

ARCHITECTURAL SPECIFICATIONS

for

**University of Toronto – QIS Laboratory & CQIQC
Suite**

Project No. P078-24-109

November, 2025

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| ISSUED FOR TENDER |
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mcCallumSather

286 Sanford Avenue North
Hamilton Ontario L8L 6A1

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END OF SECTION

DEMOLITION

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements

1.2. DESCRIPTION

1.2.1. Work Included

- a. Demolition and removal of existing building components not required in final Work.
- b. Salvage of existing building components and equipment.
- c. Temporary shoring and bracing.

1.3. REGULATORY REQUIREMENTS

- 1.3.1. Conform to applicable codes and regulations for demolition or partial demolition of structures, safety of adjacent structures, dust control, runoff control and disposal.
- 1.3.2. Obtain required permits from Authorities Having Jurisdiction.
- 1.3.3. Notify affected utility companies before starting Work and comply with their requirements.
- 1.3.4. Do not close or obstruct roadways, sidewalks, or utilities without permits.

1.4. SUBMITTALS

- 1.4.1. Submit shop drawings indicating required shoring and bracing bearing the stamp and seal of a Professional Engineer licensed in the Province of Ontario.

2. PART PRODUCTS

2.1. GENERAL

- 2.1.1. Unless otherwise indicated, remove all materials, requiring demolition and not forming a permanent part of Work, from site.
- 2.1.2. Remove surplus excavated material and dispose of in conformity with all applicable provincial legislation, with Ontario Provincial Standard Specification (OPSS) 180.
- 2.1.5. Leave Site in a condition equivalent to the existing conditions prior to Work.

DEMOLITION

3. PART EXECUTION

3.1. PREPARATION

- 3.1.1. Follow procedures for the safe removal and disposal of designated hazardous substances present within the existing structure.
- 3.1.2. Identify items noted on drawings for salvage.
- 3.1.3. Remove all contaminants, handle and dispose of from the site, according to Ontario Regulations.
- 3.1.4. Provide, erect, and maintain temporary barriers and security devices as required.

3.2. DEMOLITION REQUIREMENTS

- 3.2.1. Conduct demolition to minimize interference with adjacent lands.
- 3.2.2. Conduct operations with minimum interference to public or private accesses. Maintain egress and access at all times.
- 3.2.3. Sprinkle exterior Work with water to minimize dust.
- 3.2.4. Arrange with hydro, telephone, gas, water utilities to have all abandoned services disconnected, capped off and removed and made safe as applicable to Authorities.
- 3.2.5. When contaminated or dangerous material is encountered, remove from Site and dispose of by safe means so that no danger is involved at job Site or in disposing operations.
- 3.2.6. Selling from Site is not permitted.

3.3. DEMOLITION

- 3.3.1. Disconnect, cap off and remove exposed utilities not required in final work. Mark on as-built drawing exact location and size of abandoned lines.
- 3.3.2. Remove demolished materials from site.
- 3.3.3. Leave site in clean condition.

3.4. SALVAGE

- 3.3.1. Prior to commencement of demolition work, carefully remove items identified for salvage, and store in safe area away from general demolition activities and as directed by Owner.

END OF SECTION

MASONRY PATCHING

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Instructions.

1.2. DESCRIPTION

1.2.1. Work Included

- a. Salvage existing masonry units for re-use.
- b. Patching and making good.

1.2.2. Related Work Specified Elsewhere:

- a. Demolition: Section 02 40 00

1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies:

- a. The 2012 Building Code Compendium, Part 4, Structural Design.
- b. CAN3-S304.1-95, Masonry Design for Buildings;
- c. CAN3-S371-94, Masonry Construction for Buildings;
- d. CAN3-A370-94, Connectors for Masonry;
- e. CAN3-A179-94, Mortar and Grout for Unit Masonry;
- f. CAN3-A165 Series-94, CSA Standards on Concrete Masonry Units;
- g. CAN/CSA-A82.1-M87 R1993 Burned Clay Brick;

1.4. SYSTEM DESCRIPTION

- 1.4.1. Tolerances: Align face of masonry units within 2mm of adjacent units.

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. Masonry Units:

- a. Salvage in sufficient quantities for required patching.
- b. If sufficient quantities are not salvaged provide new units (at no additional cost to Contract), matching existing units, to Architects satisfaction.

MASONRY PATCHING

2.1.4. Vertical Masonry Reinforcement: By Dur-O-Wall: (Holmann & Barnard Company).

- a. Adjustable Wall Ties suitable for back-up wall conditions.

2.1.5. Mortar Materials: conforming to CSA A179-94.

- a. Aggregate: conforming to CSA A179-94.
- b. Cement: CAN/CSA-A5/A8 Normal Portland or masonry cement, and hydrated lime.
- c. Hydrated Lime: Type S hydrated lime, conforming to ASTM C207

2.1.6. Grout: Conforming to CAN 3-S 304-M;

2.2. MIXES

2.2.1. Mixing: Prepare mortar materials in small batches for immediate use only. Match existing mortar colour.

2.2.3. For Structural Masonry: Use Type 'S' masonry mortar, having a minimum 28 day compressive strength of 10 MPa, composed of: 1/2 part Portland cement, 1 part type N masonry cement, 4 1/2 parts damp loose sand.

