apply sealants to areas where installation of paints, coatings or flooring is in progress. Apply sealants after such work is complete and fully cured.

3.5 Interior Sealant Schedule

- .1 Include in work of this section sealants to seal open joints in surfaces exposed to view, and to make building weather-tight and air-tight, as applicable, as indicated, and as otherwise specified, except where specified under the work of other sections.
- .2 Install sealant to:
 - .1 Interior control and expansion joints in floor and wall surfaces.
 - .2 Perimeters of interior door and window frames.
 - .3 Exposed interior control joints in gypsum board.
 - .4 Millwork junctions with walls.

3.6 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

3.7 Adjusting and Cleaning

- .1 Remove droppings and clean off excess sealant or sealant residue adjacent to sealant joint installations as the work progresses by methods approved by joint sealant manufacturer before material achieves initial set.
- .2 Do not damage adjacent surfaces with harmful removal techniques and protect finished surfaces beyond those that have been masked.

Joint Sealants

- .3 Remove and replace damaged joint sealants.
- .4 Remove temporary coverings and masking protection from adjacent work areas upon completion.

3.8 Protection

- .1 Protect installed sealants during and after final curing from damage resulting during construction.

END OF SECTION

Demountable Glass Partition System

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Demountable glass partition systems:
 - .1 Single glazed (FT-1).
 - .2 Double glazed (FT-2).
 - .2 Existing frameless glass partition system (FT-3).

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .1 Submit manufacturer's hardware schedule.
- .3 Samples:
 - .1 Partition sample to show basic construction, glazed sections, door frames, trim, and finishes.
 - .2 Wood doors:
 - .1 Submit samples of proposed plastic laminate door faces for each colour, texture and pattern selected.
 - .2 Submit cut-away sample of each type of door, to show stile and rail construction, core, cross banding, door face finish and edges.
- .4 Shop drawings:
 - .1 Submit shop drawings for the work of this section.
 - .2 Clearly indicate fabrication details, plans, elevations, hardware (including hardware accessories, door bottoms, door seals, and closers), and installation details.
 - .3 Indicate door location using numbering system per door schedule, size, and hand of each door, elevation of each door type; construction type core and edge construction not covered in product data; and special blocking requirements.
 - .4 Indicate dimensions and locations of cut-outs including trim for openings.
 - .5 Indicate electrified hardware requirements and preparations.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.

Demountable Glass Partition System

.2 Operation and maintenance data:

- .1 Submit operation and maintenance data for incorporation into maintenance manual.

1.5 Quality Assurance

.1 Qualifications:

- .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with training of *Product* manufacturers.

1.6 Delivery, Storage, and Handling

- .1 Package or crate, and brace products to prevent damage during shipment and handling. Label packages and crates, and protect finish surfaces from environmental conditions where required.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Wall system must be capable of disassembly into component parts for ease of distribution, installation, inventory, and storage.
- .2 Fully glazed walls are to achieve a minimum STC rating of 35 using 12 mm laminated glazed elements, per ASTM E90-09.
- .3 Aluminum door frames are to arrive on site prepared for specified door hardware.
- .4 Door hardware to be furnished by the wall system manufacturer unless otherwise indicated.

2.2 Materials

- .1 Extruded aluminum: Controlled alloy billets of 6063 T5, to assure compliance with tight dimensional tolerances and maintain colour uniformity.

2.3 Demountable Glass Partition System

.1 FT-1:

- .1 Acceptable *Products*:
- .1 Bridgewall 'Melius Single'.
- .2 Substitutions: in accordance with Section 01 60 00.
- .2 Provide frames with the following characteristics:
- .1 Frame: single glazed.
- .2 Top profile height: 63.5 mm (2-1/2").
- .3 Bottom profile height: 38 mm (1-1/2").
- .4 Profile width: 31.7 mm (1-1/4").
- .3 Doors:

Demountable Glass Partition System

- .1 Custom solid core wood door with min. 20 kg/m² with frame filled with insulation and automatic door bottom.
 - .1 STC: minimum 35.
- .2 Aluminum framed single glaze swing door complete with automatic door bottom.
 - .1 STC: minimum 35.
- .4 Solid panels:
 - .1 Provide removable solid panels. Face of panels shall be flush with partition frame as indicated.
 - .1 Finish: to match PLAM-1 as indicated.
- .5 Accessory:
 - .1 MT-6; 3 mm (1/8") continuous aluminum plate at head and jambs of glazed partition.
 - .1 Plate width: as indicated.
 - .2 Finish: to match glazed partition frame.
- .6 Glass: in accordance with Section 08 80 00.
- .2 FT-2:
 - .1 Acceptable *Products*:
 - .1 Bridgewall 'Melius Double'.
 - .2 Substitutions: in accordance with Section 01 60 00.
 - .2 Provide frames with the following characteristics:
 - .1 Frame: double glazed complete with air gap.
 - .2 Top profile height: 63.5 mm (2-1/2").
 - .3 Bottom profile height: 38 mm (1-1/2").
 - .4 Profile width: 60.3 mm (2-3/8").
 - .3 Doors:
 - .1 Custom solid core wood door with min. 20 kg/m² with frame filled with insulation and automatic door bottom.
 - .1 STC: minimum 45.
 - .4 Solid panels:
 - .1 Removable solid panels. Face of panels shall be flush with partition frame as indicated.
 - .1 Finish: to match PLAM-1 as indicated.
 - .5 Accessory:
 - .1 MT-6; 3 mm (1/8") continuous aluminum plate at head and jambs of glazed partition.
 - .1 Plate width: as indicated.

Demountable Glass Partition System

- .2 Finish: to match glazed partition frame.
- .6 Glass: in accordance with Section 08 80 00.
- .3 FT-3; Existing refurbished glazed partitions:
 - .1 Provide aluminum profile to match FT-1, install over existing frameless glazed screens as indicated.

2.4 Hardware

- .1 Where indicated as 'by partitions manufacturer', supply and install hardware specified in Finish Hardware Schedule as part of the *Work* of this Section.

2.5 Finishes

- .1 Exposed aluminum surfaces:
 - .1 Polyester finish: in accordance with AAMA 603.8-98, multiple-stage electrostatic applied thermoset polyester finish, baked.
 - .1 MT-5 Finish:
 - .1 FT-1: Black powder coat.
 - .2 FT-2: Black powder coat.
 - .3 FT-3: Black powder coat.

2.6 Fabrication

- .1 Pre-machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required and fastened within frame with concealed screws.
- .2 Fabricate components to allow secure installation without exposed fasteners.

PART 3 - EXECUTION

3.1 Installation

- .1 Provide manufacturer's information and templates required for installation of work of this section, and assist or supervise, or both, the setting of anchorage devices, and construction of other work incorporated with products specified in this section in order that they function as intended.
- .2 Install work in accordance with manufacturers' requirements and recommendations, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation. Adjust components to allow for irregularities in adjacent construction and relate accurately to finished ceiling and floor coverings.
- .3 Install frames plumb and square, securely anchored to substrates with fasteners recommended by frame manufacturer.
- .4 Use concealed installation clips to assure that splices and connections are tightly butted and properly aligned.
- .5 Secure clips to main structural components and not to snap-in or trim members.
- .6 Do not use screws or other fasteners that will be exposed to view when installation is complete.

Demountable Glass Partition System

- .7 Fit joints and junction between components tightly and in true planes, conceal joints where possible.

3.2 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23
- .2 Manufacturer's field review to be in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

3.3 Adjusting and Cleaning

- .1 Verify under work of this section that installed products function properly, and adjust them accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective *Work* so that no variation in surface appearance is discernible.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

.1 Section includes:

- .1 Supply and off-load to place in a clean, dry, and secure room at the *Place of the Work*, which has been designated for storage of all finish hardware specified including necessary fastening devices.
- .2 Supply all finish hardware required and not supplied under other Sections.
- .3 Check and verify hardware information on door and frame shop drawings, prior to fabrication.
- .4 Packaging, labelling, provision of installation instructions, templates, fixings and similar items, and delivery to the *Work* site.
- .5 Give assistance at the *Place of the Work* to organize hardware storeroom and supply qualified staff to correctly categorize, mark, and arrange each item in groups to enable efficient dispensing in specified hardware groups for each door to installation trades.
- .6 Provide qualified staff at the *Place of the Work* promptly to assist installation trades subsequent to being requested and to ensure that hardware is being correctly installed.
- .7 Upon completion of installation of hardware, hardware *Supplier* shall arrange and conduct, in company of *Consultant* and *Contractor*, inspections to verify that all hardware is installed and functioning satisfactorily, and where necessary shall recommend adjustments of such items as closer arms, valves, door holders and latch and locksets. Report comments in writing to *Consultant* and *Contractor*.
- .8 Supply temporary locking cylinders and keys for construction purposes. Locks used for *Contractor's* security shall be keyed as required to conform to building operations' security requirements.

1.2 Administrative Requirements

.1 Coordination:

- .1 Coordinate work of this section to ensure information and material is promptly provided, to ensure orderly and expeditious progress of the *Work*, and to comply with schedule for completion.
- .2 Within 3 weeks of *Contract Award*, submit confirmed orders to manufacturers/*Suppliers* to *Consultant*.
- .3 Assist *Contractor* to organize hardware storeroom and supply qualified staff to correctly categorize, mark, and arrange each item in groups to enable efficient dispensing in specified hardware groups for each door to installation trades.
- .4 Coordinate the work of this section to ensure supplied hardware can function as required and can be installed within the particular details of the door and frame assemblies. Hardware that cannot be installed or will not function as intended will be replaced at no cost to the *Owner*.

Finish Hardware

- .2 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Schedules and samples:
 - .1 Prepare and submit for review, a finish hardware schedule with technical product data sheets for use in the *Work*. List type, selected manufacturer's name and number, location, mounting heights and finish of hardware, and complete cross reference to door schedule.
 - .2 The indication or omission of a hardware component on the hardware schedule does not remove the responsibility of this section to ensure that all hardware can be installed and will function as intended.
 - .3 Submit samples of complete line of hardware and finishes. Identify samples indicating hardware item numbers used in the Finish Hardware Schedule, manufacturer's numbers, names, types, finishes, sizes and indication of door location(s). Approved samples will be retained for comparisons and returned upon completion of the *Work*.
 - .4 Prepare and submit for review, a keying schedule recognizing *Owner* requirements which shall be determined after award of *Contract*.
- .4 Templates:
 - .1 Submit for distribution, 3 copies of templates, template information, installation instructions and details necessary to enable preparation for, and installation of finish hardware in accordance with Door Hardware Institute recommended procedures. Submit templates arranged and marked coincident with specified hardware designations.
 - .2 Submit promptly when requested, the foregoing information in 3-ring plastic hard-covered binders suitably identified.
 - .3 In lieu of 1.3.4.1 arrange for the issue by each hardware manufacturer, the manufacturer's standard book of template drawings, at the option of door and frame manufacturers.
- .5 Jigs:
 - .1 Submit template jigs for each component to be recessed to enable installation trades to prepare doors to preclude misalignment and improper fit.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Instruct the *Owner's* designated representative in proper care and preventative maintenance of hardware to assure longevity of operation.

Finish Hardware

- .2 Submit maintenance data for cleaning and maintenance of finish hardware.
- .3 Submit to building maintenance staff prior to date of *Substantial Performance*, two sets of wrenches for door closers, locksets and fire exit hardware.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 *Supplier:*
 - .1 Shall have 5 years' experience, minimum, in *Products*, systems and assemblies specified and with approval of *Product* manufacturers.

1.6 Delivery, Storage, and Handling

- .1 Package each item of hardware individually, complete with trim and necessary fastenings, and accessories, including wrenches, keys, and other appurtenances required to ensure correct installation. Mark each item as to contents and appropriate use in specified groups.
- .2 All items of hardware subject to handling when installed shall be submitted with an easily removable covering to protect against scratches, abrasions, coating with dissimilar finish materials on adjacent surfaces, and tarnishing.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 Manufacturer's standard extended warranties.
 - .2 Labour, materials, and workmanship for work of this section.
 - .1 Duration: 2 years.
 - .3 Locksets: 2 years.
 - .4 Exit devices: 2 years.
 - .5 Door closers: 10 years.
 - .6 Door operators: 5 years.
 - .7 Electric strikes: 5 years.
 - .8 Electric panic devices: 5 years.
 - .9 Hinges, full mortise: 10 years.
 - .10 Hinges, continuous: 10 years.
 - .11 Door seals: 5 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Comply with codes and requirements of governing authorities, and as specified.

Finish Hardware

- .2 Provide hardware items with characteristics to meet specified fire ratings, and conform to exit requirements of governing authorities.

2.2 Materials

- .1 Finish hardware: in accordance with Finish Hardware Schedule.

PART 3 - EXECUTION

3.1 Examination

- .1 Before furnishing any hardware, carefully check *Contract Documents*, verify door swings, door and frame materials and operating conditions, and assure that hardware will fit work to be attached.
- .2 Check shop drawings and frame and door lists affecting hardware type and installation, and verify to correctness thereof, or advise of required revisions. Check that doors, frames and panels requiring additional support are reinforced.
- .3 Point out special requirements to installer. Make final adjustment of hardware, in particular closer arms, valves and locksets, to work properly.

3.2 Installation

- .1 Install in accordance with manufacturer's written installation requirements. Refer also to installation requirements indicated, and specified in other sections of specifications.
- .2 Accurately locate and adjust hardware to meet manufacturer's written requirements. Use special tools and jigs as recommended.
- .3 Locate door stops to contact doors 75 mm (3") from latch edge.
- .4 Refer to Section 08 12 16 with respect to factory preparation for hardware for wood doors. Install wood doors and applicable hardware.
- .5 Take delivery of finishing hardware and install, except hardware specified as part of work of another section. Check each item as received.
- .6 Set, fit and adjust hardware according to manufacturer's directions, at heights later directed by *Consultant*. Hardware shall operate freely. Protect installed hardware from damage and paint spotting.
- .7 Sound and weather seals:
 - .1 Install seals to continuously seal entire perimeter of doors. Secure in place with non-ferrous screws, in accurate alignment.
 - .2 Maintain integrity of seal at head of doors fitted with closers. Adapt seals as required to achieve specified performance.
- .8 Pre-drill kickplates and doors prior to installation of kickplates. Apply with water-resistant adhesive and countersunk stainless steel screws.
- .9 Set thresholds on two continuous beads of polyurethane caulking fastened with a minimum of 4 countersunk screws.
- .10 At wood doors, use screw attachment for exit devices and closers except as follows:
 - .1 Use through-bolt attachment for exit devices and closers at mineral core doors.

Finish Hardware

3.3 Electrified Hardware

- .1 Install electronic components, security components such as magnetic locks, sentronic hold open devices door status switches, card readers, processors, transformers, and other electric devices.
- .2 Power wiring will be supplied and installed by Electrical Divisions 26, 27, and 28 including conduit, boxes and other electrical appurtenances, including connections and terminations. Be responsible for ensuring that all wiring work is done in accordance with the *Suppliers* wiring diagrams and directions.
- .3 Arrange for testing and commissioning of system by the distributor of the system. Submit a copy of reports to the *Consultant*.

3.4 Keying

- .1 Locks and latches shall be mortise lever type to match the *Owner's* standard and supplied with interchangeable cylinders and construction cores.

3.5 Field Quality Control

- .1 Field tests and inspections:
 - .1 Inspect the installation of finish hardware on an agreed frequency.
 - .2 Advise in writing of work being performed that will prejudice the installation or correct operation of items of hardware.
 - .3 Ensure items have been installed complete with required trim and accessories, and fastenings are adequately secured and approved. Ensure closer arms, valves, holder devices, locksets and latchsets are correctly adjusted.

3.6 Adjusting and Cleaning

- .1 Adjust doors to swing freely, smoothly and easily, to remain stationary at any point, to close evenly and tightly against stops without binding, and to latch positively when doors are closed with moderate force.
- .2 Adjust hardware so that latches and locks operate smoothly and without binding, and closers act positively with the least possible resistance in use. Lubricate hardware if required by *Supplier's* requirements.
- .3 Ensure that doors equipped with closers operate to close doors firmly against anticipated wind and building air pressure, and to enable doors to be readily opened as suitable for function, location and traffic.
- .4 Clean hardware after installation in accordance with *Supplier's* requirements.

END OF SECTION



DOOR HARDWARE
SECTION 08 71 00

PROJECT:  UNIVERSITY OF
TORONTO
Robarts – 5th Floor Renovation

ARCHITECT: 
101-35 Golden Avenue
Toronto, ON

Prepared By: Chris Tassone
Hinge Hardware Inc.
49 Fima Crescent, Unit #C
M8W 3R1
Tel: 416-915-9960 Ext 21, Fax: 416-915-9961

Date: March 11th 2024
Revised: July 26th 2024



Hardware Schedule

HEADING #1

Opening Description: 1016 x 2600 x 44 x SCWD Type A x ALF Type FT-2

1	Single Door #5031A	Corridor to GIS/Data Lab	RH
4	Heavy Weight Hinge	T4A3386 4 1/2" x 4 1/2" **By partitions manufacturer**	BSP
1	Classroom Lockset	LV9070BDC 03A **By partitions manufacturer**	622
1	Permanent Core	**By UofT locksmith**	622
1	Floor Stop	Bridgewall Standard **By partitions manufacturer**	BLK
1	Kick Plate	CBH 902 203 x 978 x 3M Tape	622
1	Auto Bottom	CT-53 x 1016 **By partitions manufacturer**	BLK
1	Smoke/Sound Seal	Bridgewall Standard **By partitions manufacturer**	BLK

HEADING #2

Opening Description: 1016 x 2600 x 44 x SCWD Type A x ALF Type FT-2

1	Single Door #5031B	Corridor to GIS/Data Lab	LH
1	Single Door #5026	Corridor to Collaboration Room	LH
1	Single Door #5025	Quiet Study Space to Collaboration Room	LH
12	Heavy Weight Hinge	T4A3386 4 1/2" x 4 1/2" **By partitions manufacturer**	BSP
3	Double Dummy Trim	L0172 03A **By partitions manufacturer**	622
3	Mortise Deadbolt	L460BDC	622
3	Permanent Core	**By UofT locksmith**	622
3	Auto Operator	Horton 4100LE - 1016	BLK
6	Actuator	CM324/42N Sure Wave	BLK
3	Relay	CX-33	n/a
6	Key Switch	CM-2000	628
3	Kick Plate	CBH 902 203 x 978 x 3M Tape	622
3	Auto Bottom	CT-53 x 1016 **By partitions manufacturer**	BLK
3	Smoke/Sound Seal	Bridgewall Standard **By partitions manufacturer**	BLK

Note: Auto Operators are supplied and installed in this section. 120VAC is required at the head of the door for all barrier free door operators. 15A dedicated circuit. The wall and frame must be reinforced for the automatic operator mounting. All conduit and back boxes with pull cords and wires are to be provided by the electrical contractor. Electrician is to confirm all wire locations with the auto door operator supplier prior to pulling wires.



HEADING #3

Opening Description: 1016 x 2600 x 44 x SCWD Type A x ALF Type FT-1

1	Single Door #5049	Data Consultation Centre to Office	RH
1	Single Door #5053	Data Consultation Centre to Office	LH
1	Single Door #5051	Data Consultation Centre to Office	RH
1	Single Door #5048	Data Consultation Centre to Shared Office	LH
1	Single Door #5050	Data Consultation Centre to Office	RH
1	Single Door #5054	Data Consultation Centre to Office	RH
1	Single Door #5052	Data Consultation Centre to Office	LH
1	Single Door #5038	Collision Space to Office	LH
1	Single Door #5039	Collision Space to Office	RH
1	Single Door #5036	Collision Space to Office	LH
1	Single Door #5037	Collision Space to Office	RH
1	Single Door #5042	Data Consultation Centre to Office	RH
1	Single Door #5041	Data Consultation Centre to Office	LH
1	Single Door #5043	Data Consultation Centre to Office	RH
1	Single Door #5044	Data Consultation Centre to Office	LH
60	Heavy Weight Hinge	T4A3386 4 ½" x 4 ½" **By partitions manufacturer**	BSP
15	Office Lockset	LV9050BDC 03A **By partitions manufacturer**	622
15	Permanent Core	**By UoT locksmith**	622
15	Floor Stop	Bridgwall Standard **By partitions manufacturer**	BLK
15	Kick Plate	CBH 902 203 x 978 x 3M Tape	622
15	Auto Bottom	CT-53 x 1016 **By partitions manufacturer**	BLK
15	Smoke/Sound Seal	Bridgwall Standard **By partitions manufacturer**	BLK

HEADING #4

Opening Description: 1016 x 2600 x 44 x SCWD Type A x ALF Type FT-1

1	Single Door #5030	Corridor to GIS/Data Lab	LH
4	Heavy Weight Hinge	T4A3386 4 ½" x 4 ½" **By partitions manufacturer**	BSP
1	Storeroom Lockset	LV9080BDC 03A **By partitions manufacturer**	622
1	Electric Strike	1500C 12/24VDC	BSP
1	Reader	Salto Reader **Supplied and Installed by Owner**	622
1	Controller	Salto Controller **Supplied and Installed by Owner**	n/a
1	Permanent Core	**By Owner**	622
1	Auto Operator	Horton 4100LE - 1016	BLK
2	Actuator	CM324/42N Sure Wave	BLK
1	Kick Plate	CBH 902 203 x 978 x 3M Tape	622
1	Auto Bottom	CT-53 x 1016 **By partitions manufacturer**	BLK
1	Smoke/Sound Seal	Bridgwall Standard **By partitions manufacturer**	BLK

Note: Auto Operators are supplied and installed in this section. 120VAC is required at the head of the door for all barrier free door operators. 15A dedicated circuit. The wall and frame must be reinforced for the automatic operator mounting. All conduit and back boxes with pull cords and wires are to be provided by the electrical contractor. Electrician is to confirm all wire locations with the auto door operator supplier prior to pulling wires.



HEADING #5

Opening Description: 1016 x 2600 x 12 x SCWD Type B x ALF Type FT-1

1	Single Door #5029	Quiet Study Space to Staff Meeting Room	RH
4	Heavy Weight Hinge	T4A3386 4 ½" x 4 ½" **By partitions manufacturer**	BSP
1	Storeroom Lockset	LV9080BDC 03A **By partitions manufacturer**	622
1	Electric Strike	1500C 12/24VDC	BSP
1	Reader	Salto Reader **Supplied and Installed by Owner**	622
1	Controller	Salto Controller **Supplied and Installed by Owner**	n/a
1	Permanent Core	**By Owner**	622
1	Auto Operator	Horton 4100LE - 1016	BLK
2	Actuator	CM324/42N Sure Wave	BLK
1	Kick Plate	CBH 902 203 x 978 x 3M Tape	622
1	Auto Bottom	CT-53 x 1016 **By partitions manufacturer**	BLK
1	Smoke/Sound Seal	Bridgwall Standard **By partitions manufacturer**	BLK

Note: Auto Operators are supplied and installed in this section. 120VAC is required at the head of the door for all barrier free door operators. 15A dedicated circuit. The wall and frame must be reinforced for the automatic operator mounting. All conduit and back boxes with pull cords and wires are to be provided by the electrical contractor. Electrician is to confirm all wire locations with the auto door operator supplier prior to pulling wires

Miscellaneous

1	Hardware Schedule	Provide Owner with 1 Complete Hardware Schedule Of Your Own with Cut Sheets at Job Completion
1	Warranties	Warrant all Items for one year and provide a copy of all factory warranties that extend beyond 1 year

Do Not Alternate Any Product In This Schedule Without Expressed Written Consent From The Consultant or Architect Prior To Bid Close. No Alternates Will Be Accepted After Bid Close. The General Contractor Is Responsible For Any Required Frame/Door Modifications On All Frames/Doors Being Relocated And Reused On Site.

END OF SCHEDULE



Five Knuckle Heavy Weight Full Mortise Series

Recommended for use on high frequency and/or heavy wood or metal doors in schools, hospitals or other public buildings where heavy traffic is experienced.

- Heavy weight hinges should be used on all extra heavy doors or those exposed to high frequency use
- T4A3386- Stainless steel base or available in brass base material polished
- T4A3786- Steel base material
- For Beveled Edge, where doors are beveled on hinge side, specify T4A4386 or T4A4786
- For available finishes see page **

Note: 8" x 6" and 8" x 8" have six bearings. Specify T6B3386 or T6B3786.

No.	ANSI Cross Reference	Base Material	Weight
T4A3386	A5111	Stainless	HVY
T4A3386	A2111	Brass	HVY
T4A3786	A8111	Steel	HVY

Specifications

Inches	mm	Gauge	No. of Holes	Fasteners	
				Machine	Wood
4 1/2" x 4"	114.3 x 101.6	.180	8	1/2 x 12-24	1 1/4 x 12
4 1/2" x 4 1/2"	114.3 x 114.3	.180	8	1/2 x 12-24	1 1/4 x 12
5" x 4 1/2"	127 x 114.3	.190	8	1/2 x 12-24	1 1/4 x 12
5" x 5"	127 x 127	.190	8	1/2 x 12-24	1 1/4 x 12
6" x 5"	152.4 x 127	.203	10	1/2 x 1/4-20	1 1/2 x 14
6" x 6"	152.4 x 152.4	.203	10	1/2 x 1/4-20	1 1/2 x 14
8" x 6"	203.2 x 125.4	.203	16	1/2 x 1/4-20	1 1/2 x 14
8" x 8"	203.2 x 203.2	.203	16	1/2 x 1/4-20	1 1/2 x 14

* Not available in brass base material.

** Available in steel only.

***Available in stainless steel only.

****FT tips not offered on 6" and 8" sizes, BT and ST not offered on 8" sizes.

Steel & Stainless Approved for NFPA 80 fire rated openings

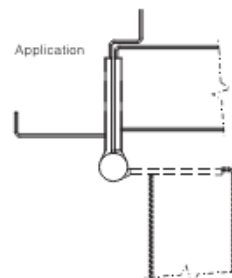
McKinney
ASSA ABLOY

FM-11

Experience a safer
and more open world

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T4A3386
T4A3786



Options:

Code	Description
NRP	Non-Removable Pin
T4B	Ball Bearing
TCA	Concealed Bearing
RC	Round Corner – 1/4" radius furnished unless specified otherwise
HT	Hospital Tip
BT****	Ball Tip
FT ****	Flat Tip
ST****	Steeple Tip
KT	Knurled Tip
SSF	Safety Stud Feature
RB	Raised Barrel*
QC	ElectroLynx® Hinge – 4, 8 or 12 wire available
CC	Concealed Circuit – 4, 8 or 12 wire available
CC-18	Concealed Circuit – 2, 4, 6, 8 or 10 wire available (2-18AWG wires and the remainder 28AWG wires)
MM	Magnetic Monitoring

* Refer to page SP-3 for Raised Barrel.

800-346-7707 | www.mckinneyhinge.com
Check the web site for the up-to-date catalog



SCHLAGE

L Series
Grade 1 Mortise Locks

Mechanical | Wired Electrified | Wireless Electronic | Multi-Point

SCHLAGE | **ALLEGION** 

Commercial.Schlage.com

Overview

Key Features

Trims & Finishes

Mechanical

Wired
ElectrifiedWireless
Electronic

Multi-Point

Credentials &
Key SystemsParts &
OptionsOrdering &
Specifications

Trims & Finishes

The Standard Collection

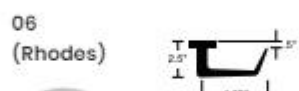
The Standard Collection levers can be paired with exit devices and locks from our trusted Schlage and Von Duprin brands. And, they are built to the same exacting standards. Our Standard Collection levers offer a more traditional style that is appropriate for use in a number of commercial applications.



801 - Milled tactile warning

802 - Knurled tactile warning¹803 - Knurled tactile warning¹

805 - Milled tactile warning



806 - Milled tactile warning



807 - Milled tactile warning

812 - Milled tactile warning
Handed

817 - Milled tactile warning



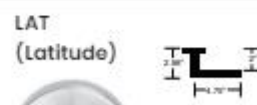
818 - Milled tactile warning



Handed



Handed



¹ Knurled tactile warning available on 800, 812, 813, 825, 826, 829, and 830 finishes only.

12

Commercial.Schlage.com | L Series Mortise Locks

SCHLAGE

ALLEGION

Trim Options

Escutcheons

**L full face**

Specify by adding 'L' after lever design.

Material: Cold-forged brass or stainless steel

Finishes: Available in all L Series finishes.

Size: 7-15/16" x 1-3/4" x 7/16" (202 mm x 44 mm x 11 mm)

**L concealed**

Specify by adding 'C' suffix to function and by adding 'L' after lever design.

Material: Cold-forged brass or stainless steel

Finishes: Available in all L Series finishes.

Size: 7-15/16" x 1-3/4" x 7/16" (202 mm x 44 mm x 11 mm)

**N full face**

Specify by adding 'N' after lever design.

Material: Heavy-wrought, reinforced brass or stainless steel

Finishes: Available in all L Series finishes.

Size: 7-7/8" x 2-1/2" x 7/16" (200 mm x 64 mm x 11 mm)

Roses

**A rose**

Available for use on L Series knob and lever designs. Specify by adding 'A' after lever design.

Material: Cold-forged brass or stainless steel

Finishes: Available in all L Series finishes.

Size: 2-1/8" (54 mm) diameter

**B rose**

Available for use on L Series knob and lever designs. Specify by adding 'B' after lever design.

Material: Cold-forged brass or stainless steel

Finishes: Available in all L Series finishes.

Size: 2-9/16" (65 mm) diameter

**C rose**

Available for use on L Series knob and lever designs. Specify by adding 'C' after lever design.

Material: Cold-forged brass or stainless steel

Finishes: 605, 606, 609, 619, 622, 625, 626, 629, 630, 643e.

Size: 2-5/8" (66 mm) diameter

**AVA rose**

Available for use with Asti (AST) lever only. Specify as ASTAVA.

Material: Cold-forged brass or stainless steel

Finishes: 605, 606, 609, 619, 622, 625, 626, 643e.

Size: 2-5/8" (66 mm) diameter

**MER rose**

Available for use with Merano (MER) lever only. Specify as MERMER.

Material: Cold-forged brass or stainless steel

Finishes: 605, 606, 609, 619, 622, 625, 626, 643e.

Size: 2-5/8" (66 mm) diameter

Thumbturns | Turns



ADA thumbturn (standard)
09-544



Large ADA thumbturn
09-509 x L943-363

Optional thumbturn trim for all deadbolt functions except L9463 and L463.



Basic thumbturn
09-509



Cylinder thumbturn
09-90x

Optional thumbturn trim for all deadbolt functions except L9463 and L463.



Coin turn
L283-124

For lock functions L9044 and L9444 with rose trim.

SWING DOOR SYSTEMS | Automatic

HD-Swing® LE Series 4100LE Low Energy Operator



Knowing act activation



Handicap Accessible



FOR HIGH TRAFFIC OR EXTRA LARGE BARRIER-FREE DOORS

Compliant with ANSI A156.19, A117.1 and Americans With Disabilities Act of 1990.

- The industry standard for low energy applications
- Appropriate for heavy and/or oversized doors
- Choice of mounting type: Surface mount or overhead concealed
- Choice of header: 6" x 6" side access or 4 1/2" x 6" bottom access
- Available for butt hung, center pivoted or offset pivot door assemblies
- Installs easily to existing structures
- Heavy duty gear drive and 1/8 HP motor designed for stack pressure and high volume pedestrian traffic

ADDITIONAL FEATURES/BENEFITS:

- Push-N-Go® automatic activation by pushing or pulling door panel
- SoftTouch® reversing and obstruction sensing
- Easily adjustable opening & closing speeds
- Manual operation in case of power failure
- Available in a variety of anodized, paint or clad finishes

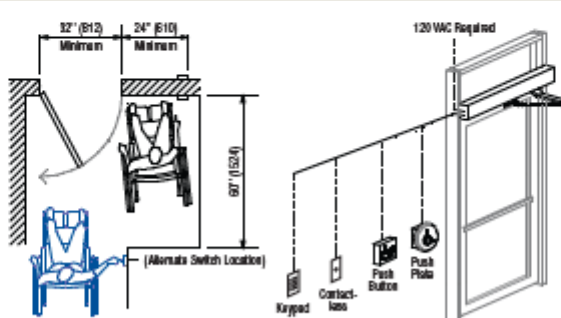
SWING DOOR SYSTEMS | Automatic

HD Swing® LE Series 4100LE Low Energy Operator

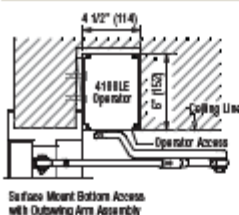
Once the activating switch is pressed, the operator slowly opens the door and holds it open for a preset time. This creates a barrier-free doorway to pass through the door before it closes with a preset force of less than 15 pounds (67 N).

Installation and Operation

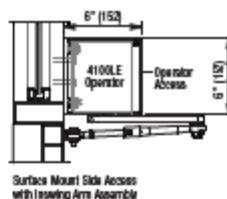
Activating device located on each side of opening for two-way traffic per ANSI Safety Standard A117.1



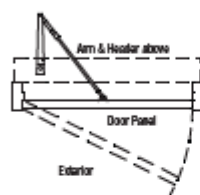
Architectural Details



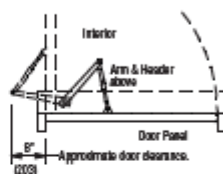
Surface Mount Bottom Access with Outswing Arm Assembly



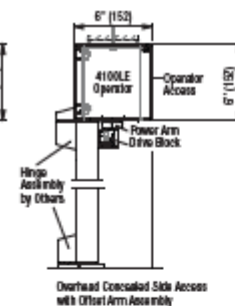
Surface Mount Side Access with Inswing Arm Assembly



Exterior



Interior



Overhead Concealed Side Access with Offset Arm Assembly

Specs:

Maximum Door Width:

4'-6"

Maximum Door Weight:

4100LE: 700 lbs

Adjustments:

- Opening speed: 3 to 6 seconds from 0 to 80° (Open check)
- Closing speed: 3 to 6 seconds from 90° to 10° (Close Check)
- Time delay: 2 to 30 seconds (ANSI A156.19 requires 5 seconds minimum time delay)

Electrical Requirements:

120, 220 VAC, 50-60 Hz, single phase, 15 amp service. Current draw - 3.15 amps.

Specify Horton and demand AAADM certified installation

AAADM American Association of Automatic Door Manufacturers

Selection Guide

Standard Single Units

Door Width	Header Width
3'	3' 3"
3' 6"	3' 9"
—	—

Standard Pair Units

Pair Width	Header Width
5'	5' 3"
6'	6' 3"
7'	7' 3"



Horton Pedestrian Access Solutions

- Horton Automatics®
- FLEX™ by Horton
- Door Services Corporation®
- Won-Door®

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Overhead Door Corporation

A Samwa Holdings Company

SPECIFY HORTON

DOOR ACTIVATION
DEVICES

TOUCHLESS SWITCHES

SUREWAVE™
BY CAMDENCM-324, CM-325
1 Relay Touchless Switches

The SureWave™ family of touchless switches lead the industry in selection, quality and performance.

CM-324 and CM-325 touchless switches provide economical and reliable door activation command while eliminating the spread of germs and adding convenience.

These hands-free switches feature an adjustable operating range of 1-30", adjustable time delay of 1-5 seconds, and provide superior performance in all ambient lighting conditions.

LINE
POWERED

1 RELAY

SHORT RANGE
MODEL**324 APPLICATION****1 Relay, Line Powered**

Ideal for economical door activation where a door or locked status indicator is not required.

**325 APPLICATION****1 Relay, Short Range**

Ideal for short range sensing in confined areas (such as in restrooms) and to resist false activation due to highly reflective surfaces (typically found in health care facilities).

CM-324, CM-325 1 Relay Touchless Switches

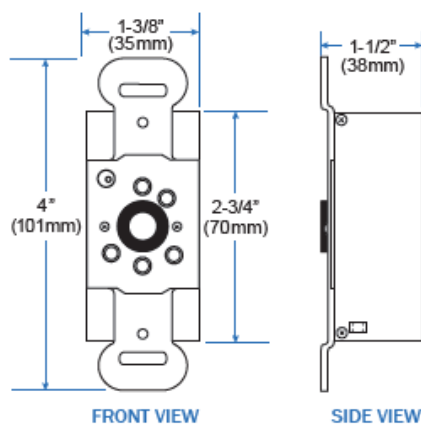
Product Specification Sheets



SPECIFICATIONS

NO. OF SENSORS:	(2) CM-324 (1) CM-325
OPERATING VOLTAGE:	12-24 VOLTS, AC/DC \pm 12%
CURRENT DRAW:	60mA
RESPONSE TIME:	100ms
ACTIVATION RANGE:	1"-3" (25MM – 75MM) MINIMUM 1"-26" (25MM – 660MM) MAXIMUM
IMMUNITY:	11" (457MM) MIN. FROM REFLECTIVE SURFACE
OPERATING TEMPERATURE:	-4°F TO +153°F (-20°C TO +85°C)
RELAY OPERATING MODES:	PULSE (SENSE) / TOGGLE
RELAY OUTPUT:	(1) FORM 'C' (SPDT)
RELAY CONTACT RATING:	5 AMPS @ 30 VDC
TIME DELAY:	1 OR 5 SECONDS
OUTPUT TYPE:	FAIL SAFE / NON-FAIL SAFE
ELECTRICAL LIFE:	100,000 OPERATIONS

SWITCH DIMENSIONS



MODELS

CM-324	Economical Touchless Switch, Line Powered, 1 Relay
CM-325	'Short Range' Touchless Switch, Line Powered, 1 Relay

OPTIONAL FACEPLATE MATERIAL (Supplied Black Polycarbonate Standard)

S	Stainless Steel Faceplate
---	---------------------------

OPTIONAL FACEPLATE GRAPHICS

(Supplied Blank Standard)



Add 'F' to graphic option for French language

OPTIONAL FACEPLATE SIZE (Supplied Single Gang Standard)

<p>Single Gang Compatible surface mount box CM-34BL</p>	<p>/N - Narrow Compatible narrow jamb surface mount box CM-23D</p>
<p>/W - Double Gang Compatible surface mounting box CM-43CBLA</p>	<p>/R - 6" Round Stainless steel only. Indoor use only. Compatible surface box CM-69SER</p>

For a complete list of all SureWave™ Touchless Switch Kits, please visit www.camdencontrols.comOpening New Doors to
Innovation, Quality and Support!

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DOOR ACTIVATION
DEVICES

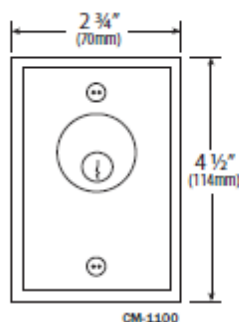
KEY SWITCHES



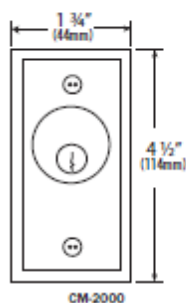
CM-1100



CM-2000

Shown with mortise
cylinder (sold separately)

CM-1100



CM-2000

CM-1100/2000

CAST ALUMINUM KEY SWITCH CONTROLS



FEATURES

- SINGLE GANG AND NARROW STYLE MODELS
- ACCEPTS STANDARD MORTISE CYLINDERS, 1" – 1 1/4"
- HEAVY DUTY 1/4" THICK ALUMINUM PLATE
- 1 PIECE DIE CAST CONSTRUCTION
- LOCATORS PREVENT CYLINDER FROM SPINNING
- NO SET SCREWS REQUIRED
- VANDAL RESISTANT
- CYLINDER SITS FLUSH TO FACEPLATE
- TAMPER PROOF SCREWS & DRIVER PROVIDED
- INDOOR OR OUTDOOR APPLICATIONS
- UL/CSA APPROVED SWITCHES
- 1 OR 2 SWITCHES MAY BE INSTALLED
- LEFT AND/OR RIGHT OPERATION
- WIDE RANGE OF SWITCH CONFIGURATIONS
- COLOR CODED 18 AWG SOLDERED LEADS
- HEAT SHRINK PROTECTIVE SLEEVE OVER CONTACTS
- CASTED CENTRE RIB PROTECTS SWITCHES FROM DAMAGE
- BRUSHED ALUMINUM FINISH
- CUSTOM COLOR FINISHES & ENGRAVING AVAILABLE
- OPTIONAL LED INDICATORS
- FAST & EASY TO INSTALL

DESCRIPTION

Camden Door Controls, CM-1100 and CM-2000 Series flush mount key switches meet the stringent demands of key switch controls. They are designed for use with standard 1", 1 1/8", or 1 1/4" mortise cylinders. Fabricated from 1/4" thick aluminum, into a one piece die cast construction, with unique Camden Manufacturing features.