3. PART EXECUTION

3.1. INSTALLATION

3.1.1. General:

- a. Lay masonry in common bond to match existing.
- b. Tooth units into existing masonry coursing.
- c. When mortar is "thumb-print" hard, tool joints where exposed to form a concave profile

3.1.6. Built-ins:

- a. Build in items provided by other Sections. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes and other items.

3.2. CLEANING

3.2.1. Keep wall clean and free of mortar stains during laying.

END OF SECTION

1. PART GENERAL

1.1.1. Conform to Division 01, General Requirements.

1.2.1. Work Included:

1.2.2. Related Work Specified Elsewhere:

- ### 1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies:

- a. The 2012 Building Code Compendium, Part 4, Structural Design.
- b. CSA S16, Steel Structures for Buildings (Limit State Design);
- c. CSA W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings;
- d. CSA W47.1-M, Certification of Companies for Fusion Welding of Steel Structures;
- e. CSA W117.2-M, Code for Safety in Welding and Cutting (Requirements for Welding Operators);
- f. American Hot Dip Galvanizers Association: The Design of Products to be Hot Dip Galvanized After Fabrication.

METAL FABRICATIONS

1.4. SUBMITTALS

- 1.4.1. Shop Drawings: Submit Shop Drawings, showing all elements of adjacent walls, floors and roof framing systems and calculations for systems showing design loads and deflections, bearing the stamp and seal of a Professional Engineer licensed in the Province of Ontario.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Structural Steel Sections and Steel Plates:
CSA-G40.21-M, Grade 300W, except HSS: Grade 350W, Class H.
- 2.1.2. Sheet Steel: Structural Quality ASTM A570. Commercial quality ASTM A366.
- 2.1.3. Sheet Aluminum: Clear Anodized finish ASTM B209.
- 2.1.4. Galvanized Sheet Steel (Structural Quality):
Galvanizing as specified ASTM A446, structural quality sheets.
- 2.1.5. Galvanized Sheet Steel (Commercial Quality):
Galvanizing as specified ASTM A526, plain commercial galvanized stretcher levelled to temper rolled.
- 2.1.6. Galvanizing (Other):
All steel specified to be galvanized except galvanized sheet steel, CSA G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles.
- 2.1.7. Welding Materials: CSA W59-M.
- 2.1.8. Metal Filler: Polyester based, one of the following:
- a. M12555 Red Flexibond by Kleen-Flo Tumbler Industries, Scarborough;
 - b. Red Lightnin' by Marson Division, Swingline of Canada Ltd., Toronto;
 - c. M45 by Dura Chemicals Ltd., Hamilton; or
- 2.1.9. Structural Steel Pipe: ASTM A53, Grade B.
- 2.1.10. Square Steel Tube: ASTM A500 or ASTM A501, seamless.
- 2.1.11. Stainless Steel: Type 304, No. 4 finish.
- 2.1.12. Bolts, Nuts and Washers: ASTM A325.
- 2.1.13. Anchors, Bolts, Nuts, Washers for Dissimilar Metals: Of stainless steel alloy with min 12% chromium.

METAL FABRICATIONS

- 2.1.14. Expanded Metal Sheet: 20mm x 2.278mm thickness carbon steel standard diamond pattern mesh, SWD and LWD size to fit designs: Z600 galvanized after fabrication when for exterior use.
- 2.1.15. Grout: non-shrink, non-metallic, epoxy flowable, 12hr., MPa 15, pull-out strength 7.9 MPa.
- 2.1.16. Galvanized Surfaces for Paint: Do not passivate galvanized surfaces to be finish painted.
- 2.1.17. Primer and Touch-Up for Ungalvanized Surfaces: CGSB 1-GP-40M, Primer, Structural Steel, Oil Alkyd Type.
- 2.1.18. Touch-Up Paint for Field Welds on Galvanized Surfaces: CGSB 1-GP-181M, Coating, Zinc-Rich, Organic, Ready-Mixed.
- 2.1.19. Bituminous Paint: CAN/CGSB 1.108-M.
- 2.1.20. Neoprene Sheet: Dense, solid neoprene.
- 2.2. DESIGN
 - 2.2.1. Design each item to be structurally sound.
 - 2.2.2. Design steel and iron articles to be galvanized after fabrication in conformance with the referenced standards.
- 2.3. FABRICATION AND MANUFACTURE
 - 2.3.1. General:
 - a. Exchange and coordinate Shop Drawings with related Sections to ensure accurate fit of components with the Work of other Sections.
 - b. Fit and assemble Work in shop where possible. Execute Work according to details and reviewed Shop Drawings. Where shop fabrication is not possible, make trial assembly in shop;
 - c. Do all welding in accordance with requirements of CSA W59-M. File or grind welds smooth and flush where exposed to view and where specifically indicated on Drawings;
 - d. Complete all assembly and welding before galvanizing;
 - e. Site assemble by bolting all galvanized items to be left exposed (not finish painted). Perform all welding on such items before galvanizing.
 - f. Fit joints and intersecting members accurately. Make Work in true planes with adequate fastening, mitre corners unless specified or shown otherwise.
 - g. Supply all fastenings, anchors accessories required for fabrication and erection of Work of this Section. Such items occurring on or in an exterior wall or slab shall be hot dip galvanized.
 - h. Make exposed metal fastenings and accessories of same material, texture,

METAL FABRICATIONS

colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless otherwise indicated;

- i. Fabricate gratings and other items with multiple parts so that a regular pattern is presented in the finished Work with all members lined up or evenly spaced and pattern is unbroken.

2.3.2. Finish:

- a. Shop Prime Paint all interior metals unless otherwise indicated on Drawings.
- b. Thoroughly clean all metals and apply one coat of primer. Brush on thoroughly and Work well into all crevices and interstices.
- c. Galvanize all exterior metals (including lintels) unless otherwise indicated on Drawings. Prime paint galvanized items that are to receive final Site painting.

3. PART EXECUTION

3.1. INSTALLATION

- 3.1.1. Fabricate, build and erect Work plumb, true, square, straight, level and accurate to sized detailed, free from distortion or defects detrimental to appearance and performance.
- 3.1.2. Insulate metals where necessary to prevent corrosion due to contact between dissimilar metals and masonry, concrete or gypsum wallboard. Use bituminous paint, butyl tape, build paper or other approved means. Use bituminous paint only at aluminum surfaces.
- 3.1.3. Supply adequate instructions, templates and, if necessary, supervise installation of fastenings or accessories requiring to be built-in by other Sections of the Work.
- 3.1.4. After erection and installation, thoroughly clean the Work and apply coat field touch up paint to all damaged surfaces of shop-primed or galvanized material. Work primer well into all joints, crevices, interstices and open spaces.

END OF SECTION

ROUGH CARPENTRY

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide framing, sheathing, interior plywood and blocking for the Work.

1.2.2. Related Work Specified Elsewhere:

- a. Carpentry: Section 06 20 00
b. Light gauge studs: Section 09 20 15

1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies: Conform to the requirements of:

- a. The Code, Part 9 for wood framing and sheathing;
b. CAN3-086.1-M, Engineering Design in Wood (Limit States Design).
c. Conform to HLGA 1970, Standard Grading Rules for Canadian Lumber.
d. Pressure treated wood must bear stamp of processing plant indicating treatment.

1.4. PRODUCT DELIVERY, STORAGE AND HANDLING

- 1.4.1. Protect all wood products from wetting and moisture. Protect wood products from moisture gain, by covering with well secured tarpaulins during rain or snow or storing indoors during prolonged inclement weather.

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. Conform to:

- a. The National Lumber Grades Authority Standard Grading Rules for Canadian Lumber, 1977.
b. CSA 0141, Softwood Lumber.
c. Kiln dried.
d. FSC certified wood.

ROUGH CARPENTRY

- 2.1.2. Moisture Content: All wood products shall be S-dry at time of delivery and installation.
- 2.1.3. Framing Lumber: NLGA, Spruce-Pine-Fir, Stress Grades: "Studs" and "Structural Joists and Planks-No. 1".
- 2.1.4. Plywood: to CSA 0121-M, Standard Grade.
- 2.1.5. Other Lumber: CSA 0141, Spruce-Pine-Fir, dressed structural.
- 2.1.6. Sheathing:
 - a. Gypsum to ASTM C 1177, 12mm DensGlass Gold Exterior Guard and 16mm DensGlass Gold Fireguard, Type X to ASTM E 136 by Georgia-Pacific Corporation or UGC or American Gypsum.
 - 1. Joint Tape: 50mm wide 10x10 glass mesh.
 - 2. Joint Compound: G-P Gypsum setting-type joint compound, compatible with exterior stucco system by Georgia-Pacific Corporation or UGC or American Gypsum.
- 2.1.6. Adhesive: CSA 0112.7-M, Resorcinal and Pheno-Resorcinal Resin Adhesives, Type 1 (room-temperature curing).
- 2.1.7. Bolts, Nuts and Washers: CSA-S16.1-M and ASTM A325, standard structural grade, hexagonal nuts.
- 2.1.8. Nails: CSA BIII:
 - a. Structural Framing: Common Spiral.
 - b. Sheathing: Plywood Subfloor Attachment Nails, Ring Thread.
- 2.1.8. Wall Blocking: 20mm plywood or solid framing lumber.

3. PART EXECUTION

3.1. INSTALLATION

- 3.1.1. Nailing of framing and sheathing shall conform to or exceed requirements of Tables 9.23.3.4 and 9.23.3.5 - A, B and C of the Code.
- 3.1.2. Attach eye-hook suspension system to existing concrete structure using drilled anchors. Power-activated devices are not allowed. Locate fasteners at sufficient frequency to carry anticipated loads. Review location of fasteners and receive approval to commence from Structural Consultant.
- 3.1.3. Provide Equipment back panels as called for in other Divisions of the Specifications.