CM-1100 is single gang (2 3/4") width, CM-2000 is only 1 3/4" wide, perfect for door frames or narrow areas. Both models accept one or two switches, and have a counter sunk cylinder opening, in a one piece casted assembly. A brass cylinder lock ring, 2 socket/slotted screws, and 2 tamperproof screws with driver, are also supplied. (The mortise cylinder is available separately from Camden Door Controls.) The design and construction makes it ideal for all-weather environments. The assembly is tamper and vandal resistant.

CM Key Switches are flexible, and can be supplied in numerous switch configurations to suit varied commercial and industrial applications, and functions. Camden Key Switches provide a practical, cost effective means for authorized personnel to control and signal various functions within a complex.

APPLICATION

CM-1100 and CM-2000 Series Key Switches will control overhead doors, electric locks, electro-magnetic locks, electric strikes, and motors. They are also used for shunting, bypassing, timed functions, activating and deactivating CCTV and access control equipment, and other applications. They are constructed for high frequency use, and will accept a standard mortise cylinder.



5502 Timberlea Blvd. Mississauga, ON Canada L4W 2T7 • Toll Free: 1 877 226-3369 (CAMDEN9)
Tel: (905) 366-3377 • Fax: (905) 366-3378 • E-mail: info@camdencontrols.com • www.camdencontrols.com

KEY SWITCHES

PUSH BUTTONS

MOUNTING OPTIONS

RF CONTROLS

HANDS-FREE SWITCHES

SPECIAL PURPOSE SWITCHES

KEYPADS

ACCESSORIES

12

Electric Strikes

1500 Series™ Electric Strike

*Works with most brands
of cylindrical and mortise
locksets without a deadbolt*

Also available in
a Complete One
Box Solution



The most advanced, modular electric strike that works with most brands of cylindrical or mortise locks designed to work with a 4-7/8" strike plate.

The 1500 Series Electric Strike sets a new standard in the industry by offering dynamic integrated adjustability and field configurable options compatible with any cylindrical or mortise lock. The modular design of the platform makes stocking and installing easier with interchangeable faceplates and accessories. For the first time, the aesthetics of an electric strike are complementary to other surrounding door hardware and blend in with the opening due to the fully finished design, available in eight finishes.

Features

Standard Features

- Stainless steel construction
- Tamper resistant
- Static strength 1,500 lbs
- Dynamic strength 70 ft-lbs
- Endurance 1 million cycles
- Field selectable fail safe/fail secure
- Non-handed
- Interchangeable faceplates and accessories
- Field replaceable components
- Fully finished faceplate, keeper, case and trim
- Field adjustable integrated shim
- Strike body depth 1-3/8" [34.9mm]
- SecuriCare five-year, no-fault, no questions asked warranty (Addition of SMART Pac® III extends the warranty to 10 years)

Optional Features

- LM Lock monitor
- DLM Dual lock monitors
- LMS Lock monitor and strike monitor
- DLMS Dual lock monitors and strike monitor

Accessories

- 157 Torx screws
- HES-CUT-MTK Metal template kit
- 1500-104-xxx Lip extension trim adapter (finish to match)
- 1500-106-xxx 4500 adapter and trim enhancer kit (finish to match)
- OPT-1SRK Spring replacement kit
- OPT-1LM Single lock monitor
- OPT-1DLM Dual lock monitors
- MOD-1SOL Solenoid replacement module



Grade 1



5 Year Warranty



Mortise Locks without Deadbolt



Cylindrical Locksets



Field Selectable (Fail secure / Fail safe)



Dual Voltage 12/24



PoE Friendly



Fire Rated



Windstorm Rated



Outdoor Rated



Burglary Rated

hes

ASSA ABLOY



1500 Electric Strike

13

Electric Strikes

Specifications

Certifications

- ANSI/BHMA A156.31, Grade 1
- UL 1034 burglary-resistant listed and suitable for outdoor use
- UL 294 listed
- RoHS compliant
- UL 10C fire rated, 3-hour single door (fail secure only)
- UL 10C fire rated, 1-1/2 hour double door (fail secure only)
- CAN/ULC-S104 fire door conformant
- NFPA-252 fire door compliant
- ASTM-E152 fire door compliant
- California Fire Marshal listed
- ANSI/SDI A250.13 windstorm resistant
- Florida Building Code approved TAS 201, 202, 203
- ANSI-ASTM E330
- Sustainability documentation

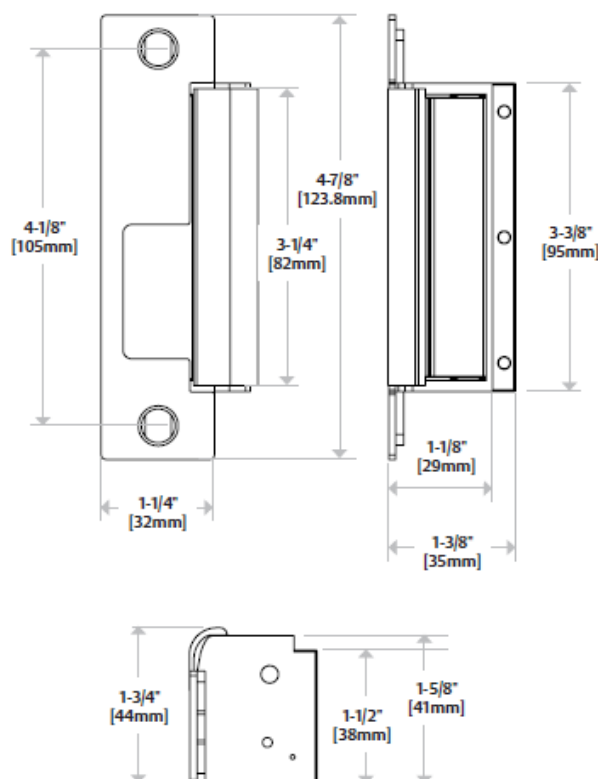
Frame Application

- Metal
- Wood

Electrical (DC Continuous Duty)

- Dual voltage 12/24 VDC/VAC
- 240 mA at 12 VDC/120 mA at 24 VDC
- PoE friendly

Dimensions



How to Order

SERIES	MODEL	FINISH*	OPTION(S)**
1500	—	— 630	— LM
1500	Universal Electric Strike; faceplate option kits ordered separately	C* Complete Electric Strike; includes 1LB faceplate kit for latchbolts	(blank) No Monitor
		605 Bright Brass	LM Lock Monitor
		606 Satin Brass	DLM Dual Lock Monitor
		612 Satin Bronze	LMS Lock Monitor and Strike Monitor
		613 Bronze Toned	DLMS Dual Lock Monitors and Strike Monitor
		613E Dark Oxidized Satin Bronze Powder	
		629 Bright Stainless Steel	
		630 Satin Stainless Steel	
		BSP Black Suede Powder	

*Complete Pacs are only available in the 630 finish **LMS/DLMS factory installed only option.

NOTE: Electric strike compatibility is determined at time of electric strike product release. ASSA ABLOY is not responsible for incompatibility of products that have changed in design or craftsmanship by their respective manufacturers. When compatibility is a concern, contact Customer Support for application assistance.

US hesinnovations.com | 800 626 7590 | customerservice.hes@assaabloy.com
 Canada assaabloydss.ca | 800 461 3007 | sales.dss.ca@assaabloy.com

Updated 7/23/24 Patent pending and/or patent www.assaabloydss.com/patents

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Fax: 416-243-3352
Email: info@cbhmf.com
Web: www.cbhmf.com

All dimensions are in inches.
Product specifications are subject
to change. For the most updated
product features, contact our
customer service department.

©2022 Canadian Builders
Hardware MFG Inc.

CBH 900/901/902/903

MATERIAL: ALUMINUM, BRASS,
BRONZE AND STAINLESS STEEL

FINISHES: ALL STANDARD

SKUS:

CBH 900-ALUMINUM KICKPLATE

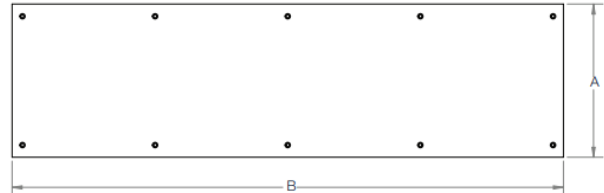
CBH 901-BRASS KICKPLATE

CBH 902-BRONZE KICKPLATE

CBH 903-STAINLESS STEEL KICKPLATE

.050 GAUGE PLATES WILL BE SUPPLIED STANDARD.
FOR THICKER GAUGE PLATES USE SUFFIX

A. 062 B. 125

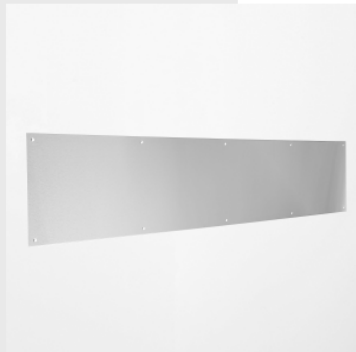


CBH 900-ALUMINUM
CBH 901-BRASS
CBH 902-BRONZE
CBH 903-STAINLESS STEEL

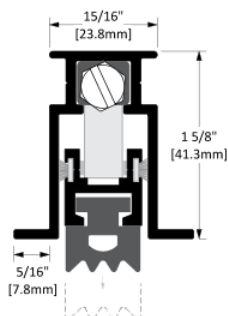
KICKPLATE

All kickplates are drilled, countersunk and
supplied standard with #6 x 5/8 oval head
socket wood screws. Machine screws or tape
fastening is available upon request.

Kickplates available with bevelled edges at extra
cost. All tape Kickplates are bevelled edge.



Quality Craftsmanship Since 1978.

KNC**CT-53**

Operation	Automatic Door Bottom
Features	<ul style="list-style-type: none"> • Mill Finish Extruded Aluminum with Neoprene • Maximum effective drop: 11/16" (17.5mm)
Application	• Ideal for Residential, Commercial & Industrial

Finish Options

- OP: STD**
- Mill Finish
 - Black Anodized

Screw Options

- Standard**
- Screw Type: **N**
#6 X 3/4" Stainless Steel Truss Head, Robertson Drive, Type A Screws
- Optional**
- Screw Type: **O**
#6 X 3/4" Stainless Steel Button Head, Tamper-Resistant Torx Drive, Type A Screws

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Glass and glazing.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Show details of each type of glazing system in conjunction with the framing system indicating type of glass, sizes, shapes, glazing material and quantity. Show details indicating glazing material, glazing thickness, bite on the glass and glass edge clearance.
- .4 Samples:
 - .1 Submit 305 mm (12") square samples of each type of glass indicated except for clear monolithic glass products, and 305 mm (12") long samples of each color required, except black, for each type of sealant or gasket exposed to view.
- .5 Test and evaluation reports:
 - .1 Obtain compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealant as well as other glazing materials including insulating units.
 - .2 Submit valid independent laboratory test reports for the various glass and glazing assemblies in coordination with the specified aluminum framed glazing systems demonstrating compliance with specified acoustic performance values in accordance with recognized industry standards and specified performance requirement specified in this section.
 - .1 Test reports shall be recent and produced with the past 5 years.
- .6 Manufacturer reports:
 - .1 Submit glass fabricator's product information and structural calculations indicating compliance with glazing standards established by the Glass Association of North America (GANA). Submittal to include thermal stress and structural load analysis of the proposed glass types, configuration and sizes.
- .7 Submit sample glazing warranty.

Glass and Glazing

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit maintenance and cleaning instructions for glass and glazing for incorporation into the operating and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 *Subcontractor:*
 - .1 Shall be thoroughly trained and experienced in skills required.
 - .2 Shall be completely familiar with referenced standards and requirements of the work of this section.
 - .3 Shall personally direct installation performed under this section.
 - .2 Foreperson experience: Shall have 10 years' experience, minimum, as glazing mechanic.
 - .3 Glazing mechanic experience: Shall have 3 years' experience, minimum, as glazers.

1.6 Delivery, Storage, and Handling

- .1 Protect glass from edge damage, dust, and contaminants during handling and storage. For insulating units exposed to substantial altitude changes, comply with insulating glass manufacturers written recommendations for venting and sealing to avoid hermetic seal ruptures.
- .2 Storage and protection: Protect glazing materials according to manufacturer's written requirements and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun or other causes.

1.7 Field Conditions

- .1 Ambient Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by the glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation or other causes.
- .2 Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 4.4°C.

1.8 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 General extended warranty:
 - .1 Labour, materials, and workmanship for work of this section.

Glass and Glazing

- .2 Duration: 2 years.
- .2 Special product warranty for laminated glass products:
 - .1 Warranty shall cover deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to the glass manufacturer's published instructions. Warranty shall be manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units.
 - .2 Duration: 5 years from date of manufacture for laminated glass.
- .3 Special product warranty for tempered glass products:
 - .1 Warrant that tempered glass will not break spontaneously as a result of Nickel Sulfide (NiS) inclusions at a rate exceeding 0.8% (8/1000) for a period of five years from the date of manufacture. Warranty shall be manufacturer's standard form in which tempered-glass manufacturer agrees to replace tempered-glass units.
 - .2 Duration: 5 years from date of manufacture for fully tempered glass.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 General:
 - .1 Publications: Comply with recommendations in the publications below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section.
 - .1 GANA Glazing Manual.
 - .2 GANA Engineering Standards Manual.
 - .3 GANA Laminated Glazing Reference Manual.
 - .4 GANA Sealant Manual.
- .2 Glass strength:
 - .1 Design glass in conformance with the building code and the following requirements:
 - .1 Minimum thickness of annealed or heat-treated glass products to be selected so the worst case probability of failure does not exceed the following:
 - .1 8 breaks per 1000 for glass installed vertically less than 15 degrees from the vertical plane and under wind action.
 - .2 Provide annealed, heat strengthened, and tempered lights where required by the building code, and where required for the various solar exposures on the building.
 - .3 Glass thicknesses and glass types specified, indicated, or scheduled in the *Contract Documents* are minimums required. Modify glass thickness as required to satisfy design and building code requirements, and requirements of authorities having jurisdiction, and any such modifications shall be clearly indicated on shop drawings.

Glass and Glazing

- .3 Provide glass *Products* of uniform appearance, reflectivity, hue, shade, visible light transmittance, and colour when viewed from distance of 3 m (10 ft) to 30 m (100 ft) perpendicular to the glass or from 45 degree angle to the glass.
- .4 Protect laminated glass interlayer from damage or discolouration resulting from contact with deleterious and incompatible sealants, substances, and materials. Comply with manufacturer's recommended installation requirements.

2.2 Performance/Design Requirements - Acoustic

- .1 Design glass and glazing units in conjunction with aluminum framed glazing systems and related assemblies to provide the indicated sound transmission class (STC) as indicated on the drawings when tested to ASTM E90-09.

2.3 Glass Manufacturers

- .1 Subject to compliance with the requirements of the *Contract Documents*, provide primary glass by one of the following float glass manufacturers:
 - .1 Cardinal Glass Industries.
 - .2 Guardian Industries, LLC.
 - .3 Pilkington North America.
 - .4 Vitro Architectural Glass.

2.4 Glass Materials

- .1 General:
 - .1 Single source responsibility: Provide materials from a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source and manufacturing plant for each type and class required.
- .2 Heat treated (tempered or heat strengthened) float glass:
 - .1 In accordance with CAN/CGSB 12.1-M90 Tempered or Laminated Safety Glass.
 - .2 Minimum thickness: 6 mm (1/4").
 - .3 Fabrication process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
 - .4 For uncoated glass, comply with requirements for Condition A in accordance with ASTM C1048-18.
 - .5 For coated vision glass, comply with requirements for Condition C (other coated glass) in accordance with ASTM C1048-18.
 - .6 Heat strengthened glass shall have surface compression of 24-52 MPa (3,500-7,500 psi).
- .3 Laminated glass:
 - .1 In accordance with CAN/CGSB 12.1-M90.

Glass and Glazing

- .2 Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written recommendations. Use materials that have a proven record of no tendency to bubble, discolour, or lose physical and mechanical properties after fabrication and installation.
- .3 Glass thickness: as required to meet design requirements, and to at least thicknesses as indicated.
 - .1 Glass thickness, minimum: 13 mm (1/2").
- .4 Interlayer colour: Clear unless otherwise indicated.
- .5 Glass type: Tempered glass to meet requirements of CAN/CGSB 12.1-M for tempered glass.
- .6 Exposed glass edges: bevelled and polished smooth.
- .7 Laminated glass products to be fabricated free of foreign substances and air or glass pockets in autoclave with heat plus pressure.
- .4 Glazing film: in accordance with Section 08 87 00.

2.5 Glazing Materials (Non-Fire Rated)

- .1 Glazing materials; general: Select glazing sealants, tapes, gaskets and additional glazing materials of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
- .2 Glazing gaskets: Moulded or extruded gaskets of profile and hardness required to maintain watertight seal, made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2019).
- .3 Setting blocks: Moulded or extruded material with Shore, Type A Durometer hardness of 85, plus or minus 5, made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2019).
- .4 Spacers: Moulded or extruded blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2019).
- .5 Edge blocks: Moulded or extruded material of hardness needed to limit glass lateral movement (side walking) made from the following:
 - .1 Preformed, EPDM to ASTM C864-05(2019).
- .6 Cleaners, primers and sealers: Type recommended by sealant or gasket manufacturer.
- .7 Butt joint glazing sealant:
 - .1 Medium-modulus, neutral-curing silicone sealant; complying with ASTM C920-14, Type S, Grade NS, Application G, Class 25.
 - .2 Colour: clear.
 - .3 Acceptable *Products*:

Glass and Glazing

- .1 DOWSIL '999-A'.
- .2 Momentive 'SCS1200'.
- .3 Pecora '860'.
- .4 Tremco 'Proglaze'.

2.6 Fabrication of Glazing Units

- .1 Fabricate glazing units in sizes required to fit openings, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - .1 Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
- .2 Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- .3 Grind smooth and chamfer, and polish exposed glass edges and corners, unless otherwise indicated.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine framing, glazing channels, and stops, with glazing installer present, for compliance with the following:
 - .1 Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
 - .2 Inspect butt and mitre joints in framing. Seal joints found to be open with a compatible sealant prior to glazing.
 - .3 Glazing pockets and surfaces are free of dust, construction debris, and contaminants.
 - .4 Presence and functioning of weep systems.
 - .5 Minimum required face and edge clearances as per FGIA and GANA standards.
 - .6 Effective sealing between joints of glass-framing members.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

- .1 Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- .2 Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.
- .3 Clean contact surfaces with solvent and apply primers to surfaces to receive tapes and sealants in accordance with the manufacturer's requirements. Ensure surfaces are free of moisture and frost.

Glass and Glazing

3.3 Glazing - General

- .1 Comply with combined written requirements of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- .2 Adjust glazing channel dimensions as required by conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- .3 Protect glass edges from damage during handling and installation. Remove damaged glass from *Project* site and legally dispose of off *Project* site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- .4 Clean glazing rebate surfaces of traces of dirt, dust, or other contaminants.
- .5 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- .6 Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- .7 Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- .8 Provide spacers for glass lites where length plus width is greater than 1270 mm (50").
 - .1 Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 - .2 Provide 3.2 mm (1/8") minimum bite of spacers on glass and use thickness equal to sealant width.
- .9 Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel.
- .10 Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- .11 Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 Gasket Glazing (Dry)

- .1 Allow gaskets to relax and cut compression gaskets to lengths recommended by gasket manufacturer to fit openings to suit frame dimensions.
- .2 Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- .3 Installation with drive-in wedge gaskets: Centre glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centres of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

Glass and Glazing

- .4 Installation with Pressure-Glazing Stops: Centre glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- .5 Install gaskets so they protrude past face of glazing stops.

3.5 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

3.6 Adjusting and Cleaning

- .1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed.
- .2 Final cleaning of glass in accordance with Section 01 78 39.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 GF-2: Custom film.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Samples:
 - .1 Submit full height samples of each specified film type, pattern and colour. Height to match the height of glass in demountable partitions in Section 08 12 16.