END OF SECTION

FINISH CARPENTRY

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included But Not Limited To:

- a. Provide finish wood items, trim and grommets for the Work.
- b. Provide nailing strips for Architectural Woodwork and Specialties.
- c. Receive and install: Architectural woodwork, metal fabrications as specified, doors, door frames, finish hardware unless specified otherwise, access doors for concealed mechanical equipment, door grilles, built-in equipment.

1.2.2. Related Work Specified Elsewhere:

- | | | |
|----|--|------------------|
| a. | Rough framing: | Section 06 10 00 |
| b. | Millwork: | Section 06 40 00 |
| c. | Items installed by this Section include but are not limited to those supplied by the following Sections: | |
| | Wood Doors and Frames: | Section 08 21 00 |
| | Finish Hardware: | Section 08 70 00 |
| | Mechanical General Requirements: | Division 20 - 25 |
| | Electrical General Requirements: | Division 26 |

1.3. QUALITY ASSURANCE

1.3.1. Perform work of this Section by carpenters familiar with the work they are installing.

1.3.2. Conform to the requirements of the latest edition of the following;

- a. The Code;
- b. CAN3-086.1-M84, Engineering Design in Wood (Limit States Design).
- c. The National Lumber Grades Authority Standard Grading Rules;
- d. Quality Standards For Premium Architectural Woodwork, by the Architectural Woodwork Manufacturers Association of Canada (AWMAC), latest edition;
- e. CSA O112 - Series M, Standards for Wood Adhesives;
- f. CSA O115 - M, Hardwood and Decorative Plywood.
- g. CSA O121 - M, Douglas Fir Plywood;
- h. CSA O141 - Softwood Lumber;
- i. CSA O151 - M, Canadian Softwood Plywood;

FINISH CARPENTRY

j. CSA O153 - M, Poplar Plywood;

1.4. SUBMITTALS

1.4.1. Submit installation details and instructions for all work to be installed by this Section. Where products are fabricated by other Sections, instructions and details shall be as provided by the fabricator through this Section.

1.4.2. Submit samples as requested by Architect.

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. General:

Conform to:

- a. The National Lumber Grades Authority Standard Grading rules;
- b. The Architectural Woodwork Manufacturers Association of Canada Millwork Standards, (AWMAC), Premium Grade unless noted otherwise.

2.1.2. Moisture Content: All wood products shall be within the following prescribed range at time of delivery and installation:

- a. Interior Wood: 7%, with range permitted in individual pieces of 5% to 9%.

2.1.3. Unfinished Lumber: NLGA Spruce-Pine-Fir, "Construction" Light Framing Grade.

2.1.4. Unfinished Plywood: Douglas Fir, G1S, sanded, waterproof, 19mm thick unless noted.

2.1.5. Moisture Resistant Plywood: Douglas Fir, G1S, Marine board, 19mm thick unless noted.

2.1.6. Interior Exposed Wood for Paint: AWMAC Paint Grade, White birch or Poplar.

2.1.7. Interior Exposed Wood for Clear Finish and Concealed Hardwood: AWMAC Premium Grade (Standard Grade at concealed hardwood), quarter cut Birch.

2.1.8. Interior Exposed Plywood for Paint: AWMAC Paint Grade, White birch face or faces (each exposed face).

2.1.9. Interior Exposed Plywood for Clear Finish: AWMAC Architectural Grade on exposed faces and AWMAC Good Grade on exposed faces as indicated on drawings, White birch face or faces (each exposed face).

2.1.10. Nails: "Common spiral nails", for unfinished work, and "spiral finishing nails" for finished work, conforming to CSA B111. Galvanized nails for exposed exterior use.

2.1.12. Wood Screws: CSA B35.4, Wood Screws, non-ferrous, corrosion-resistant alloy finished. Stainless steel for exterior use.

FINISH CARPENTRY

2.1.13. Adhesives: Waterproof, suited to work for which they are used, conforming to CSA 0112 Series-M.

2.1.14. Grommets: Provide the following quantity and sizes of grommets (for placement in millwork) by Hafele or approved equal. Location to be determined on site:

1. 50mm dia

2.2. FABRICATION

2.2.1. Fabricate work of this Section to AWMAC Premium Grade.

2.2.2. Prep doors and frames for (but not limited to) heavyweight hinges, continuous hinges, concealed vertical rod and mortise lock case exit devices, cylindrical locksets, surface door closures and concealed overhead stops.

3. PART EXECUTION

3.1. INSTALLATION, INCLUDING BUT NOT LIMITED TO

3.1.1. Finished Woodwork: Conform to AWMAC Millwork Standards for Premium Grade work.

3.1.2. Woodwork: Cut and fit accurately, neatly and true to line. Cope inside corners of wood base, screw fasten at 400 oc min., countersink and fill.