1.3 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit maintenance and cleaning instructions for incorporation into operating and maintenance manuals.
 - .2 Instruct *Owner's* representative on proper care and maintenance for work of this section.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*: Shall have 5 years' experience, minimum, in application of *Products* specified.

1.5 Delivery, Storage, and Handling

- .1 Package materials and identify on attached labels the manufacturer, contents and material specification number.

1.6 Field Conditions

- .1 Conform to manufacturer's written documented temperatures, relative humidity, and substrate moisture content and temperature for application of materials of this section.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Applied film shall function as intended, and exhibit none of the following:
 - .1 Bubbling.

Applied Films

- .2 Cracking.
- .3 Crazing.
- .4 Delamination.
- .5 Discolouration.
- .6 Peeling.

2.2 Materials

- .1 Applied films; custom print film (GF-2):
 - .1 Location: as indicated on drawings.
 - .2 Pattern: as indicated on drawings.
 - .3 Acceptable *Products*:
 - .1 3M 'SH2SSIM-S Illumina Silky S Glass Film' as supplied by Convenience Group Inc.
 - .2 Substitutions: in accordance with Section 01 60 00.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine glass surfaces to receive film and verify that they are free from defects and imperfections which will affect the final appearance of installed film. Correct such deficiencies before starting film application.

3.2 Preparation

- .1 Prepare surfaces for film application in accordance with film manufacturer's written requirements.
- .2 Window and window framing will be cleaned thoroughly with a neutral cleaning solution. Surface of glass shall be bladed with industrial razor to ensure the removal of any foreign contaminants in accordance with film manufacturer's instructions.
- .3 Towelling or other absorbent material shall be placed on the window sill or sash to absorb moisture accumulation generated by the film application.

3.3 Installation

- .1 Applied film; interior application:
 - .1 Apply film to indicated surface of glazing units in accordance with film manufacturer's written requirements, applied plumb, true and level over clean glazing, without air bubbles, wrinkles, blisters, and other defects.
 - .2 After installation, applied film shall be flat with no obvious concentrations of moisture, free of creases, free of tears, with no moisture dimples when viewed under normal conditions.
 - .3 Film edges shall be cut neatly and square at a uniform distance of 1.5 mm (1/16") to 0.79 mm (1/32") from frame.

Applied Films

3.4 Adjusting and Cleaning

- .1 Clean film and glass surfaces so they are free of foreign matter using cleaners recommended by film manufacturer.

3.5 Protection

- .1 Comply with manufacturer's written requirements respecting protection.

END OF SECTION

Metal Supports for Gypsum Board

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Metal support systems for interior gypsum board partitions, interior ceilings, and interior assemblies as indicated.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the *Work* of this section, including additional data as may be required to demonstrate compliance with the *Contract Documents*.
- .3 Engineered shop drawings:
 - .1 Submit engineered shop drawings for metal support systems at interior locations where noted as engineered.
- .4 Test and evaluation reports:
 - .1 Submit certified test results for each required fire resistance rated assembly for work of this section.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 *Subcontractor*: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements - Engineered Interior Metal Support Systems

- .1 Design system members to withstand own dead load, super-imposed dead loads, to maximum allowable deflection of L/240, without permanent deformation.
- .2 Loads on walls acting as guards: Where the floor elevation on one side of a wall, including a shaftwall, is more than 600 mm (24") higher than the elevation of the floor or ground on the other side, the wall shall be designed to resist the lateral design loads prescribed in the building code or 0.5 kPa (0.07 PSI), whichever produces the greatest effect.
- .3 Metal support systems shall be engineered where indicated in *Contract Documents* as "engineered" or "structural". Horizontal framing of ceilings shall be engineered. Indicated framing depths are maximum permitted unless approved otherwise by *Consultant*.

Metal Supports for Gypsum Board

2.2 Performance/Design Requirements - Fire Resistance Rated Assemblies

- .1 Where gypsum board systems with fire resistance ratings are indicated or required, provide materials and installations that are identical with those of applicable assemblies tested by fire testing laboratories acceptable to authorities having jurisdiction.

2.3 Materials - General

- .1 For sheet metal *Products*: Sheet metal thickness indicated herein pertains to the minimum base steel thickness exclusive of coating.
- .2 Protective coatings for metal supports and framing:
 - .1 Minimum corrosion protection: Z120 (G40) ASTM A653/A653M-13.
 - .2 Heavy duty corrosion protection where scheduled or indicated: Z275 (G90) ASTM A653/A653M-13.
- .3 Sheet metal screws shall have a minimum coating thickness of 0.008 mm (0.0003") of zinc. Other coatings providing equal or better corrosion protection may be used, subject to acceptance of *Consultant*.
- .4 Screws:
 - .1 Steel screws shall be equal to or exceed minimum diameter indicated on shop drawings.
 - .2 Penetration beyond joined materials shall be not less than 3 exposed threads.
 - .3 Thread types and drilling capability shall conform to manufacturer's recommendations.

2.4 Partition Support Materials

- .1 Interior non-loadbearing channel stud framing: to ASTM C645-18; roll formed from 0.455 mm (0.0179") minimum thickness unless otherwise indicated or as recommended by gypsum board manufacturer, galvanized steel sheet. Provide service holes starting at 450 mm (18") from bottom, then 914 mm (36") on centre to top of studs.
 - .1 Steel studs at abuse resistant gypsum board locations: 0.836 mm (0.0329") minimum thickness.
 - .2 Steel studs at abuse resistant gypsum board locations: 0.836 mm (0.0329") minimum thickness.
- .2 Interior floor and ceiling tracks (runners): to ASTM C645-18; in widths to suit stud sizes.
 - .1 Metal thickness: to match studs.
 - .2 For openings wider than 914 mm (36"), provide 0.836 mm (0.0329") minimum thickness for header.
 - .3 At carpet locations: 124 mm (4-7/8") high floor tracks, Bailey 'Carpet Base Track'.
- .3 Interior floor and ceiling track (runner) fasteners:
 - .1 To concrete and masonry: Use stub nails or power-driven fasteners.
 - .1 Power actuated fastening systems are not permitted.

Metal Supports for Gypsum Board

- .2 To suspended acoustic ceiling tile grid: Manufactured to fit applicable ceiling grid profile; CGC 'Partition Clip'.
- .4 Bracing channels: Minimum 19 mm x 10 mm x 1.087 mm (3/4" x 3/8" x 0.0428") cold rolled galvanized steel.

2.5 Furring

- .1 Furring channels: 0.836 mm (0.0329") minimum typical thickness, cold rolled steel, wiped coated, nominal size of 22 mm (7/8") depth x 35 mm (1-3/8") face, hat type with knurled face.
- .2 Z-furring members: Galvanized steel z-shaped furring members; ASTM A653/A653M-13, G60, 0.836 mm (0.0329") minimum thickness of base metal, of depth indicated, designed for mechanical attachment of insulation boards or blankets.
- .3 Fasteners for furring members: Type and size recommended by furring manufacturer for substrate and application indicated, corrosion resistant finish for exterior building envelope applications, load rating and spacing to support materials carried by assembly with factor of safety of 3x per fastener manufacturer data sheets.

2.6 Accessories

- .1 Backer plates:
 - .1 Plywood backer plates: Softwood plywood; 19 mm (3/4") minimum x length and width to suit size of items to be attached; fastened to studs for attachment of surface mounted fittings and accessories.
 - .2 Elimination of backer plates or direct attachment of accessories or equipment to studs will not be permitted.

PART 3 - EXECUTION

3.1 Installation General

- .1 Comply with ASTM C754-20 and manufacturer's requirements, except as modified herein. Do not bridge building expansion joints with support system. Frame both sides of joints with furring and other supports as indicated.
- .2 Provide and install studs, framing, shimming, and furring to provide proper support for gypsum board to achieve the following installation tolerances:
 - .1 Do not exceed 3 mm (1/8") in 3 m (10') variation from plumb, level, and plane.
 - .2 Do not exceed 10 mm (3/8") from drawings locations.
 - .3 Do not exceed 1.5 mm (1/16") variation between planes of abutting edges or ends.
 - .4 Install each framing member so fastening surfaces vary not more than 3.2 mm (1/8") from the plane formed by faces of adjacent framing.
 - .5 In double stud walls, do not bridge across studs on opposite sides of wall with gypsum board or metal cross bracing.
- .3 Give complete cooperation and direction to trades erecting framing and furring over which this work is applied. Coordinate finished joint location with framing.

Metal Supports for Gypsum Board

- .4 Coordinate installation and cooperate with mechanical and electrical work to accommodate mechanical electrical items and any other work required to be incorporated into or coordinated with the partitions, ceiling and soffit systems.
 - .1 Where the presence of suspended ductwork or other mechanical or electrical services or devices above ceiling framing conflicts with ceiling framing suspension points from structure above, provide bridging framing below conflicting work as required to support ceiling framing on specified intervals.
 - .2 Do not suspend ceiling framing from mechanical or electrical suspension systems unless agreement is obtained in writing from engineer for *Subcontractor* installing such framing that additional imposed loads are acceptable; obtain *Consultant's* acceptance before proceeding.
- .5 Provide clearances between work of this section and structural elements to prevent transference of structural loads.
- .6 Do not bridge building expansion joints with steel framing or furring members. Independently frame both sides of joints with framing of furring members or as indicated.
- .7 Size framing systems according to manufacturer's engineered load tables, to meet allowable deflection without permanent deformation.
 - .1 Maximum allowable deflection: $L/240$.

3.2 Blocking

- .1 Attach to framing adequate backer plates to support the load of, and to withstand the withdrawal and shear forces imposed by, items installed upon the work of this section.

3.3 Furring - General

- .1 Furring indicated in *Contract Documents* is schematic. Do not regard as exact or complete. Provide all necessary framing and furring to support gypsum board in accordance with manufacturers' specifications.
- .2 Shim furring as required to achieve required installation tolerances.
- .3 Leave finished work rigid, secure, square, level, plumb, curved to detailed radius and erected to maintain finish gypsum board line dimensions and contours. Make allowance for thermal movement.
- .4 Thermally separate metal studs from exterior concrete or masonry.

3.4 Furred Ceilings

- .1 Erect cross furring channels transversely across runner channels at 400 mm (16") on centre maximum, 305 mm (12") on centre at fire rated assemblies, at not more than 150 mm (6") from boundary wall openings, interruptions in ceiling continuity, and changes in direction.
- .2 Secure furring channels to each support with purpose-made slips or wire tie. Splice joints by lapping channels and tying together.
- .3 Level cross furring channels to maximum tolerance of 3 mm in 3 m (1/8" in 10 ft).

Metal Supports for Gypsum Board

3.5 Wall Furring

- .1 Install steel furring for braced walls, free standing walls, walls that are furred out as indicated.
- .2 Frame openings and around built-in equipment, cabinets, access panels, on 4 sides, with channels. Extend furring into reveals. Check clearances with equipment suppliers.
- .3 Provide bulkheads and boxed-in duct shafts, for beams, columns, pipes and around exposed services where indicated. Install 19 mm (3/4") channels at corners and at 305 mm (12") on centre.

3.6 Metal Stud Partition Framing

- .1 Provide partition tracks (runners) at floor and underside of structural assembly and as follows:
 - .1 Align accurately and lay out according to partition layout.
 - .2 Secure runners to concrete, access flooring and to concrete slabs, as applicable, with screwed or shot fasteners located 50 mm (2") from each end and spaced at maximum 610 mm (24") on centre.
 - .3 At partition corners, extend one runner to end of corner and butt other runner to it, allowing necessary clearance for gypsum board thickness. Runners should not be mitred.
- .2 Unless otherwise indicated, place interior studs vertically at centres as follows:
 - .1 Provide studs at 400 mm (16") on centre, and as specially spaced in accordance with details indicated.
 - .1 *Provide* studs at 300 mm (12") on centre for spans greater than 4.4 m high.
 - .2 Provide studs not more than 50 mm (2") from abutting walls, openings and each side of corners.
 - .3 Provide freedom for 19 mm (3/4") deflection under beams, structural slabs and the like to avoid transmission of structural loads to studs, or install 50 mm (2") leg ceiling tracks.
- .3 Install studs in tracks at floor and ceiling.
- .4 Where horizontal runs of service lines are scheduled to be installed, arrange with applicable trades and install studs simultaneously with services.
- .5 At openings in stud walls, erect track at head and sills to accommodate intermediate studs. At each end of track, cut out flanges, turn up web, and fasten to studs. Install intermediate studs above and below openings in same manner and spacing as wall studs. Install double studs at each jamb, and double tracks at head of door openings.
- .6 At partitions requiring fire rating, erect in accordance with requirements of listing.
- .7 Size studs, connections, and runners to carry loads according to stud manufacturer's load tables, at 24 kg/m² (5 lb/ft²) live load to meet maximum allowable deflection limits. Where depth of stud is indicated, size metal thickness to meet allowable deflection limits.
- .8 Provide three studs at corner and intermediate intersections of partitions.

Metal Supports for Gypsum Board

- .9 Coordinate work with others installing horizontal runs of service lines so that work is done simultaneously. Where standard holes are too small for installed services, notch studs, and splice notched flanges with splice pieces 305 mm (12") longer than notches, each fastened with 2 screws.
- .10 Coordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .11 Coordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other sections.
- .12 Unless otherwise indicated, partitions, together with gypsum board facings, shall extend above ceilings to underside of structure above.
- .13 Chase walls:
 - .1 Provide chase walls consisting of two parallel steel stud partitions.
 - .2 Provide cross bracing consisting of metal furring, located at quarter points on each pair of studs. Attach cross bracing to studs with metal screws.
- .14 Lateral support bracing channels:
 - .1 Stiffen partitions over 3 m (10') in vertical span, at mid-height to maximum vertical spacing of 2440 mm (8') on centre, with at least one 19 mm (3/4") horizontal bracing channel, extending full length of partition, overlapping at least two stud spaces at ends of bracing channels.
 - .2 Stiffen partitions at not more than 150 mm (6") from the top and bottom of openings and across two full stud spaces at each side of openings with horizontal bracing channel.

3.7 Control Joints

- .1 Control joints: in accordance with Section 09 29 00.

3.8 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

END OF SECTION

Gypsum Board

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Gypsum board; paper-faced.
 - .2 Gypsum board; fire-rated, paper-faced.
 - .3 Gypsum board; abuse resistant.
 - .4 Gypsum board accessories and miscellaneous related materials.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Fire-rated assembly listings and STC assembly ratings:
 - .1 Submit fire-rated assembly listings for each required fire resistance rated assembly for work of this section.
 - .2 Submit STC assembly ratings for each required STC rated assembly for work of this section.

1.3 Quality Assurance

- .1 Qualifications:
 - .1 *Subcontractor*: Shall have 10 years' experience, minimum, in successful installation of work of type and quality indicated and specified.

1.4 Field Conditions

- .1 Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum boards.
- .2 Install paper-faced gypsum panels after installation areas are enclosed and conditioned.
- .3 Panels that are wet, moisture damaged, or mould damaged shall not be installed.
 - .1 Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - .2 Indications that panels are mould damaged include, but are not limited to, fuzzy or splotchy surface contamination and discolouration.

Gypsum Board

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Single source responsibility: Obtain gypsum and cement board products from a single manufacturer.
- .2 Fire resistance rating:
 - .1 Construct fire resistance rated assemblies in accordance with listing and CAN/ULC S101-14.
- .3 Paper-faced gypsum board: in accordance with ASTM C1396/C1396M-17.
- .4 Fire rated in accordance with listed assemblies where indicated: Type X or Type C.

2.2 Gypsum Board Panels

- .1 Gypsum board; paper faced:
 - .1 Acceptable *Products*:
 - .1 CertainTeed 'Regular Gypsum Board'.
 - .2 CGC 'Sheetrock Brand Gypsum Panel'.
 - .3 Georgia-Pacific 'ToughRock Gypsum Board'.
- .2 Gypsum board; fire-rated, paper faced:
 - .1 Acceptable *Products*:
 - .1 CertainTeed 'Type X and Type C'.
 - .2 CGC 'SHEETROCK Brand Firecode X and Firecode C'.
 - .3 Georgia-Pacific 'ToughRock Fireguard X Gypsum Board and ToughRock Fireguard C Gypsum Board'.
 - .4 PABCO Gypsum 'QuietRock ES'.
- .3 Gypsum board; abuse resistant:
 - .1 Mould and moisture resistant: in accordance with ASTM D3273-16, with a panel score of 10.
 - .2 Abuse resistance performance:
 - .1 Surface abrasion surface damage: in accordance with ASTM D4977/D4977M-03(2013)e1, Level 3.
 - .2 Surface indentation surface damage: in accordance with ASTM D5420-16, Level 1.
 - .3 Soft-body impact penetration: in accordance with ASTM E695-03(2015)e1, Level 2.
 - .4 Hard Body Impact resistance: in accordance with ASTM C1629/C1629M-18, App.1, Level 1.
 - .3 Paper faced:
 - .1 Acceptable *Products*:

Gypsum Board

- .1 CertainTeed 'Air-Renew Extreme Abuse Resistant' Gypsum Board.
- .2 CertainTeed 'Extreme Abuse' Gypsum Board.
- .3 CGC 'Sheetrock Brand Panels Mold Tough AR Firecode X'.

2.3 Attachment Materials

- .1 Screws; for gypsum board: bugle head, fine thread, self-tapping, Type W or S or S-12 point to suit framing type and metal gauge, with corrosion resistant finish in accordance with ASTM C1002-07/ASTM C954-11.
 - .1 Screw sizing:
 - .1 #6 x 25 mm (1") for single thickness board fastening.
 - .2 #6 x 32 mm (1-1/4") for single thickness 15.9 mm (5/8") board fastening.
 - .3 #7 x 41 mm (1 5/8") for double thickness board fastening.
 - .2 Tie wire: 1.6 mm (0.063") diameter galvanized soft annealed steel wire.

2.4 Accessories

- .1 Accessories: in accordance with ASTM C1047-19 unless otherwise indicated, maximum length pieces per location. Flanges shall be free from dirt, grease, or other material that adversely affects the bond of joint treatment or decoration.
- .2 Trims:
 - .1 Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
 - .1 Shapes:
 - .1 Corner bead.
 - .1 Mechanically fastened corner beads at impact resistant gypsum walls.
 - .2 "L" or "LC" beads.
 - .3 Reveal trims.
 - .1 12.5 mm (1/2") Z reveal where indicated on drawings.
 - .2 12.5 mm (1/2") shadow bead reveal where indicated on drawings.
 - .4 Control joints, certified by manufacturer for use at fire resistance rated assemblies as required.
 - .3 Aluminum trims: extruded accessories of profiles and dimensions as indicated.
 - .1 Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5.
 - .2 Shapes:
 - .1 Z reveal.
 - .2 Acceptable manufacturers:
 - .1 Fry Reglet.
 - .2 Gordon Interior Specialties.

Gypsum Board

2.5 Related Support Assemblies and Backer Plates

- .1 Metal support systems and backer plates at interior assemblies: in accordance with Section 09 22 00.

2.6 Joint Treatment Materials

- .1 General: Comply with ASTM C475/C475M-17(2022).
- .2 Joint tape: in accordance with manufacturer's written requirements.
- .3 Joint compound for interior gypsum board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - .1 Prefilling: Use setting-type compound as recommended by panel board manufacturer.
 - .2 Embedding and first coat: Use setting-type or taping compound as recommended by panel board and trim accessory manufacturers.
 - .3 Fill and finish coats: Use sanding type setting-type or taping compound as recommended by panel board manufacturer.
- .4 Joint compound for exterior applications: in accordance with manufacturer's written requirements.
- .5 Joint compound for tile backing panels: in accordance with manufacturer's written requirements.

2.7 Acoustic Wall Assembly Materials

- .1 Acoustic sealant; concealed locations: to meet material requirements as listed in Part 9 of ASTM C919-22, including ASTM C834-10 or ASTM C920-14:
 - .1 Acceptable *Products*:
 - .1 Hilti Canada Corp 'CS-S SA Light'.
 - .2 Owens Corning 'QuietZone Acoustic Sealant'.
 - .3 Pecora 'BA-98'.
 - .4 Pecora 'AC-20'.
 - .5 Tremco 'Tremflex 834'.
 - .6 Substitutions: in accordance with Section 01 25 00.
- .2 Acoustic sealant; exposed locations: Interior paintable sealant in accordance with Section 07 92 00.
- .3 Smoke and acoustic sealant; concealed and exposed locations, non-fire-rated acoustic assemblies:
 - .1 Acrylic smoke and acoustic sealant, in accordance with ASTM C834-10 maximum VOC content 60 g/L, paintable, Flame Spread Value of maximum 25 to CAN/ULC-S102-10.
 - .2 Sealant shall not deteriorate (stain or bleed into) painted surfaces.
 - .3 Acceptable *Products*:

Gypsum Board

- .1 Hilti Canada Corp 'CS-S SA Light'.
- .2 Tremco 'Tremstop Smoke & Sound Sealant'.
- .3 Substitutions: in accordance with Section 01 25 00.
- .4 Acoustic sealant for plenum locations: Smoke-seal sealant with flame-spread not more than 25 and smoke developed classification not more than 50 to CAN/ULC-S102-10, in accordance with Section 07 84 00.
- .5 Acoustic compound: premixed perlite plaster.
- .6 Acoustic (sound attenuation) insulation (INS-2):
 - .1 Mineral-fibre sound attenuation batts: in accordance with CAN/ULC S702-14, Type 1, and non-combustible to CAN/ULC-S114-05.
 - .1 Acceptable *Products*:
 - .1 CertainTeed 'Sustainable Insulation NoiseReducer'.
 - .2 Johns Manville 'MinWool Sound Attenuation Fire Batts'.
 - .3 Johns Manville 'Sound-SHIELD'.
 - .4 Owens-Corning 'Thermafiber SAFB'.
 - .5 Owens-Corning 'QuietZone'.
 - .6 Rockwool 'AFB'.
 - .2 Fasteners: use mechanical fasteners where required to secure insulation into position in accordance with insulation manufacturer.

2.8 Access Doors

- .1 Access doors: in accordance with Divisions 21, 22, and 23 and Divisions 26, 27, and 28.

PART 3 - EXECUTION

3.1 Installation

- .1 General:
 - .1 Comply with ASTM C840-18b, GA 216-21, GA 600-21, and manufacturer's written requirements, except as otherwise indicated.
 - .2 Do not bridge building expansion joints with support system.
 - .3 Frame both sides of joints with furring and other supports as indicated.
 - .4 Install work of this section in accordance with the 2012 Wall and Ceiling Specifications Standard Manual.
- .2 Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1.6 mm (1/16") open space between boards. Do not force into place.
- .3 Cover both faces of stud partition framing with gypsum board in concealed spaces (above ceiling, and the like) unless otherwise indicated, except in chase walls which are properly braced internally.

Gypsum Board

- .4 Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cut-outs.
- .5 Apply components of fire-rated assemblies in conformance with indicated designs.
- .6 Do not apply gypsum board in close proximity to hot pipes or heating ducts.
- .7 Install materials with the minimum number of joints. Tightly butt joints, without force, and neatly align them.
- .8 Frame openings on every side. Provide clearances with services.
- .9 Work shall include bulkheads over doors, frames, screens, and changes in ceiling levels, pipe space and as indicated.
- .10 Provide clearances between work of this section and structural elements to prevent transference of structural loads in accordance with Section 09 22 00.
- .11 Tolerances:
 - .1 Do not exceed 3 mm (1/8") in 3 m (10') variation from plumb, level, and plane in exposed surfaces, except at end joint between gypsum board panels.
 - .2 Do not exceed 10 mm (3/8") from indicated location.
 - .3 Do not exceed 1.5 mm (1/16") variation between planes of abutting edges or ends.
 - .4 Surface flatness shall not exceed 1.5 mm (1/16") within 305 mm (12") straight edge. For non-tapered-edge end joints between boards, measure flatness tolerance with end of straight end at centreline of joint.

3.2 Accessories

- .1 At external corners install corner trim secured to framing at 230 mm (9-1/16") on centre on both flanges with screw fasteners or clinch tool.
- .2 Secure casing trim at board edges where exposed to view, where board butts against other materials with no trim to conceal junction, at perimeter of ceiling surfaces at tops of partitions where they stop against continuous ceiling surfaces, and where indicated.
- .3 Erect accessories straight, plumb or level, rigid and at proper plane.
- .4 Use full length pieces.
- .5 Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners, free from rough edges. Secure in accordance with manufacturer's specifications unless otherwise required.
- .6 Installation tolerances:
 - .1 Alignment with board panels shall not exceed tolerances specified above.
 - .2 End joints shall be flush aligned to maximum offset of 0.5 mm (0.020").

3.3 Board Application - General

- .1 Before installation of board commences, ensure that internal services have been installed, tested, and approved; conduits, pipes, cables, and outlets are plugged, capped, or covered; and that fastenings and supports installed by others are in place.

Gypsum Board

- .2 Extend board into door, window, and other openings, reveals, behind fitments, and other applied items and on metal stud partitions to structure above unless indicated otherwise.
- .3 Apply board with long dimension perpendicular to supports, unless otherwise indicated.
- .4 Locate joints on opposite sides of partitions on different studs, and at least 305 mm (12") from opening jambs.
- .5 Install board to minimize joints, and align end joints to be the least objectionable (where they are unavoidable), according to the indicated lighting design. Locate joints in ceilings where least prominently discerned, and never line them up with opening edges.
- .6 Form smooth joints at ends and at field cut edges of board panels.
- .7 Fasten board to metal support members by metal gypsum board screws, 9.5 mm (0.374") minimum to, and 12.7 mm (1/2") maximum from, centre of joints.
 - .1 Space screws:
 - .1 At fire rated board as per fire-rated assembly.
 - .2 At typical board walls at 400 mm (16") on centre at edges and field unless otherwise required.
 - .3 At typical board ceilings at 305 mm (12") on centre at edges and field unless otherwise required.
- .8 Offset gypsum board joints 150 mm (6") minimum from corners of openings.
- .9 Locate gypsum panel product joints so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.

3.4 Abuse Resistant Board Application

- .1 Install abuse resistance gypsum board in accordance with gypsum board manufacturer's written requirements.
- .2 Where both abuse resistant gypsum panels and plain gypsum board are used together on the same surface plane adjacent to one another, a smooth transition between the two types of boards is required. Finish the work in a manner such that the transition provides an inconspicuous joint when viewed by a person at normal viewing angles while standing in front of the boards from a distance of not less than 1000 mm (39").

3.5 Acoustic Wall Assemblies

- .1 Acoustical sealant and plaster:
 - .1 Apply acoustical sealant to seal gaps in accordance with ASTM C919-22 and in accordance with the STC rated assembly.
 - .2 Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919-22 and with manufacturer's written requirements for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
 - .3 Clean substrate, remove debris and deleterious substances.
 - .4 Apply sealant to close voids; no leaks around track and gypsum board.

Gypsum Board

.2 Sound attenuation insulation:

- .1 Install sound attenuation insulation to fill cavity unless otherwise indicated.
- .2 Trim insulation to provide close-fit contact to framing assemblies and fill the partition cavity or acoustic insulation assemblies to thicknesses specified or indicated.
- .3 Maintain air space between backs of sound attenuation insulation and back of opposite partition face layer, as applicable.
- .4 Cut insulation to provide close-fit contact around electrical boxes, pipes, and other obstructions and penetrations through and within acoustic assemblies.
- .5 Extend acoustic partition assemblies to underside of structure. Incorporate approved provision to prevent transmittance of structural deflection to partition assembly.
- .6 Staple sound attenuation insulation where required by manufacturer's installation requirements.
- .7 Where studs are not faced with gypsum board on both sides, mechanically fasten wire mesh to non-faced side of stud to retain insulation.
- .8 Mechanically attach sound attenuation insulation in wall assemblies where cavity of wall assembly is greater than 150 mm (6").
- .9 Secure insulation in such a manner that it will not sag or settle away from required locations.

.3 Sound flanking paths:

- .1 Where sound rated partition walls intersect non rated gypsum board partition walls, extend sound rated construction to completely close sound flanking paths through non rated construction.
- .2 Seal joints between face layers at vertical interior angles of intersecting partitions.

3.6 Finishing

- .1 Provide levels of gypsum board finish for locations as follows, in accordance with GA 214-21.
 - .1 Level 1: Ceiling plenum areas and concealed areas, except provide higher level of finish as required to comply with fire resistance ratings and acoustical ratings.
 - .2 Level 2: Gypsum board substrate at applied hard surfaces, except remove tool marks and ridges.
 - .3 Level 4: Exposed gypsum board surfaces, except where another finish level is indicated.
- .2 Interior gypsum board:
 - .1 Prefill:
 - .1 Use setting-type joint compound. Mix joint compound according to manufacturer's written requirements.
 - .2 Fill joints between boards flush to top of eased or beveled edge.

Gypsum Board

- .3 Fill joints of gypsum board above suspended ceilings in fire rated partitions.
- .4 Wipe off excess compound and allow compound to harden.
- .5 Prefill joint gaps not greater than 3.2 mm (1/8") with either ready-mix or setting type joint compound; prefill joint gaps greater than 3.2 mm (1/8") with setting-type joint compound.
- .2 Taping (Level 1):
 - .1 Butter taping compound into inside corners and joints.
 - .2 Center tape over joints and press down into fresh compound.
 - .3 Remove excess compound.
 - .4 Tape joints of gypsum board above suspended ceilings.
- .3 First coat (Level 2):
 - .1 Use taping or all-purpose drying-type compound.
 - .2 Immediately after bedding tape, apply skim coat of compound and allow to dry completely in accordance with manufacturer's written requirements.
 - .3 Apply first coat of compound over flanges of trim and accessories, and over exposed fastener heads and finish level with board surface.
 - .4 Cover fastener heads and accessories with 1 coat of joint compound.
- .4 Second coat (Level 3): After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 50 mm (2") beyond edge of first coat.
 - .1 Cover fastener heads and accessories with total of 2 separate coats of joint compound.
- .5 Third coat (Level 4):
 - .1 After second coat has dried, sand surface lightly and apply thin finish coat to joints, fasteners and trim, feathering compound 50 mm (2") beyond edge of second coat.
 - .2 Allow third coat to dry. Apply additional compound, and touch-up and sand, to provide surface free of visual defects, tool marks, and ridges, and ready for application of finish.
 - .3 Finished joints will be accepted with a camber not greater than 1 mm (1/32") and shall be seamless, plumb, true and flush and with square, neat corners.
 - .4 Cover fastener heads and accessories with total of 3 separate coats of joint compound.
- .3 Joint compound:
 - .1 Apply finish coat of compound feathering 75 to 100 mm (3" to 4") beyond tape edges.
 - .2 Feather coats onto adjoining surfaces so that camber is maximum 0.79 mm (1/32").
- .4 Trim:

Gypsum Board

- .1 Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
- .2 Install metal corner beads at external corners.
- .3 Install metal casing bead trim whenever edge of gypsum base would otherwise be exposed or semi exposed, and where gypsum base terminates against dissimilar material.
- .4 Erect beads plumb or level, with minimum joints.
- .5 Control joints:
 - .1 Provide control joints set in board facing. Support control joints with studs or furring channels on both sides of joint.
 - .2 Provide control joints in required locations.
 - .1 Review control joint locations with *Consultant* prior to installation.
 - .3 Install control joints where a partition, wall, or ceiling traverses a construction joint (expansion, seismic or building control element) in the building structure.
 - .4 Install control joints where a wall or partition runs in an uninterrupted straight plane exceeding 9100 mm (30 linear feet).
 - .5 Install control joints in interior ceilings:
 - .1 With perimeter relief:
 - .1 Linear dimensions between control joints shall not exceed 15000 mm (50 ft) and total area between control joints shall not exceed 230 m² (2500 ft²).
 - .2 Without perimeter relief:
 - .1 Linear dimensions between control joints shall not exceed 9100 mm (30 ft) and total area between control joints shall not exceed 84 m² (900 ft²).
- .6 Install control joints where ceiling framing members change direction.
- .7 Where a control joint occurs in an acoustical or fire-rated system, provide blocking behind the control joint by using a backing material such as 16 mm (5/8") Type X gypsum panel products, mineral fibre, or other tested equivalent. Construct through-wall control joints at fire-rated assemblies in accordance with assembly listing requirements.
- .8 Line up control joints with joints in other construction or with centre lines of mullions, columns, piers, or similar building elements, where accepted by *Consultant*.
- .9 Install control joints straight and true.
- .10 Ceiling height door frames may be used as control joints. Less than ceiling height frames shall have control joints extending to the ceiling from both corners. If control joints are not used, additional reinforcement is required at corners to distribute concentrated stresses.
- .11 Locate board joints so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.

Gypsum Board

3.7 Fire Separations

- .1 Install fire-rated assemblies in accordance with assembly listing requirements in order to obtain fire ratings indicated and as required by authorities having jurisdiction.
- .2 Vertical bulkheads in ceiling spaces over fire rated partitions, doors and the like shall have same fire rating as the partition over which they occur. Such bulkheads shall be of gypsum board construction unless otherwise indicated.
- .3 Use fire rated gypsum wallboard as specified.
- .4 Where lighting fixtures, diffusers, and the like are recessed into fire rated ceilings or bulkheads, provide enclosure to maintain required fire rating. Form removable panel to give access to fixture outlet box.
- .5 Where fire hose cabinets or other fixtures or equipment are recessed in fire rated walls or partitions, provide gypsum board enclosure or backing to maintain required fire rating, unless otherwise detailed.

3.8 Access Doors

- .1 Install access doors to mechanical and electrical fixtures specified in respective sections of Divisions 21, 22, and 23 and Divisions 26, 27, and 28.
- .2 Access doors shall be as supplied by Divisions 21, 22, and 23 and Divisions 26, 27, and 28. Locations to be reviewed and confirmed by *Consultant*.
- .3 Install access panels in locations to be determined by coordination with trades installing mechanical, electrical and other building services and consultation with *Consultant*.
- .4 Rigidly secure frames to furring or framing systems.

3.9 Adjusting and Cleaning

- .1 Remove debris and rubbish from wall and ceiling cavities before enclosing with board.
- .2 Clean up and remove surplus materials and rubbish resulting from the work of this section upon completion.
- .3 Clean off beads, casings, joint compound droppings and the like, leave the work of this section ready for painting trades.

END OF SECTION

Acoustical Tile Ceiling Systems

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Acoustical tile ceiling systems; ACT-1.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Cooperate with mechanical and electrical *Subcontractors*.
 - .2 Coordinate layout and installation of acoustic ceiling units and suspension systems components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, partition system, fire suppression system components and other work required to be incorporated in or coordinated with the ceiling system.
- .2 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Submit manufacturer's standard details.
 - .2 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines, and acoustical unit support at ceiling fixture.
 - .3 Submit reflected ceiling plans for special grid patterns as indicated.
- .4 Samples:
 - .1 Submit sample of each component of ceiling system. Samples shall fully represent materials to be supplied in colour, texture, finish and construction.
 - .2 Submit samples, load test data and design tables for each type of insert to be used in the *Work* for hanger supports.
- .5 Certificates:
 - .1 Submit certificate of compliance stating that the suspension system provided, including materials and installation, comply with the requirements of the *Contract Documents*.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Maintenance data:

Acoustical Tile Ceiling Systems

- .1 Submit maintenance and cleaning instructions for acoustical ceiling systems for incorporation into the maintenance manuals.
- .3 Maintenance materials:
 - .1 Deliver for maintenance use, 2% of each type and colour of suspension components and acoustical tiles used in the *Work*.
 - .2 Pack panels in suitable containers, clearly dated and identified as to type and location of installation in the *Work*, and store where directed by *Owner*.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers / applicators / erectors:
 - .1 Installers: Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

1.6 Delivery, Storage, and Handling

- .1 Ship exposed members and mouldings in rigid crates to avoid damage. Bent or deformed material shall be rejected. Baked enamelled members shall be suitably wrapped and protected against damage.
- .2 Deliver acoustical ceiling units to the *Place of the Work* in original, unopened packages and store in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- .3 Before installing acoustical ceiling units, permit them to reach room temperature and stabilized moisture content.
- .4 Handle acoustical ceiling units carefully to avoid chipping edges or damaging units.

1.7 Field Conditions

- .1 Commence installation after building is enclosed with windows and exterior doors in place and glazed, and roof watertight.
- .2 Interior temperature of building to range from 15°C to 30°C and relative humidity of not more than 70% before and during installation. Maintain uniform temperatures for 72 hours prior to commencement of the work of this section and maintain temperature until completion of the work of this section.

1.8 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranties:
 - .1 System:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 Duration: 2 years.
 - .2 Manufacturer's *Product* warranty for the following:

Acoustical Tile Ceiling Systems

- .1 Acoustical tiles:
 - .1 Duration: 30 years.
- .2 Suspension systems:
 - .1 Duration: 10 years.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Design suspension systems for a maximum mid-span deflection not exceeding $L/360$ in accordance with ASTM C635/C635M-22 deflection test.
- .2 Design suspension system to support safely, and without distortion, the superimposed loads of:
 - .1 Air supply diffusers and return grilles.
 - .2 Lighting fixtures.

2.2 General

- .1 Single source responsibility: Obtain each type of acoustical ceiling unit and suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the *Work*. Products installed as part of the work of this section shall be from same production run.

2.3 Acoustical Tiles

- .1 ACT-1:
 - .1 Classification: Type IV, Form 2, Pattern E in accordance with ASTM E1264-23.
 - .2 Size: 610 mm x 1220 mm (24" x 48").
 - .3 NRC: 0.85.
 - .4 Material: mineral fibre.
 - .5 Surface texture: smooth.
 - .6 Edge: square tegular 9/16".
 - .1 Paint to cover field tegularized edges.
 - .1 Acceptable *Product*: Armstrong 'SuperCoat Ceiling Touch Up' or approved alternate by CGC.
 - .7 Colour: White.
 - .8 Flame spread:
 - .1 Maximum values in accordance with CAN/ULC-S102-10:
 - .1 Flame Spread Value (FSV): 25.
 - .2 Smoke Developed Value (SDV): 50.
 - .9 Acceptable *Products*:
 - .1 Armstrong 'Calla Tegular 2825'.

Acoustical Tile Ceiling Systems

- .10 Acceptable alternate manufacturer, subject to approval by *Consultant*:
- .1 CGC.

2.4 Metal Suspension Systems

- .1 Hanger anchorage devices: Screws, clips, bolts, concrete inserts or other devices applicable to the indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data. Size devices for 3 x calculated load supported except size direct pull-out concrete inserts for 5 x calculated loads.
- .2 Concrete hanger anchors; post installed: Steel eye bolts and nuts to suit ceiling hangers with capability to sustain, without failure, a load equal to 4 times that imposed by ceiling construction, as determined by testing per ASTM E488/E488M-22, conducted by a qualified independent testing laboratory.
 - .1 Dynabolt Sleeve Anchor 'TW-1614' or Readi-Tie-Drive 'TD4-112' tie wire anchor by ITW Ramset/Red Head.
 - .2 Kwik-Bolt III 'HHDCA 1/4' tie wire anchor by Hilti Corporation.
 - .3 Fasteners exposed to weather, condensation, and corrosion: Zinc-plated or stainless steel fasteners in applicable product lines specified in preceding paragraphs.
- .3 Hangers and tie wire: Galvanized wire, recommended by manufacturer of suspension system, minimum 2.66 mm (0.1") (12 gauge).
- .4 Suspension system accessories:
 - .1 Splices, clips, and perimeter moulding, of manufacturer's standard type to suit the applicable conditions unless special conditions and access area are shown or specified.
 - .2 Stepped wall mouldings; hemmed with prefinished exposed flanges:
 - .1 For 24 mm (15/16") grid applications; shadow moulding with exposed bottom flange of 22 mm (7/8") and reveal of 19 mm (3/4").
 - .1 Armstrong '7871'.
 - .2 CGC 'MS154'.
 - .2 For 14 mm (9/16") grid applications; shadow moulding with exposed bottom flange of 14 mm (9/16") and reveal of 10 mm (3/8").
 - .1 Armstrong '7873'.
 - .2 CGC 'MS174'.
- .5 Narrow suspension system, non fire-rated:
 - .1 Intermediate duty in accordance with ASTM C635/C635M-22, 14 mm (9/16") interlocking tee system, designed to support acoustical panels in patterns indicated with deflection of main tees less than L/360, consisting of main tees and cross tees. The system shall provide lock joint intersections of cross and main tees.
 - .2 Acceptable *Products*:
 - .1 Armstrong 'Suprafine XL 9/16" Exposed Tee Systems'.