3.1.3. Securement: Secure woodwork and other products in accordance with manufacturer's recommendations for best results, in accordance with AWMAC standards, the Drawings and reviewed shop drawings and to best practice to ensure all work in place for long life under hard use.

3.1.4. Installation of Products from Other Sections: Collect and review shop and installation drawings of all such work. Install all such work in accordance with reviewed installation drawings and manufacturers printed instructions and directions.

- a. Doors and frames are prepped for (but not limited to) heavyweight oversize butt hinges, continuous hinges, cylindrical locks, rim exit devices, concealed vertical rod at panic sets, surface door closers and concealed overhead stops.

3.1.5. Doors and Screens: Hang wood and steel doors and screens plumb and accurately within openings, free of hinge bound condition.

3.1.6. Special Doors: Install locking ceiling access doors to manufacturer's instructions. Install access doors for concealed mechanical and electrical equipment in accordance with those Divisions, reviewed shop drawings and reviewed instructions.

3.1.7. Hardware: Install all hardware except cabinet hardware, unless specified otherwise. Install in strict accordance with manufacturer's instructions and as dictated by hardware schedule.

FINISH CARPENTRY

- 3.1.8. Equipment Supplied by Owner: Install in accordance with suppliers written instructions.
- 3.1.9. Grommets: Install in locations directed by Consultant.

END OF SECTION

ARCHITECTURAL WOODWORK

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide all architectural woodwork requiring shop fabrication c/w hardware.
- a. Provide Solid Surfaces for installation by Others.

1.2.2. Related Work Specified Elsewhere:

- a. Installation of this work: Section 06 20 00

1.3. QUALITY ASSURANCE

- 1.3.1. Quality Standards for Architectural Woodwork by the Architectural Woodwork Manufacturers Association of Canada (AWMAC), Premium Grade.

- 1.3.2. Manufacture and install Architectural Woodwork to the specified AWMAC Architectural Woodwork Standards manual, Latest Edition.

1.4. SUBMITTALS

- 1.4.1. Shop Drawings: Submit shop drawings for review.

1.4.2. Samples:

- a. Submit samples of range of clear finishes available for selection by Architect.
- b. Submit samples 1 bd. ft. in size of each type of finish on each type of wood to be used;
- c. Submit samples of all joinery, if requested;
- d. Submit triplicate samples of plastic laminate and solid surface.
- e. Submit triplicate samples of wood species and stains.
- f. Submit samples of hardware.

1.4.3. Reference Data:

Provide finish materials catalogue cuts and maintenance instructions including warnings on wrong maintenance practices for insertion in Operating Manuals and Reference Data specified in Section 01 33 00, Submittals.

ARCHITECTURAL WOODWORK

1.5. WARRANTY

- 1.5.1. Provide a warranty against defects attributable to labour, material and workmanship for a period of three (3) years from date of Substantial Performance, or a three (3) year maintenance bond for the full value of the Work.

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. Materials:

- a. Medium Density Fiberboard: Industrial Grade Medium Density Fibreboard (MDF) with a formaldehyde free binder to ANSI A201.2-1994 density 740 Kg/m³, product class MD: paint grade, good/solid grade. 19mm thickness unless noted otherwise on drawings.
- b. Plywood: Douglas Fir, G1S, sanded, waterproof, 19mm thick unless noted - FSC Certified Wood.
- c. Veneer Plywood: Walnut and Oak faced, A grade flat cut, thickness as noted and/or required for curving- FSC Certified Wood.
- d. Solid Wood: Walnut and Oak - FSC Certified Wood.
- e. Plastic Laminate: Conforming to CAN3-A172-M, Standard Grade, 2mm thick except 1.25mm thick post forming grade where required, 0.50mm thick backing sheet, sanded one side by same manufacturer, colour and finish choice by Architect from Arborite, Formica, Nevamar or Wilsonart complete range. Premium finish (speckled, crystal or quarry etc.) at countertops.
 1. See Drawings for colour selection.
- f. Thermofused Melamine: Certified EPP (Environmentally Preferred Product) by CPP (Composite Panel Association) and to NEMA LD-3-95 Grade VGL consists of a decorative paper impregnated and saturated with melamine resin, thermally fused under heat and pressure to MDF substrate. Overlay bonded to both faces to prevent warping.
- g. Solid Surface: Corian. See Drawings for series and colour selection.
- h. Door and Drawer Edges: 3mm vinyl, to match adjacent laminate or melamine colour/pattern, 3mm solid hardwood for wood doors and drawers.
- i. Nails, screws and fasteners: To CSA B111, galvanized for exterior work, plain finish elsewhere.

2.1.2. Cabinet Hardware:

- a. Heavy Duty Hinges: Self closing, concealed European style 170° open, all metal plated parts with six - way adjustability by Blum, Hettic or Grass.
- b. Pulls: Brushed Aluminum, 100mm D-style pull.
- c. Drawer Slides: Heavy duty ball bearing carrier, fully extendable, heavy duty.

ARCHITECTURAL WOODWORK

- d. Pilaster Strips and shelf Brackets: Brushed metal, recessed.
- e. Locks: Cam style, keyed same for all Work.

2.1.3. Adhesives: Waterproof resin type except for plastic laminate which shall be recommended by plastic laminate manufacturer, all conforming to CSA 0112 Series – M and in conformance with The South Coast Rule #1168 VOC limits for adhesives (www.aqmd.gov).

2.2. FABRICATION

2.2.1. Provide backing sheet on all plastic laminate work. Plastic laminate surfaces shall be free of core ghosting. Adjacent sheets of plastic laminate on finished work shall be matched in colour with seam inconspicuous. Do not use more than one sheet when a sheet size is available that will cover required area. Precision camber outside corners between finished surfaces.

2.2.2. Make all joints tight, flush, level and plumb.

2.2.3. No exposed fasteners on exterior surfaces of melamine panels in finished (installed) condition. Assemble melamine millwork using doweled/wafered-and-glued construction unless otherwise specified.

2.2.4. Make provisions for electrical, gas and water services and outlets and provide concealment of service lines in the work except where service connections must be exposed.

2.2.5. Seal edges of cut-outs in countertops with two coats of varnish.

2.2.6. Install hardware. Install all pulls horizontally or as shown otherwise on Drawings.

2.2.7. Ship all work fully assembled as far as practicable. Otherwise fabricate for site assembly and provide Section 06 20 00 with instructions to assemble on Site.

2.2.8. Protect all work with wrappings of cardboard or heavy kraft paper as is necessary to protect shipped work.

2.2.9. Replace, rework and/or refinish Work that does not meet specified AWMAC AWS Standards Latest Edition, at no additional cost to the Owner, and to the approval of AWMAC's independent Inspector.

3. PART EXECUTION

3.1. INSTALLATION

3.1.1. Install Work to AWMAC Standards.

END OF SECTION

THERMAL PROTECTION

V1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01 - General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide insulation for the Work.
- b. Foamed-in-Place insulation for localized gaps and spaces between systems.

1.3. SUBMITTALS

1.3.1. Samples:

- a. Submit representative samples of each specified insulation material, insulation clips, adhesives, fasteners, tapes, flexible flashings and all other material if requested.
- b. Submit data from manufacturer's or independent laboratory indicating compatibility and adhesive results of proposed materials if requested.

1.4. PROTECTION

- 1.4.1. Comply with manufacturer's printed recommendations respecting protection.
- 1.4.2. Take suitable fire precautions were recommended by manufacturer for specific Products.
- 1.4.3. Repair all damage resulting from performance of Work of this Section in manner acceptable to Architect.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

- 1.5.1. Deliver materials in original unopened containers.
- 1.5.2. Label containers with manufacturer's name, brand name, installation instructions, safety precautions and identification of various items.
- 1.5.3. Store adhesive materials between 5°C and 27°C. If exposed to lower temperature, restore to acceptable temperature before using.
- 1.5.4. Store materials in dry area and protect.
- 1.5.5. WHMIS Safety bulletins on all hazardous Products are to be readily available to the Work crew at all times.

THERMAL PROTECTION

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. General: Refer to Drawings for thicknesses and minimum thermal values of insulation required.

2.1.6. Semi-Rigid Fibre Insulation:

- a. Mineral fibre insulation with minimum 50% recycled content, conforming to CAN/CGSB S702.
- b. RSI 0.75/25mm (R 4.3/in.) minimum.
- c. Acceptable Products:
 - 1. "Cavityrock" by Rockwool.
 - 2. "JM CladStone 45" by Johns Manville.
 - 3. Approved equal.

2.1.7. Batt Insulation:

- a. Mineral fibre with minimum 50% recycled content, conforming to CSA A101-M,
- b. RSI 0.74/25mm. (R 4.2/in.) minimum.
- c. Acceptable Products:
 - 1. "Roxul Safe 55" or AFB by Rockwool.
 - 2. "EcoTouch PINK Fiberglas" by Owens Corning.
 - 3. Approved equal.

2.1.8. Sound Batt Insulation:

- a. Mineral fibre batts with minimum 50% recycled content.
- b. Acceptable Products:
 - 1. "AFB evo" by Rockwool
 - 2. "Thermafiber SAFB" by Owens Corning
 - 3. "SAFB" by Johns Manville.

2.1.9. Foamed-In-Place Insulation: Low expanding foam sealant with no ozone depleting blowing agent.

- a. Insta Seal Eco Blend (Contractor Line) or Great stuff (Consumer Line) manufactured by Flexible Products Co.
- b. Acceptable equal Products manufactured by:
 - 1. Insta-Foam Products, Inc., and distributed by U.L.C. Foam and Plastics (Division of Ure-Al Corp. (Canada) Ltd.)

THERMAL PROTECTION

2. "Poly- Cell One" by W.R. Grace Canada Ltd.
3. "EnerFoam" or "Foamitt" by Abisko Manufacturing Inc.
4. Similar acceptable type by CanAm Air Leakage Control Systems Incorporated.