Acoustical Tile Ceiling Systems

.2 CGC 'DXT'.

2.5 Miscellaneous Materials

- .1 Acoustical sealant: Non-drying, non-hardening, non-skinning, non-staining, non-bleeding, gunnable sealant complying with requirements specified in Section 07 92 00.

2.6 Metal Finish

- .1 Metal exposed in finished work shall have a pre-coated baked enamel finish in non-yellowing colour. Submit paint formulation of grid system to lighting fixture, speaker grille, sprinkler and diffuser manufacturers to ensure consistency of colour, sheen and texture of exposed metal components in the ceiling assemblies.
 - .1 Colour: Flat white.

PART 3 - EXECUTION

3.1 Installation - General

- .1 Install ceiling panels and metal suspension system in accordance with manufacturer's directions. Where manufacturer's directions are at variance with *Contract Documents*, notify *Consultant* before proceeding with installation.
- .2 Do not commence installation until work above suspended ceiling has been completed, inspected and accepted.

3.2 Installation - Suspension System

- .1 Install suspension system rigid, secure, square, level and plumb, framed and erected to maintain dimensions and contours indicated, and in accordance with ASTM C636/C636M-19, Cisca installation standards and any other applicable national or local code requirements. Make allowance for thermal and structural movement.
- .2 Attach hangers to structure with inserts and hanger supports. Do not use powder activated fasteners.
- .3 Support hangers for suspended ceiling grid independent of walls, columns, pipes and ducts.
- .4 Space hangers for ceilings at maximum 1220 mm (48") on centre in both directions. Provide additional hangers as required to comply with manufacturer's written installation requirements.
- .5 Locate hangers at not more than 150 mm (6") from ends of main tee members.
- .6 Install exposed tee members to pattern indicated. Securely attach hangers to main tee members.
- .7 Exposed tees shall be as long as possible to minimize joints. Make joints square, tight, flush and reinforce with splines. Distribute joints to prevent clustering in one area.
- .8 Space tee bars to suit ceiling panels and as detailed, and to accommodate lighting fixtures, diffusers and return grilles.
- .9 Cooperate in the installation of ceiling systems, making adjustments where required to ensure that the lighting fixtures, supply diffusers, exhaust grilles and other built-in items properly fit into ceiling module and finish flush with rest of ceiling.

Acoustical Tile Ceiling Systems

- .10 Restrict creep inside module panels so that strips are centred on module lines.
- .11 Install edge moulding as detailed where ceiling abuts vertical surfaces. Lap corners, use maximum lengths to minimize joints. Make joints square, tight and flush.
 - .1 Screw attach mouldings to substrates at intervals not more than 400 mm (16") on centre and not more than 210 mm (8") from ends, levelling with suspension system. Lap corners accurately and connect securely.

3.3 Installation - Tiles

- .1 Take precautions during installation to ensure tile edges are not chipped or otherwise damaged.
- .2 Minimize field cutting. Rectify cut tile edges of tile to match factory cut edge profile and colour.
 - .1 Cutting: Use tools recommended by manufacturer for cutting of tegular edge.
 - .2 Cover field tegularized edges of mineral fiber tiles with manufacturer's recommended touch-up/sealer paint system.
- .3 Install acoustical tiles to form horizontal and level ceiling with parts flush and joints butted tightly to hairline appearance.
- .4 Distribute variations in colour and texture of panels to obtain a uniform appearance.

3.4 Installation - Tolerances

- .1 Allowable tolerances: in accordance with ASTM C636/C636M-19.
- .2 Install suspension systems level to tolerance of 1:1200.
- .3 Install edge mouldings level to tolerance of 3 mm in 3660 mm (1/8" in 12'-0").

3.5 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23 and as follows:
 - .1 Field tests and inspections:
 - .1 Independent inspection and testing company shall perform random load tests for ceiling anchor installation.

3.6 Adjusting and Cleaning

- .1 Replace uneven, defective or damaged materials and finishes, eliminate waves, remove soiled or stained areas.
- .2 Clean dirty and discoloured surfaces of acoustical units and suspension system according to manufacturer's recommendations.

END OF SECTION

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Resilient base; B-1 and B-2.
 - .2 Transition trim threshold, TH1 and TH2.

1.2 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Samples:
 - .1 Samples for verification: Submit 3 samples of the following:
 - .1 305 mm (12") long samples of each colour and type of base material. Include sample of outside corner of base.
- .4 Manufacturer's instructions:
 - .1 Submit manufacturer's installation instructions for *Products* proposed for use in the work of this section.

1.3 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.4 Quality Assurance

- .1 Qualifications:
 - .1 Installers:
 - .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.

1.5 Field Conditions

- .1 Ambient conditions:
 - .1 Install materials of this section only when surfaces and air temperatures have been maintained between 21°C and 29.4°C for 7 days preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13°C after above period.

Resilient Base and Accessories

- .2 Verify that adequate ventilation is provided during installation and curing of materials of this section.
- .3 Applications exposed to intense or direct sunlight, protect *Products* during the conditioning, installation, and adhesive curing periods, by covering the light source.
- .4 Allow coiled material to lay flat for at least 24 hours at 18°C prior to installation, and maintain this temperature during installation.

PART 2 - PRODUCTS

2.1 General

- .1 Single source responsibility: Obtain each type of resilient *Product* from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the *Work*. Products installed as part of the work of this section shall be from same production run.

2.2 Resilient Base

- .1 Rubber base types; B-1 and B-2:
 - .1 Acceptable *Products*:
 - .1 Tarkett 'TightLock Carpet Wall Base', in a 6.3 mm (1/4") tapered wedge thickness, complete with preformed corners.
 - .2 Substitutions: in accordance with Section 01 60 00.
 - .2 Base height: 108 mm (4.25").
 - .3 Colours:
 - .1 B-1: as indicated.
 - .2 B-2: as indicated.

2.3 Floor Transition Trim Threshold

- .1 TH1:
 - .1 Height: as indicated.
 - .2 Colour: as indicated.
 - .3 Acceptable *Product*:
 - .1 Schluter SCHIENE - M series.
 - .2 Substitutions: in accordance with Section 01 25 00.
- .2 TH2:
 - .1 Height: as indicated.
 - .2 Colour: as indicated.
 - .3 Acceptable *Product*:
 - .1 Mohawk '1/4" Reducer to Floor - CRA10'.
 - .2 Substitutions: in accordance with Section 01 25 00.

Resilient Base and Accessories

2.4 Accessories

- .1 Block wall filler: Filler type as recommended by resilient base manufacturer to suit substrate and compatible with materials.
- .2 Primers and adhesives: Types as recommended by resilient product manufacturer compatible with materials and to suit substrate types.
- .3 Sealant:
 - .1 Medium-modulus, neutral-curing silicone sealant; complying with ASTM C920-14, Type S, Grade NS.
 - .2 Colour: Clear.
 - .3 Acceptable Manufacturers:
 - .1 Dowsil.
 - .2 Mumentive.
 - .3 Tremco.

PART 3 - EXECUTION

3.1 Examination

- .1 Verify that field conditions have been provided as requested and specified.
- .2 Substrates shall be firm, structurally sound, sufficiently porous, and dry.
- .3 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .4 Examine substrates in advance of application of products to ensure that substrates are protected against entry of water and moisture.
- .5 Report conditions contrary to requirements preventing proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .6 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- .7 Defective work resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.

3.2 Preparation

- .1 Substrates shall be free of deleterious material that may inhibit bond strength or act as a bond breaker. Remove such contaminants and deleterious material using mechanical methods recommended by manufacturer. Do not use chemical abatement methods.
- .2 Fill gaps, voids, and cracks, and remove ridges, or other defects which will ghost or telegraph through finished product installation.
- .3 Expansion joints, isolation joints, and other movement joints in substrates shall not be filled with patching or levelling compound.
- .4 Sweep and vacuum clean substrates minimum 24 hours prior to alkalinity, moisture, and adhesion testing. Do not use sweeping compounds.

Resilient Base and Accessories

- .5 Notify *Consultant* of any substrate or levelling compound defects or installation conditions that may result in unsatisfactory performance.
- .6 Do not install products until they are same temperature as space where they are to be installed.
- .7 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. Do not use sweeping compounds.
- .8 Where flooring adjoins thicker floor materials, apply levelling screed, feather out to make up difference in level between materials.
- .9 Spray paints, permanent markers and other indelible ink markers shall not be used to write on the back of the resilient material or used to mark the substrate as they could bleed through and permanently stain the resilient material. If such contaminants are present on the substrate they shall be mechanically removed prior to the installation of the resilient material.

3.3 Installation of Resilient Base

- .1 Spread adhesive to ribbed surface (back) of wall base with a 3 mm (1/8") square-notched trowel; allow slight set-up, then bring base into contact with substrate. Ensure full adhesion of base to substrate. Adhesive should cover 80% of back surface. Leave a 6 mm (1/4") uncovered space at the top of the wall base to prevent the adhesive from oozing onto the wall above the base when installed.
- .2 Position wall base on wall surface and roll with hand roller. Always roll back to starting point to prevent stretching the wall base.
- .3 Set base to ensure installation over finished flooring material is free of gaps.
- .4 Install base in longest lengths possible, minimum 2440 mm (8'). Adhere toe of base to substrate, and ensure edge of toe is straight.
- .5 Scribe and fit to door frames and other obstructions.
- .6 Joints shall be tightly fitted, straight and vertical, and not less than 610 mm (24") from corners.
- .7 Provide joints in base over substrate control joints.
- .8 Field-made inside corners:
 - .1 Install wall base to terminate into the corner with a mitre cut.
 - .2 Position another piece of wall base on opposing wall, without adhesive, approximately 25 mm (1") from the installed piece.
 - .3 Utilizing the dividers, place the hooked end at the top of the installed piece and the pointer end on the top of the uninstalled piece. Carefully, move the dividers downward in a straight vertical motion, allowing the hooked end of the dividers to follow the profile of the installed piece. At the same time, place adequate pressure on the pointer end to transfer and/or scribe the profile onto the surface of the uninstalled piece.
 - .4 Use a utility knife to cut the pattern on the uninstalled wall base, apply adhesive, and position the trimmed section into place.
- .9 Field-made outside corners:

Resilient Base and Accessories

- .1 Install wall base to terminate into the corner with a mitre cut.
- .2 Stop application of adhesive to wall base approximately 450 mm (18") from the outside corner of the wall.
- .3 Position the wall base at the corner and pencil line the back of the wall base where the bend is desired.
- .4 Lay the wall base on the floor with the back up. Utilizing a top-set or pull-type gouge tool, make a shallow notch along the pencil line.
- .5 Notch depth should not exceed one-quarter the total thickness of the wall base.
- .6 Reposition the wall base corner on the wall. The corner of the wall should fit snugly into the notched recess on the back of the wall base.
- .7 Apply adhesive and roll firmly into place.

3.4 Installation Transition Trim

- .1 Coordinate transitions with work of other sections and install transition trim to transitions between different flooring types.
- .2 Locate thresholds directly beneath the door (in a closed position).
- .3 Set to ensure installation is free of gaps.
- .4 Install in longest lengths possible.
- .5 Scribe and fit to obstructions.
- .6 Fit joints tightly, straight and vertical as applicable. Transition trim joints shall be not less than 610 mm (24") from corners.
- .7 Mitre corners.

3.5 Installation Tolerances

- .1 Resilient base: Install straight and level to variation of 3 mm (1/8") over 3 m (10'-0").
- .2 Transition trim: Install straight to variation of 3 mm (1/8") over 3 m (10'-0").

3.6 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

3.7 Adjusting and Cleaning

- .1 Remove adhesive from surfaces as work progresses in manner described by manufacturer.
- .2 Thoroughly clean surfaces in accordance with manufacturer's written requirements.

END OF SECTION

Carpet

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Carpet tile; CPT-1.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordinate transitions with work of other sections and install transition trim to transitions between carpet flooring and adjacent flooring.
- .2 Conduct a pre-installation meeting in accordance with Section 01 30 00.
 - .1 Independent inspection and testing company shall attend the pre-installation meeting.
 - .2 The following items shall be addressed at the pre-installation meeting:
 - .1 Analysis of the work and existing conditions.
 - .2 Testing requirements for floor substrates.
 - .3 Recommendations for mitigation of existing slab moisture.
 - .4 Compatibility of materials adhesives with products and substrate.
 - .5 Installation details and patterns.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
- .3 Shop drawings:
 - .1 Carpet tile layout drawings: Submit for review drawings of tile layout pattern, location and type of accessories.
- .4 Samples:
 - .1 Submit 3 samples of each type and colour of carpet.
 - .2 Minimum sample sizes:
 - .1 Carpet tile: Full size tile.
 - .3 Submit 150 mm (6") length sample of floor edge trim.
- .5 Test and evaluation reports:
 - .1 Submit moisture, alkalinity, and adhesive bond test results.

Carpet

.6 Manufacturers' instructions:

- .1 Submit carpet and adhesive manufacturer's written installation recommendations for each type of substrate required.
- .2 Identify trowel notch size and shape, and required adhesive coverage rates for each specified carpet material for installation of specified materials.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
- .3 Maintenance materials:
 - .1 Carpet tile: 3% of each carpet colour and type specified, supplied in full size units.
 - .2 Maintenance materials to be same production run as installed materials.
 - .3 Suitably package for protection and storage, each identified with name of manufacturer and flooring material.
 - .4 Tag and store where directed by *Owner*.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers:
 - .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
 - .2 Only persons who are Trade Qualified or Product Qualified in accordance with NFCA Part A05 requirements shall be engaged in the installation of resilient flooring.
 - .3 Preparation, materials, and workmanship shall be in strict accordance with NFCA requirements and material manufacturer's written recommendations and detail requirements for conditions of work that apply and guarantee / warranty periods.
- .2 Mock-ups:
 - .1 Prior to commencing flooring installation for this section, prepare full room mock-up (room size at least 10 m² (100 ft²) in area) for acceptance by the *Consultant*.
 - .2 Location of installation shall be determined by *Consultant*.
 - .3 Do not proceed with flooring specified in this section until mock-up has been accepted by *Contractor* and *Consultant*.

1.6 Field Conditions

- .1 Ambient conditions:

Carpet

- .1 Ambient temperature and humidity shall comply with CRI Carpet Installation Standard 2015.
- .2 Unroll and allow carpet to relax in the installation area for a minimum of 24 hours at a temperature between 18-35°C.
- .3 In areas that are exposed to intense or direct sunlight, *Products* shall be protected during the conditioning, installation, and adhesive curing periods, by covering the light source.

PART 2 - PRODUCTS

2.1 General

- .1 Single source responsibility: Obtain each *Product* from a single source with resources to provide products of consistent quality in appearance and physical properties, same production run, without delaying progress of the *Work*. Products installed as part of the work of this section shall be from same production run.

2.2 Carpet Tile

- .1 CPT-1:
 - .1 Tile size: 250 mm x 1000mm (9.845" x 39.38").
 - .2 Installation pattern: Ashlar.
 - .3 Thickness:
 - .1 Finished pile thickness: 1.90 mm.
 - .2 Total thickness: 3.60 mm.
 - .4 Acceptable *Product*:
 - .1 Interface 'Open Air 401 - 16336'.
 - .1 Colour: 107686 Oat.
 - .2 Backing material: GlasBac.
 - .2 Substitutions: in accordance with Section 01 60 00.

2.3 Miscellaneous Materials

- .1 Primers and adhesives: Type as recommended by carpet manufacturer compatible with materials and to suit substrate types and to comply with warranty requirements.
 - .1 Carpet tile: Pressure sensitive type.
 - .2 Transition trim adhesive: Type as recommended by transition trim manufacturer compatible with materials and to suit substrate types.
- .2 Patching and levelling compound:
 - .1 Type as recommended by flooring manufacturer compatible with materials and to suit substrate types and to comply with warranty requirements.
 - .2 Trowel applied Portland cement based, moisture, mildew, and alkali-resistant.
 - .3 Minimum compressive strength after 28 days shall be minimum 3,500 psi when tested in accordance with ASTM C109/C109M-21.

Carpet

- .4 Gypsum based compounds are not acceptable.
- .5 Acceptable manufacturers:
 - .1 Ardex.
 - .2 Mapei.
 - .3 Substitutions: in accordance with Section 01 60 00.
- .3 Floor transition strips:
 - .1 Resilient transition trims: in accordance with Section 09 65 13.

PART 3 - EXECUTION

3.1 Examination

- .1 Ensure that field conditions have been provided as requested and specified.
- .2 Ensure that substrates have been provided as specified without holes, protrusions, cracks or unfilled control joints or depressions that would telegraph in finished carpet installation.
- .3 Substrates shall be firm, structurally sound, sufficiently porous, and dry.
- .4 Examine substrate to ensure clean lines, correct level and freedom from cracks, ridges, dusting, scaling and carbonation.
- .5 Examine floors in advance of application of flooring to ensure that floors are protected against entry of water and moisture.
- .6 Report conditions contrary to requirements preventing proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.
- .7 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- .8 Defective work resulting from application to unsatisfactory surfaces will be considered the responsibility of those performing the work of this section.

3.2 Preparation

- .1 Comply with recommendations of ASTM F710-22.
- .2 Substrates shall be free of wax, oil, silicone, soap, grease, dust, solvents, sealers, curing compounds, hardeners, alkaline salts, excessive carbonation or laitance, mould, mildew, paints, varnish, asphalt, residual adhesives, adhesive removers, or other contaminants or deleterious material that may inhibit bond strength or act as a bond breaker. Remove such contaminants and deleterious material using mechanical methods recommended by manufacturer. Do not use chemical abatement methods.
- .3 Flooring substrates shall be smooth and level within a tolerance of 3 mm (1/8") in a 3m (10'-0") radius.
- .4 Concrete substrates that are loose, sandy, scaly, or have a white powdery surface are not acceptable. Substrates shall be mechanically prepared.
- .5 Fill surface cracks, holes, score marks, depressions, and grooves, and repair surface spalls with Portland cement patching or levelling compound.

Carpet

- .6 Expansion joints, isolation joints, and other movement joints in substrates shall not be filled with patching or levelling compound.
- .7 Remove bumps, high spots, peaks and ridges to produce a uniform and smooth substrate.
- .8 Prepare substrates so that installation of flooring shall not show telegraphing of substrate.
- .9 Remove chalking and dusting and loose material from concrete surfaces with wire brushed or by scraping.
- .10 Sweep and vacuum clean substrates minimum 24 hours prior to alkalinity, moisture, and adhesion testing. Do not use sweeping compounds.
- .11 Notify *Consultant* of any substrate or levelling compound defects or installation conditions that may result in unsatisfactory performance.
- .12 Alkalinity, moisture, and adhesion testing:
 - .1 Test substrates in accordance with paragraph 3.6 Field Quality Control after mechanically preparing subfloor or applying patching and levelling compounds.
 - .2 Proceed with installation only after substrates pass testing. Document tests performed and submit in writing to *Consultant*.
- .13 Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. Do not use sweeping compounds.
- .14 Where flooring adjoins thicker floor materials, apply levelling screed, feather out to make up difference in level between materials.
- .15 Spray paints, permanent markers and other indelible ink markers shall not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and permanently stain the flooring material. If such contaminants are present on the substrate they shall be mechanically removed prior to the installation of the flooring material.

3.3 General Installation Requirements

- .1 Comply with CRI Carpet Installation Standard 2015 by applicable installation method and manufacturer's written installation requirements.

3.4 Installation - Carpet Tile

- .1 Select the appropriate adhesive and trowel notch configuration recommended by the carpet, and adhesive manufacturers.
- .2 Determine quadrants by grid line of area using standard tile laying methods, or use laser alignment.
- .3 Pressure sensitive adhesive:
 - .1 Use a 200 mm (8") wide paint roller to apply adhesive full spread over substrate area.
 - .2 Allow adhesive to set until surface becomes tacky to the touch but no adhesive is transferred.
- .4 Lay carpet tiles accurately and firmly along centre lines of selected quadrants. Follow with subsequent tiles within quadrant using 'stair-step' techniques.