3. PART EXECUTION

3.1. INSTALLATION - GENERAL

- 3.1.1. Install insulation in strict accordance with manufacturer's printed recommendations, using minimum recommended quantities and recommended mix ratios. Finished Work shall be installed neatly, tightly bonded and level. Use adhesives within temperature ranges recommended by manufacturers. Remove excess adhesive.
- 3.1.2. Surfaces to receive insulation shall be dry and free of dew, frost, voids, loose material, oil, grease, asphalt, curing compounds and other matter detrimental to bond of the adhesive or fasteners.
- 3.1.3. Ensure substrate is level such that no voids or air pockets will occur behind insulation boards.
- 3.1.4. Carefully cut and fit insulation to fit all surfaces to which insulation bears contact. Cut backs of pieces as required to fit over projecting anchors, fastenings or similar protrusions. Fit boards neatly with tight joints around pipes, ducts, obstructions, openings, corners, and all structural members. Cavity wall insulation to fit snug around reinforcing rods.
- 3.1.5. Butt edges of each board snugly against adjacent board to form an unbroken thermal envelope. Ensure integrity and continuity of insulation at juncture with different types of materials and seal in an acceptable manner. Stagger joints in each row.
- 3.1.6. Unless otherwise specified, apply insulation in single layer of thickness indicated. Where double layer of insulation is accepted or indicated, stagger joints of succeeding layers so that joints are offset. Where adhesive is required, set in adhesive as specified for the one layer.
- 3.1.7. Do not install damaged insulation, or insulation with abraded surfaces.
- 3.1.8. Where firestopping and/or thermal insulation is indicated on the Drawings or required by Code to be installed to areas of building requiring a thermal barrier, and where the certified minimum depth of firestopping materials placed by Work of Section 07 27 00 does not fill the entire depth of this construction, augment firestopping materials with Type A insulation to ensure total insulation membrane coverage.

3.3. FOAMED-IN-PLACE INSULATION

THERMAL PROTECTION

- 3.3.1. Installation locations: All door and window frames, louvres and mechanical openings through exterior walls.
- 3.2.2. Install to manufacturer's printed instructions and as specified.
- 3.2.3. Ensure all shimming and final adjustments to frames has taken place, and welding of steel has been completed prior to commencing injection of insulation.
- 3.2.4. Ensure minimum surface and ambient temperature of minimum 5°C during and 3 hours after application.
- 3.2.5. Inject insulation to completely fill voids between frames and wall opening, and to completely fill exterior hollow metal frames.
- 3.2.6. After insulation has set, re-check application and top off any low area. Trim off excess as directed by manufacturer.

END OF SECTION

SPRAY APPLIED FOAM INSULATION

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

1.1.1. Conform to Division 01 - General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

a. Spray applied foam insulation.

1.3. QUALITY ASSURANCE

1.3.1. Application of insulation/air barrier system only by applicators certified by CUFCA/NECA (Canadian Urethane Foam Contractors Association/National Energy Conservation Association) or certified by the manufacturer of the system being installed for the installation of their system and have third party independent certification in accordance with the training requirements outlined in CAN/ULC S705.2-98.

1.4. SUBMITTALS

1.4.1. Submit manufacturer's product data sheets.

1.5. PERFORMANCE REQUIREMENTS

1.5.1. Long Term Thermal Resistance tested to CAN/ULC S770-09 and achieving RSI 0.91 per 25mm @50mm at a minimum core density of 28.34 kg/m3.

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. Spray Insulation.

a. Sprayed polyurethane foam material to CAN/ULC S705.1-01.

b. Burning characteristics: maximum values in accordance with CAN/ULC-S102-03.

1. Flame spread.

2. Smoke developed: 500.

c. Water vapour permeance: Maximum 60 ng/Pa.m2 .s. (1 perm) when tested to ASTM E96/E96M-05.

b. Acceptable Products:

1. BASF Building Systems 'Walltite – ECO v.3.

2. Demilec Inc. 'Heatlok Soya/Polarfoam SOYA.

SPRAY APPLIED FOAM INSULATION

3. Dow Chemical 'Styrofoam Brand SPF CA Insulation.

3. PART EXECUTION

3.1. EXAMINATION

- 3.1.1. Verify that surfaces and conditions are ready to accept the work of this section. Application of work of this section deems acceptability of existing conditions. Report in writing defects in substrate which may adversely affect the performance of the foam insulation/air barrier.

3.2 PREPARATION:

- 3.2.1. Surfaces to receive foam insulation/air barrier shall be free of frost, loose or foreign matter which might impair adhesion of materials.
- 3.2.2. Prepare adjacent surfaces to receive transition membrane by removing contaminants which will affect adhesion of membrane.

3.3. FOAMED-IN-PLACE INSULATION

- 3.3.1. Apply materials over clean and dry surfaces.
- 3.3.2. Fill joints with foam sealant making allowances for post expansion of foam.
- 3.3.3. Ensure joints are free from air pockets and imbedded foreign materials. Cut back excess foam sealant after cutting flush with surrounding surfaces unless otherwise directed or detailed.
- 3.3.4. Apply foam insulation/air barrier within +6.4 mm (1/4") and -0 mm (0") of indicated thicknesses.
- 3.3.5. Do not allow foam insulation to cover or mark adjacent surfaces. Use masking materials if necessary.
- 3.3.6. Clean and make good surfaces soiled or damaged by work of this section. Consult with section of work soiled before cleaning to ensure methods used will not damage their work.