Carpet

- .5 As tiles are installed, frequently check all joints with fingers to ensure proper alignment. Do not install tiles that are out of alignment.
- .6 Measure out 11 carpet tiles to attain the cumulative space gained over 10 joints, which shall not exceed 6 mm (1/4"). Repeat frequently throughout installation.
- .7 Carefully butt tiles together, avoiding too much pressure which may cause peaks or buckles. Brush back face pile and tip tile into place to avoid pile being caught in joint. Anchor all cut tile and perimeter tiles with release adhesive.
- .8 Make cuts from backs of tiles using templates for fitting around columns, service cut-outs and the like.
- .9 Finish and adhere securely along the wall line; with a smooth, neat appearance where no wall base materials are indicated; and concealed beneath base materials where wall base materials are indicated. Base materials shall be installed after installation of carpet.
- .10 Install carpet accurately fitted at perimeter of rooms, cut with precision at columns, door frames and at other obstructions. At columns and other penetrations, cut carpet with maximum possible coverage.
- .11 Extend carpet tile into recesses and closets and around fixtures and service devices.
- .12 Allow no traffic over installation until adhesives have fully cured, minimum 24 hours.
- .13 Installed carpet shall be free from perceptible variance in colour, stains, baldness, tears, fraying, patchwork, and other defects detrimental to good performance and appearance.

3.5 Installation - Transition Trim

- .1 Protect exposed edges of flooring, where finished and unfinished areas adjoining, by means of a transition trim butting to and flush with the finished surface of the flooring covering material and securely adhered to the substrate material.
- .2 Set transition trim to height as required to cover carpet backing and not protrude above carpet fibres. Review heights with *Consultant* not later than 5 days prior to installation.
- .3 Allow coiled vinyl material to lay flat for at least 24 hours at ambient temperatures specified above prior to installation.
- .4 Set to ensure installation is free of gaps.
- .5 Install transition trim in longest lengths possible.
- .6 Install transition trim straight to maximum variation of 3 mm (1/8") over 3 m (10'-0").
- .7 Scribe and fit transition trim to obstructions.
- .8 Fit transition trim joints tightly, straight and vertical as applicable and not less than 610 mm (24") from corners.
- .9 Mitre transition trim corners.

3.6 Field Quality Control

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.
 - .1 Manufacturer's field review to be in accordance with Section 01 45 00.

Carpet

- .1 In addition to field review described in Section 01 45 00, manufacturer to perform a site walkthrough post-installation with a certified floor inspection. Cost of this inspection / walkthrough shall be included in the *Contract Price*.
- .2 Field tests and inspections: Conduct field testing and inspection in accordance with the NFCA Quality Assurance Program, including, but not limited to the testing described below.
 - .1 Moisture and alkalinity:
 - .1 Test for moisture vapour transmission in accordance with ASTM F710-22 and ASTM F1869-22 or ASTM F2170-19a in accordance with manufacturer's written flooring installation requirements. Results must not exceed 170 µg/m² (3 lb per 1,000 ft²) in 24 hours when tested to ASTM F1869-22, or exceed 75% when tested to ASTM F2170-19a.
 - .2 Test for surface pH. Levels of pH shall not exceed the written recommendations of the flooring manufacturer and adhesive manufacturer. Test in accordance with ASTM F710-22.
 - .3 For each test type: Conduct 3 tests for flooring applications up to 93 m² (1000 ft²) in area, and 1 additional test for each additional 93 m² (1000 ft²) of flooring area.
 - .4 Testing shall be conducted by independent inspection and testing company and in accordance with Section 01 40 00, 01 45 00, and 01 45 23.
 - .2 Adhesion bond test:
 - .1 Proceed with bond test after substrates have been prepared and alkalinity and moisture test have been completed.
 - .2 Select six substrate test areas, each 915 mm (3'-0") x 915 mm (3'-0") in size. Test areas shall be spaced a minimum 1220 mm (48") apart.
 - .3 Using the specified adhesive, glue down carpet tiles using adhesive manufacturer's recommended trowel.
 - .4 After 72 hours, attempt to remove the carpet tiles by pulling up from the corners.
 - .5 Testing shall be conducted by independent inspection and testing company and in accordance with Section 01 40 00, 01 45 00, and 01 45 23.

3.7 Adjusting and Cleaning

- .1 After installation is completed, clean and vacuum carpet of dirt, dust and foreign materials. Remove spots with suitable spot remover, remove cuttings, vacuum carpet thoroughly using approved commercial type equipment and leave clean. Provide necessary commercial vacuum cleaning equipment.

3.8 Protection

- .1 Prohibit foot traffic on installed flooring for a period of 24 hours after installation. No heavy traffic, rolling loads, or furniture placement are permitted for a minimum of 72 hours after installation.
- .2 Protect new floors from time of final set of adhesive until final inspection.

Carpet

- .3 Install floor protection in areas where work, repairs and installation of equipment, and foot traffic will occur.

END OF SECTION

Wall Coverings

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Fabric wall coverings (WC-1) complete with corner guard (CG-1).

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 Samples:
 - .1 Submit 305 mm (12") square samples of each colour and texture of wall covering.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
- .3 Maintenance materials:
 - .1 Deliver 2% extra of full width material of each pattern, texture and colour for maintenance use. Store where directed. Clearly identify each roll.
 - .2 Maintenance materials to be from same production run as installed materials.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers:
 - .1 Shall have 5 years' experience, minimum, in application of *Products* specified and with approval and training of *Product* manufacturer.
- .2 Mock-up:
 - .1 Prior to commencing wall covering installation for this section, prepare minimum three wall mock-ups (size at least 3550 mm x 1500 mm) showing each specified colour for acceptance by the *Consultant*.
 - .2 Mock-up shall include at least one inside corner and one outside corner.
 - .3 Mock-up shall include each type of wall covering application complete with inside, outside edge treatment and relationships to adjoining surfaces.
 - .4 Location of installation shall be determined by *Consultant*.

Wall Coverings

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Fire resistance rating: *Provide* products that are identical with those of specified test method by qualified testing agency.
- .2 Flame spread: Maximum values in accordance with CAN/ULC-S102-10.
 - .1 Flame Spread Value (FSV): 25.
 - .2 Smoke Developed Value (SDV): 50.

2.2 Wall Coverings

- .1 Wall covering; WC-1:
 - .1 Colour: Earthquake, as indicated or scheduled.
 - .2 Acceptable *Products*:
 - .1 DeNovo Wallcoverings 'Cappi Linen – DN2-CPL-15' as distributed by Levey.

2.3 Accessories

- .1 Primer: Type as recommended by wall covering manufacturer to suit substrate type and compatible with wall covering adhesive.
- .2 Adhesive: Type as recommended by wall covering manufacturer to suit substrate type and compatible with wall covering and primer.
- .3 Wall covering corner guard; CG-1:
 - .1 Finish: standard black powder coat, as indicated or scheduled.
 - .2 Acceptable *Products*:
 - .1 Fry Reglet 'WCTBT125-217'.

PART 3 - EXECUTION

3.1 Examination

- .1 Examine substrates and conditions for compliance requirements affecting performance of *Work*. Proceed with installation only after unsatisfactory conditions have been corrected.
- .2 Examine substrates and installation conditions to ensure surface conditions meet or exceed a Level 4 finish, GA 214-21, Recommended Levels of Gypsum Board Finish.
- .3 Do not install wall coverings until wet-work in spaces is completed and dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at the levels specified for when the site is occupied for its intended use.

3.2 Preparation

- .1 Substrates surfaces shall be solid and dry.
- .2 Completely remove contaminants and deleterious substances and debris which may prevent, reduce, and affect adhesion.

Wall Coverings

- .3 Where gypsum board substrates do not have a Level 4 finish, prepare gypsum board surfaces to meet or exceed a Level 4 finish, GA 214-21, Recommended Levels of Gypsum Board Finish.
- .4 Work penetrating substrate shall be completed before installing wall covering.
- .5 Prime substrate surfaces to receive wall covering.
- .6 Unwrap wall covering and allow acclimatizing in installation area for 24 hours before application.

3.3 Installation - Vinyl and Fabric Wallcoverings

- .1 Installation sequence shall be in accordance with wall covering manufacturer's written requirements.
- .2 Trim additional selvage where required to achieve colour and pattern match at seams.
- .3 Hang non-matched patterns by overlapping edges and double cutting through both thicknesses with 1 or 1.5 mm (4/100 or 6/100") thick zinc or aluminum strip back-up to prevent cutting substrate.
- .4 Wrap wall covering 150 mm (6") beyond inside and outside corners. No cutting at corners permitted, unless pattern or colour changes.
- .5 Horizontal seams are not permitted.
- .6 Use stiff bristled brush or flexible broad knife to eliminate air pockets and to achieve 100% contact of wall covering to substrate.

3.4 Wall Covering Corner Guard Installation

- .1 Install in accordance with manufacturer's written requirements.

3.5 Adjusting and Cleaning

- .1 Remove excess adhesive with damp sponge from seams as work progresses, and wipe clean and dry with cloth towel.
- .2 Leave completed work smooth; clean, without wrinkles, gaps, overlaps or air pockets.

END OF SECTION

Acoustic Wall Panels

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Acoustic wall panels; WP-1, WP-2, WP-3, and WP-4.
 - .2 Acoustic blanket insulation; INS-1.

1.2 Administrative Requirements

- .1 Coordination:
 - .1 Coordination of work: coordinate layout and installation of acoustic wall panels and support systems components with other work supported by or penetrating through acoustic wall panel systems.
 - .2 Take accurate site measurements, including surrounding existing construction to remain and existing devices to remain (i.e. FHC, speaker grilles).
- .2 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data:
 - .1 Submit *Product* data sheets for work of this section, complete with required anchors.
- .3 Shop drawings:
 - .1 Submit shop drawings, indicating panel layout and system components, for each panel system.
 - .2 Include plans, elevations, sections and large scale details, and indicate components and methods of assembly, materials and their characteristics, fastenings, finishes, and other fabrication information required for the work of this section. Indicate assembly joint lines.
 - .3 Submit coordination drawings indicating locations of concealed grounds, cutouts, plates, and other required fabrications.
 - .4 Show relation to adjoining construction, details of outside and inside corners and door openings.
- .4 Selection samples:
 - .1 Submit a set of 3 - 300 mm x 300 mm (12" x 12") samples of each type in the specified finish. Consultant to review samples against existing conditions to confirm matching. Allow for submitting up to 3 sets of samples to confirm matching.
- .5 Verification samples:
 - .1 Submit 2 - 300 mm x 300 mm (12" x 12") samples of each component of panel system to *Consultant* for review.

Acoustic Wall Panels

- .2 Samples shall fully represent materials to be supplied in colour, texture, finish and construction.
- .6 Acoustic data:
 - .1 Submit acoustic data verifying that *Products* meet specified acoustic design requirements.
 - .2 Acoustic data shall include detailed descriptions of both mounting method and test method used to calculate acoustical performance, complete with references to codes and standards used in such calculations.
 - .3 Acoustic data submitted shall be from a certified acoustic testing agency.
- .7 Flame spread and smoke developed data:
 - .1 Submit flame spread and smoke developed data verifying that *Products* meet specified flame spread and smoke developed ratings designated by building code requirements and/or authorities having jurisdiction.
 - .2 Flame spread and smoke developed data submitted shall be from a certified testing agency.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Installers:
 - .1 Shall have 5 years' experience, minimum, in application of *Products*, systems and assemblies specified and with approval and training of *Product* manufacturers.
- .2 Mock-ups:
 - .1 WP-1 and WP-4: Coordinate with mock-ups specified in Section 06 40 00.
 - .2 WP-2 and WP-3:
 - .1 Submit 1600 mm x 3600 mm mock-up complete with perimeter trims in location designated by *Consultant*, for review and acceptance by *Consultant*.
 - .2 Obtain *Consultant's* acceptance of surface, finish and workmanship as a standard by which remainder of the *Project* will be judged. Apply material in accordance with manufacturer's written application requirements. Mock-up must be approved and accepted prior to start of system application. Maintain mock-up during construction for workmanship comparison. Do not alter, move or destroy mock-up until the work is completed and approved by *Consultant*.

Acoustic Wall Panels

1.6 Delivery, Storage, and Handling

- .1 Ship panels in rigid crates to avoid damage. Bent or deformed material shall be rejected.
- .2 Deliver panels and system components to the *Place of the Work* in original, unopened packages and store in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- .3 Before installing panels, permit them to reach room temperature and stabilized moisture content. Acclimatization period shall be 24 hours, minimum, longer as recommended by panel manufacturer.
- .4 Handle panels carefully to avoid chipping edges or damaging units in any way.

PART 2 - PRODUCTS

2.1 General

- .1 Single source responsibility: Obtain system components for each panel system type from a single source with resources to provide *Products* of consistent quality in appearance and physical properties without delaying progress of the *Work*.

2.2 Wood Acoustic Panels

- .1 WP-1:
 - .1 Acceptable *Products*:
 - .1 Atkar 'Au.diMicroperf'.
 - .1 WP-1a: Atkar 'Au.diMicroperf', complete with 64 mm (2.5") gap.
 - .2 Substitutions: in accordance with Section 01 60 00.
- .2 Description:
 - .1 Species: White oak, rift cut.
 - .2 Core: Recomposed high density rock fiber.
 - .3 Thickness: 25 mm (1").
- .3 Performance/design requirements:
 - .1 NRC: minimum 0.80.
 - .2 Flame spread:
 - .1 Maximum values in accordance with CAN/ULC-S102-10:
 - .1 Flame Spread Value (FSV): 150.
 - .2 Smoke Developed Value (SDV): 350.
- .4 Accessories:
 - .1 Z-clip and z-bar for clip mounting system.
 - .2 Fasteners: helix screws as recommended by panel manufacturer.

2.3 Acoustic Panels

- .1 WP-2:

Acoustic Wall Panels

- .1 Acceptable *Products*:
 - .1 Unika Vaev 'Ecooustic Panel – 0.98" thick'.
 - .2 Substitutions: in accordance with Section 01 60 00.
- .2 Material: 100% PET.
- .3 Core: manufacturer's core material meeting the requirements of OBC 3.1.5.10 (2), in black colour.
- .4 Thickness: 25 mm (0.98").
- .5 Dimensions: 1210 mm x 2720 mm (47.6" x 107.1").
- .6 Mounting: direct mount.
- .7 Performance/design requirements:
 - .1 NRC: minimum 0.85.
 - .2 Flame spread:
 - .1 Maximum values in accordance with CAN/ULC-S102-10:
 - .1 Flame Spread Value (FSV): 150.
 - .2 Smoke Developed Value (SDV): 390.
- .8 Edge: as indicated.
- .9 Colour: Fossil.
- .10 Trim: as recommended by manufacturer. Colour and locations as indicated.
- .2 WP-3:
 - .1 Reserved.
- .3 WP-4:
 - .1 Acceptable *Products*:
 - .1 Atkar 'Au.diSlat Custom (Grille)'.
 - .2 Substitutions: in accordance with Section 01 60 00.
 - .2 Description: White oak veneer to match PLAM-1, rift cut.
 - .3 Dimensions: 25 mm wide x 64 mm depth (1" x 2.5").
 - .1 Slat spacing/centres: 64 mm (2.5") on centre.
 - .4 Fabric:
 - .1 Guilford of Maine 'FR701'.
 - .1 Colour: Silver Papier 538.
 - .5 Performance/design requirements:
 - .1 Flame spread:
 - .1 Maximum values in accordance with CAN/ULC-S102-10:
 - .1 Flame Spread Value (FSV): 150.
 - .2 Smoke Developed Value (SDV): 350.

Acoustic Wall Panels

- .6 Perimeter trim: as indicated on drawings and in accordance with Section 06 40 00.

2.4 Acoustic Blanket Insulation (INS-1)

- .1 Product shall be dimensionally stable with no capability for shrinking or warping.
- .2 Product shall have a resilient composition with good resistance to damage from job-site impact.
- .3 Product shall be composed of inorganic glass fibres.
- .4 Product's mat face shall be able to be cleaned by vacuuming.
- .5 Product shall not be susceptible to rot or mildew contamination.
- .6 Product shall not cause corrosion greater than caused by sterile cotton to steel and aluminum, when tested in accordance with ASTM C665.
- .7 Flame Spread: 25 or less, to UL 723-2013 and CAN/ULC-S102-10.
- .8 Density: 32 kg/m³ (2 lb/ft³).
- .9 Thickness:
 - .1 50 mm (2") unless otherwise indicated.
- .10 Acceptable *Product*:
 - .1 Owens Corning 'SelectSound Acoustic Blanket – Type 200.
- .11 Fasteners: Galvanize metal impaling clips, consisting of perforated metal base, metal pin, and metal friction washer, prepainted flat black to match finish.

PART 3 - EXECUTION

3.1 Examination

- .1 Gypsum board assemblies shall be taped and sanded by Section 09 29 00 and painted in accordance with Section 09 91 00 and shall not permit any air leakage through wall.
- .2 Concrete masonry unit walls shall have flush joints and painted in accordance with Section 09 91 00 and shall not permit any air leakage through wall.
- .3 Do not proceed with installation until unsatisfactory conditions have been corrected. Beginning of installation indicates acceptance of existing substrate conditions.
- .4 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 16°C for 72 hours prior to commencement of the work of this section and maintain temperature until completion of the work of this section.
- .5 Do not commence installation until work of other sections behind panels has been completed, inspected and accepted by *Consultant*.

3.2 Installation

- .1 Install acoustical panels to clean, dry and firm substrates in accordance with manufacturer's written requirements.

Acoustic Wall Panels

- .2 Install acoustical blanket insulation in accordance with manufacturer's written requirements.
- .3 Install system in accordance with manufacturer's written installation requirements.
- .4 Panel arrangements as indicated. Maintain dimensions and contours as indicated. Coordinate layout with *Consultant* prior to commencing installation.
- .5 Make allowance for thermal movement.
- .6 Panels shall have no visible fastenings.
- .7 Install fabric systems with matching grain patterns and textures, level, plumb and true free from wrinkles, sags, blisters, waves, and ripples. Installed fabric shall not puddle or dent when touched or leaned upon. Installed fabric shall be self-healing when pushed, punched, or hit and shall revert back to original finished condition.
- .8 Seaming of fabric by sewing is not permitted.

3.3 Installation Tolerances

- .1 Install panels plumb, level, tight, rigid, and secured.
- .2 Comply with the following maximum tolerances:
 - .1 Plumb and level: 3 mm (1/8").
 - .2 Variation from indicated position: plus/minus 3 mm (1/8").
 - .3 Maximum variation of reveal widths: plus/minus 1.5 mm (1/16").
 - .4 Maximum variation of surfaces intended to be flush: plus/minus 1.5 mm (1/16").

3.4 Adjusting and Cleaning

- .1 Examine work of this section on completion and replace uneven or defective materials, eliminate all waves, remedy damaged exposed finished surfaces and remove soiled or stained areas.

END OF SECTION

Painting

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Painting of interior paintable surfaces (PT).
- .2 Paintable and non-paintable surfaces:
 - .1 Paint and finish paintable surfaces included in the *Work*, except where excluded by the *Contract Documents*.
 - .2 The following surfaces are considered non-paintable, except as otherwise indicated or scheduled:
 - .1 Material and equipment furnished prime and finish painted.
 - .2 Internal surfaces of steel tanks and stacks.
 - .3 Sprayed fire-resistive materials.
 - .4 Stainless steel, weathering steel, copper, bronze, chromium plate, nickel, anodized or lacquered or mill finished aluminum, Monel metal.
 - .5 Metallic and mastic insulation finishes.
 - .6 Abrasive material finishes on floors, stair treads, stair nosing and landings.
 - .7 Insulated electric cables.
 - .8 Machined parts of machinery and equipment.
 - .9 Concealed surfaces.
 - .10 Manufactured finish materials.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets and list of *Products* proposed for use in the work of this section as identified in 'Approved Product List' section of the MPI (Master Painters Institute) Architectural Painting Specification Manual. Correlate *Products* to Schedule furnished by *Consultant*.
- .3 Samples:
 - .1 Samples for initial paint colour and finish selection:
 - .1 Submit manufacturer's colour charts showing full range of colours available, including light and deep dark tones, for each type of finish material indicated for colour selection by *Consultant*.

Painting

- .2 *Consultant* shall have complete freedom in choice of colours in compiling colour schedule and will not necessarily select colours from standard colour charts of manufacturer of *Products* specified.
- .3 Submit 3 drawdowns of each selected colour for review by *Consultant* and resubmit to *Consultant* as required to obtain approval. Drawdown to be of specified colour, sheen, and paint formula for applicable surface.
- .2 Samples for verification:
 - .1 Submit 3 samples on 200 mm x 305 mm (8"x 12") material of same type as that on which coating is to be applied, for *Consultant's* approval, at least 30 days before materials are required.
 - .2 Identify each sample as to *Project*, finish, formula, colour name, number, gloss name and number, date and name of *Contractor* and painting *Subcontractor*.
 - .3 Resubmit as required until colours and gloss value are approved.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.
- .3 Maintenance materials:
 - .1 Provide 2 sealed containers, each of 4 litres (1 gallon) capacity of each paint product in each colour used in the *Work* for *Owner's* maintenance use. Containers shall be new, clearly labelled with manufacturer's name, type of paint, colour and colour number. Store at *Place of the Work* where directed by *Owner*.

1.5 Quality Assurance

- .1 Qualifications
 - .1 Manufacturers:
 - .1 Paint manufacturers and *Products* used shall be as listed under the Approved Product List section of the MPI Painting Manual.
 - .2 Installers / applicators / erectors:
 - .1 Applicators: Shall have minimum 5 years proven satisfactory painting experience of projects of similar size and class subject to *Consultant's* approval.
 - .2 Only qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices shall work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .2 Mock-ups:
 - .1 Provide the following in-situ mock-ups:

Painting

- .1 Provide mock-up of re-painted perimeter induction unit covers – 1 full section including top and front elements (approximately 1830 mm long).
- .2 Upon completion and approval, mock-ups shall serve as a standard for the balance of the work of this section. Subsequent work carried out and not in the *Consultant's* opinion equal to standard shall be repainted without charge.

1.6 Delivery, Storage, and Handling

- .1 Deliver painting materials in sealed, original labelled containers bearing manufacturer's name, brand name, type of paint or coating and colour designation, standard compliance, materials content as well as mixing and/or reducing and application requirements.
- .2 Store paint *Products* and materials in original labelled containers in secure (lockable), dry, heated and well ventilated single designated area meeting minimum requirements of both paint manufacturer and authorities having jurisdiction, and at a minimum ambient temperature of 7°C.
- .3 Protect floor and wall surfaces of storage area. Protect floors with sheets or clean plywood or metal pans where mixing is being carried out.

1.7 Field Conditions

- .1 Ambient conditions:
 - .1 Comply with environmental requirements of MPI Manual.
 - .2 Perform no painting work when ambient air and substrate temperatures are below 10°C for both interior and exterior work, unless suitable weatherproof covering and sufficient heating and ventilation facilities are in place in accordance with MPI Manual.
 - .3 Perform no painting work when relative humidity is above 85% or when dew point is less than 3°C (5°F) variance between air/surface temperature.

PART 2 - PRODUCTS

2.1 Performance/Design Requirements

- .1 Except where more stringent requirements are specified, the following reference standard shall govern the work of this section:
 - .1 Master Painters Institute (MPI) Architectural Painting Specification Manual (MPI Manual), including Identifiers, Evaluation, Systems, Preparation and Approved Product List, latest edition, and referenced herein as the MPI Manual, as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .2 Materials, preparation and workmanship shall conform to requirements of latest edition of Architectural Painting Specification Manual by the Master Painters Institute (MPI) (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .3 Painting systems:

Painting

- .1 Shall remain free from failure due to causes including: material failure; surface preparation less than that specified; and paint film thickness less than that specified, or when not specified, less than that coverage recommended by manufacturer.
- .2 Presence of any of following shall constitute failure: visible corrosion; film peeling, blistering, checking, scaling, embrittling or general film disintegration; and poor adhesion as determined by tape "peel-off" test procedures.

2.2 Materials

- .1 *Products* listed in MPI Manual shall be used in the *Work*, unless specified otherwise.
- .2 Paint and materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, and the like) shall be in accordance with the MPI Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .3 Other paint materials, such as linseed oil, shellac, and the like, shall be highest quality *Products* of an approved manufacturer listed in the MPI Manual and shall be compatible with other coating materials as required.
- .4 Paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes or sags.
- .5 Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by building code requirements and/or authorities having jurisdiction.

2.3 Equipment

- .1 Painting and coating equipment in accordance with written requirements of MPI Manual.

2.4 Mixing and Tinting

- .1 Unless otherwise specified, paints shall be ready-mixed. Re-mix prior to application to ensure colour and gloss uniformity.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in accordance with manufacturer's written requirements.
- .3 Perform colour tinting operations prior to delivery of paint to *Place of the Work*.
- .4 Where thinner is used, addition shall not exceed paint manufacturer's recommendations.

2.5 Colours and Gloss Levels

- .1 Paint colours and gloss levels shall be as selected by the *Consultant*. Locations as indicated or scheduled.
- .2 Colour and gloss schedule (PT): as indicated on drawings.
- .3 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat finish	0 to 5	10 maximum
G2	Velvet finish	0 to 10	10 to 35
G3	Eggshell finish	10 to 25	10 to 35

Painting

G4	Satin finish	20 to 35	35 minimum
G5	Semi-gloss finish	35 to 70	
G6	Gloss finish	70 to 85	
G7	High-Gloss finish	> 85	

PART 3 - EXECUTION

3.1 Examination

- .1 Prior to commencement of work of this section, thoroughly examine surfaces scheduled to be painted.
- .2 Check moisture content and alkalinity of surfaces to be painted in accordance with paragraph above titled Field Conditions.
- .3 Inspect surfaces to be coated for gouges, marks, nibs, and other defects and properly prepare patching, filling, smoothing or other surface preparation necessary to ensure satisfactory finish.
- .4 Report in writing any condition adversely affecting work of this section.
- .5 Proceed with work only when surfaces and conditions are satisfactory. Remove dust, grease, rust, scale and extraneous matter, tool and machine marks and insects from surfaces which could be detrimental to a satisfactory and acceptable finish.

3.2 Preparation

- .1 Comply with manufacturer's written requirements and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- .2 Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - .1 After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- .3 Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, mildew, grease, and incompatible paints, encapsulants, and other deleterious materials.
- .4 Paint surfaces when moisture content or alkalinity of surfaces to be painted comply with paragraph 3.5 Field Quality Control / Standard of Acceptance.
- .5 Concrete substrates: Remove release agents, curing compounds, efflorescence, and chalk.
- .6 Masonry substrates: Remove efflorescence and chalk.
- .7 Shop-primed steel substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

Painting

- .8 ZF75 and ZF120 galvanized-metal substrates: Remove grease and oil residue from galvanized sheet metal by methods to produce clean surfaces that promote adhesion of subsequently applied paints.
- .9 Z275 galvanized-metal substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- .10 Aluminum substrates: Remove loose surface oxidation.
- .11 Wood substrates for paint finish:
 - .1 Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - .2 Sand surfaces that will be exposed to view, and dust off.
 - .3 Prime edges, ends, faces, undersides, and backsides of wood.
 - .4 After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- .12 Existing painted substrates:
 - .1 Clean substrates as indicated above.
 - .2 Sound existing paint surfaces and remove paint surfaces that are not sound, loose or are otherwise stained, cracked, wrinkled, peeling, or defective.
 - .3 Dull hard or glossy surfaces by sanding or other abrasive methods prior to finishing.
 - .4 Apply tie-coat primer product that compatible with substrate as recommended by paint coatings manufacturer.
 - .5 Follow with paint finish coats as specified for like substrate materials specified herein.

3.3 Installation

- .1 Do not paint unless substrates are acceptable and/or until Field Conditions (heating, ventilation, lighting and completion of work of other sections) are acceptable for applications of *Products*.
- .2 Apply primer, paint or stain in accordance with MPI Manual Premium Grade finish requirements.
- .3 Apply paint and coatings within an appropriate time frame after cleaning when Field Conditions encourage flash-rusting, rusting, contamination or manufacturer's paint specifications require earlier applications.
- .4 Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- .5 Tint each coat of paint progressively lighter to enable confirmation of number of coats.
- .6 Unless otherwise approved by *Consultant*, apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.
- .7 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000 mm (39").

Painting

- .8 Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
- .9 Prime coat of stain or varnish finishes may be reduced in accordance with manufacturer's directions.
- .10 Paint finish shall continue through behind wall-mounted items (i.e. chalk and tack boards) and exposed/ visible in complete work including interiors of cupboards and closets, tops of doors, trim, and the like, whether in sight line or not, including behind surface mounted fixtures and heating units.
- .11 *Consultant* shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to *Owner*.
- .12 Access doors, prime coated butts and other prime painted hardware, registers, radiators and covers, exposed piping and electrical panels shall be painted to match adjacent surfaces in terms of colour, texture and sheen, unless otherwise indicated.

3.4 Mechanical and Electrical Items

- .1 Finish paint primed mechanical and electrical items with 2 coats of paint. Include for the following list unless otherwise indicated:
 - .1 Convectors and induction units, as noted above.
 - .2 Conduit, where surface mounted.
 - .3 Diffusers (black out sides).
 - .4 Ductwork above slat ceilings.
 - .5 Grilles.
 - .6 Hangers above slat ceilings.
 - .7 Fire hose cabinets.
- .2 Prime and paint exposed insulated and bare pipes. Prime and paint exposed conduits and electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items. Use heat resistant epoxy paint on pipes and surfaces where operating surface temperature exceeds 65°C.
- .3 Coordinate the painting of pipes, and coverings with mechanical contractor applying colour banding, flow arrows and pipe identification after the painting of pipes and coverings.
- .4 Paint work to match adjacent walls and ceilings unless directed otherwise.
- .5 Air diffusers shall be primed and finished with 2 coats of paint of same colour and sheen as ducts and/or ceiling.

3.5 Field Quality Control / Standard of Acceptance

- .1 Conduct quality control in accordance with Section 01 40 00, 01 45 00, and 01 45 23.
 - .1 Field tests and inspections:
 - .1 Paint and Coating Quality Assurance Inspections:

Painting

- .1 Field quality control shall be in accordance with Section 01 40 00, 01 45 00, and 01 45 23.
- .2 Moisture and alkalinity testing:
 - .1 Check moisture content of surfaces to be painted using properly calibrated electronic moisture meter approved by paint manufacturer, and *Consultant*, or other approved method. Maximum moisture contents shall be in accordance with manufacturer's recommendations and as follows:
 - .1 Concrete and concrete masonry (clay and concrete brick/block): Maximum 12%.
 - .2 Gypsum board and plaster: Maximum 12%.
 - .3 Wood: Maximum 15%.
 - .2 Conduct moisture tests on concrete floors using cover patch test method.
 - .3 Test concrete, masonry and plaster surfaces for alkalinity.
- .3 Painted interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the *Consultant*:
 - .1 Brush / 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.
 - .2 Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
 - .3 Damage due to touching before paint is sufficiently dry or any other contributory cause.
 - .4 Damage due to application on moist surfaces or caused by inadequate protection from weather.
 - .5 Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- .4 Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces to the *Consultant*:
 - .1 Visible defects are evident on vertical and horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm (39").
 - .2 Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
 - .3 When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area.
- .5 Painted surfaces rejected by the *Consultant* shall be made good at the expense of the *Subcontractor*. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

Painting

- .6 Painting *Subcontractor* shall obtain from *Contractor* written confirmation of specific surface preparation procedures and primers used for fabricated steel items from the fabricator/*Supplier* to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

3.6 Adjusting and Cleaning

- .1 Promptly as work proceeds and on completion of *Work*, remove paint where spilled, splashed or spattered during the progress of the *Work*. Keep the premises free from unnecessary accumulation of tools, equipment, surplus materials and debris; at the conclusion of the work leave the premises clean.

3.7 Interior Paint Systems

- .1 System references listed are based on MPI Manual and are Premium Grade, unless otherwise indicated:
 - .1 Primed ferrous metal; touch-up and finish coats required under this section:
 - .1 Ferrous architectural metal fabrications: Prepared and primed in accordance with Section 05 50 10.
 - .2 INT 5.1R High performance architectural latex (over alkyd primer).
 - .2 Galvanized metal: (doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.)
 - .1 INT 5.3M High performance architectural latex.
 - .3 Aluminum (minor fabrications or existing conditions where noted to receive patch painting):
 - .1 INT 5.4F High performance architectural latex.
 - .4 Dressed lumber: (including doors, door and window frames, casings, mouldings, etc.)
 - .1 INT 6.3A High performance architectural latex.
 - .5 Plaster and gypsum board: (gypsum wallboard, drywall and textured finishes)
 - .1 INT 9.2B High performance architectural latex finish.

END OF SECTION

Roller Window Shades

PART 1 - GENERAL

1.1 Summary

- .1 Section includes:
 - .1 Roller window sun shades at interior locations.

1.2 Administrative Requirements

- .1 Conduct a pre-installation meeting in accordance with Section 01 30 00.

1.3 Submittals

- .1 Submit required submittals in accordance with Section 01 30 00 and 01 33 00.
- .2 *Product* data sheets:
 - .1 Submit manufacturer's *Product* data sheets for *Products* proposed for use in the work of this section.
 - .2 Submit flammability performance data.
 - .3 Submit manufacturers' installation instructions.
- .3 Shop drawings:
 - .1 Submit shop drawings or fully dimensioned catalogue cuts.
 - .2 Window treatment schedule: Use same designations indicated on *Contract Documents*.
 - .3 Clearly indicate general construction, configurations, jointing methods and locations, fastening methods, handing of controls, required blocking locations, banding (tandem shades), and installation details.
- .4 Samples:
 - .1 Selection samples:
 - .1 Submit manufacturer's range of colours available for selection by *Consultant*.
 - .2 Submit samples of each material and finish colour selected and each accessory.

1.4 Closeout Submittals

- .1 Submit closeout submittals in accordance with Section 01 78 39.
- .2 Operation and maintenance data:
 - .1 Submit manufacturer's operation and maintenance instructions for inclusion in the operation and maintenance manuals.

1.5 Quality Assurance

- .1 Qualifications:
 - .1 Manufacturers:

Roller Window Shades

- .1 Company specializing in manufacturing the *Products* specified in this section, with 10 years' experience minimum.
- .2 Installers / applicators / erectors:
 - .1 Work of this section shall be by forces in the direct employ or under control of the system manufacturer, skilled, trained, and experienced in work of similar scope and complexity.
- .2 Mock-ups:
 - .1 Erect 1 full size mock-up each roller shade type at the *Place of the Work* for review. Completed and accepted mock-up shall act as the standard to which balance of the work of this section will be judged.

1.6 Delivery, Storage, and Handling

- .1 Before delivery to the *Place of the Work*, check each shade for operation; remove finger marks and smudges.
- .2 Package *Products* to prevent distortion in shipment and handling. Label packages and crates, and protect finish surfaces by sturdy wrappings.

1.7 Warranty

- .1 Warrant work of this section in accordance with Section 01 78 36.
- .2 Extended warranty:
 - .1 Labour, materials, and workmanship for work of this section.
 - .2 Duration: 2 years.

PART 2 - PRODUCTS

2.1 Manufacturers/Products

- .1 Basis of design:
 - .1 Sun Protection Group 'Infinity Cassette CRS-80-DLC'.
 - .2 Substitutions: in accordance with Section 01 60 00.
- .2 Subject to compliance with requirements, provide *Products* by one of the following alternate manufacturers:
 - .1 Altex.
 - .2 Elite Pro Shading.
 - .3 MechoShade Systems, Inc.
 - .4 Solarfective Products by Legrand Global.
 - .5 Sun Glow Window Covering Products of Canada Ltd.
 - .6 Substitutions: in accordance with Section 01 60 00.

2.2 Performance/Design Requirements

- .1 Manual operation:

Roller Window Shades

- .1 Every part of a corded window covering that is accessible to a child and is small enough to be totally enclosed in a small parts cylinder in accordance with 'Corded Window Coverings Regulations - SOR/2019-97' must be affixed to the corded window covering so that the part does not become detached when it is subjected to a force of 90 N applied in any direction.
- .2 Unreachable cords:
 - .1 A cord that is not reachable must remain so, whether the corded window covering is fully opened, fully closed or in any position in between, throughout the useful life of the corded window covering.
- .3 Reachable cord with one free end; length:
 - .1 A reachable cord with one free end must not exceed 220 mm in length when it is pulled in any direction by the gradual application of force attaining 35 N.
- .4 Reachable cord between two consecutive contact points; length:
 - .1 A reachable cord with no free end must not exceed 220 mm in length between two consecutive contact points when it is pulled in any direction by the gradual application of force attaining 35 N.
- .5 Loop created by a reachable cord; perimeter:
 - .1 If a reachable cord is pulled in any direction by the gradual application of force attaining 35 N, the perimeter of any loop, whether it is existing, created or enlarged, must not exceed 440 mm.
- .6 Two reachable cords:
 - .1 If two reachable cords with one free end each can be connected to one another, end to end, after each has been pulled in any direction by the gradual application of force attaining 35 N, the following criteria must be met:
 - .1 The length of the resulting cord must not exceed 220 mm.
 - .2 The perimeter of the loop that is created must not exceed 440 mm.

2.3 Hardware - Manual Controlled Shades

- .1 Shades shall be operated to permit infinite positioning. Left or right hand operation and banding as applicable to suit *Place of the Work* condition.
 - .1 Drive assembly:
 - .1 Allow finger tip control and include a built in shock absorber system to prevent cord breakage under normal operating conditions;
 - .2 Capable of being field adjusted from the exterior of the shade unit without having to disassemble the hardware.

2.4 Assembly

- .1 Provide fully factory assembled shade unit consisting of 2 shade brackets, one piece extruded aluminum shade tube, extruded aluminum fascia, aluminum profile hembars, extruded vinyl fabric spline, and fabric as specified.
- .2 Fabric shall hang straight, without shifting sideways more than 3 mm (1/8") in either direction due to warp distortion or weave design.

Roller Window Shades

- .3 Factory modify housings where necessary to bypass columns.
- .4 End brackets: a two piece molded ABS construction with nylon drive sprocket. Bracket colour shall coordinate with the fascia colour.
- .5 Shade tube: Minimum 1.52 mm (0.060") thick extruded aluminum with three equally spaced continuous stiffening fins, non-sag design, maximum deflection under full load of fabric L/700.
- .6 Fascia: Minimum 1.5 mm (1/6") thick extruded aluminum.
- .7 Hembar: Extruded aluminum with matching plastic end finials.
- .8 Mounting: Removal of shade system shall not require the disassembly of the shade unit.

2.5 Shade Mounting System

- .1 Design extruded aluminum bracket to accept preassembled shade system.
 - .1 Use brackets to facilitate the alignment with shade opening.
- .2 Modular construction: Shades shall be removable as a complete modular unit without any component disassembly required.

2.6 Aluminum Finish

- .1 Exposed aluminum: Baked enamel, black colour to match window frame finish.
- .2 Unexposed aluminium: Mill finish.

2.7 Shade Fabric Types

- .1 Sun control fabric; dimensionally stable shade fabric:
 - .1 Acceptable *Products*; 1% open area:
 - .1 To later selection by *Consultant*.
 - .2 Substitutions: in accordance with Section 01 60 00.
 - .2 Colour: to later selection by *Consultant*.
- .2 Fabric:
 - .1 Hang flat, without buckling or distortion. Edge, where trimmed, shall hang true and straight, without shifting sideways more than 3 mm (1/8") in either direction due to warp distortion or weave design.
 - .2 Colour fast, retain its shape, and not be affected by moisture or heat.
- .3 Flammability performance:
 - .1 Certified by an independent laboratory, shade fabric shall pass CAN/ULC S109-14.

2.8 Fabrication

- .1 Finished assemblies: Square, true to size and free from distortion, twist, or other defects that could affect their strength, operation or appearance.
- .2 Factory applied finish: Uniform, smooth and without blemishes.

PART 3 - EXECUTION

3.1 Installation

- .1 Install shade systems in plumb, squared, adequately anchored, maintaining uniformed clearances, accurate alignment levels, and parallel with the window plane. Fabric shall not travel more than 3 mm (1/8") in either direction within channels after installation.
- .2 Fabric shall be pre-measured and manufactured off-site.
- .3 Shades shall be snapped into place without screws or visible fasteners.
- .4 Incorporate reinforcing, fastening and anchorage required for installation of shades.
- .5 Securely attach installation fittings to their mounting surfaces with stainless steel or hardened aluminum screws of proper length and type, and durable anchors.
- .6 Install shade roller true and level, and with cloth to hang flat without buckling or distortion.

3.2 Adjusting and Cleaning

- .1 Verify that installed shade system functions properly, and adjust it accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective work so that no variation in surface appearance is discernible.

END OF SECTION