END OF SECTION

MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1. Conform to Division 01, General Requirements.

1.2 SECTION INCLUDES

1. Patching and making good existing modified bituminous roofing at new penetrations.

1.3 REFERENCES

1. ASTM D312-00(2006) - Asphalt Used in Roofing.
2. ASTM D2822-05 - Asphalt Roof Cement.
3. ASTM D6162-00ae1 - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements
4. ASTM D6163-00e2 - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements
5. ASTM D6164-05e1 - Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements
6. CAN/CGSB-37.5-M89 - Cutback Asphalt Plastic Cement.
7. CAN/CGSB-37-GP-56M-1985- Membrane Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
8. CAN/ULC-S107-03 - Methods of Fire Tests of Roof Coverings.
9. CGSB-37-GP-9Ma-83 - Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
10. Province of Ontario Roofing Contractors Association – Roofing Specifications Manual
11. CRCA (Canadian Roofing Contractors' Association) – CRCA Roofing Specifications Manual.
12. ULC (Underwriters Laboratories of Canada) - List of Equipment and Materials for:
 1. Building Materials.
 2. Fire Resistance.
 3. Firestop Systems and Components.

1.4 ADMINISTRATIVE REQUIREMENTS

1. Coordination:

MODIFIED BITUMINOUS MEMBRANE ROOFING

1. Coordinate with other work having a direct bearing on work of this section.
2. Coordinate the work with the installation of associated metal flashings, as the work of this section proceeds.

1.5 SUBMITTALS

1. Product Data: Provide membrane materials, base flashing materials, insulation, deck board and vapour retarders.
2. Installation Data: Manufacturer's special installation requirements, including special precautions required for seaming the membrane.
3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

1. Perform Work in accordance with CRCA Roofing Specifications Manual.
2. Maintain one (1) copy of document on site.
3. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.
4. Installer Qualifications: Member of the C.R.C.A. and a member in good standing with the Ontario Industrial Roofing Contractors Association. Specializing in performing the work of this section with minimum three (3) years documented experience.

1.7 REGULATORY REQUIREMENTS

1. Conform to applicable code for roof assembly fire hazard requirements.
2. CAN/ULC-S107: Class A Fire Hazard Classification.
3. Wind uplift design, in accordance with CSA 123.21.

1.8 DELIVERY, STORAGE, AND HANDLING

1. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.
2. Store products in weather protected environment, clear of ground and moisture.
3. Stand roll materials on end.

1.9 ENVIRONMENTAL REQUIREMENTS

1. Do not apply roofing membrane during inclement weather or ambient temperatures below 5 degrees C or above 35 degrees C.

MODIFIED BITUMINOUS MEMBRANE ROOFING

2. Do not apply roofing membrane to damp or frozen deck surface.
3. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.10 WARRANTY

1. Contractor's Warranty: Provide five (5) year warranty on roofing, dated from time of Substantial Performance.
2. Manufacturer's Warranty: Provide a ten (10) year manufacturer's warranty to include coverage for failure to meet specified requirements, including damage to building resulting from failure to prevent penetration of water.

PART 2 PRODUCTS

2.1 MANUFACTURERS - MEMBRANE MATERIALS

1. Soprema Inc.
2. IKO
3. Bakor
4. Or approved equal.

2.2 MEMBRANE MATERIAL

1. Membrane: CAN/CGSB-37-GP-56M, Asphalt and polymer modifiers of styrene-butadiene-styrene (SBS) prefabricated sheet.
 1. Base Sheet Membrane and Flashing: non-woven polyester reinforcement, weighing 180 g/m².
 1. Application: fully adhered:
 2. Top surface sanded.
 3. Underside thermofusible plastic film.
 2. Cap Sheet Membrane and Flashing: non-woven polyester reinforcement and elastomeric bitumen, weighing 180 g/m².
 1. Application: fully adhered:
 2. Top surface granule surfaced.
 3. Underside thermofusible plastic film.

2.3 BITUMEN MATERIALS

1. Asphalt: CSA-A123.4, Type 2
2. Asphalt Primer: CGSB-37-GP-9Ma.
3. Adhesive: Membrane and flashing adhesive recommended by manufacturer.

MODIFIED BITUMINOUS MEMBRANE ROOFING

2.4 FLASHINGS AND TRANSITION MEMBRANES

1. Flexible Flashings: Same material as membrane.
2. Metal Flashings: Prepainted galvanized steel; ASTM A653/A653M Z275; 24 gauge core steel, colour to match existing flashing.
3. Transition Membranes: Blueskin SA vapour impermeable by Henry Inc. or equal by Dorken Systems Inc., Grace, WR Meadows, all to CGSB 71-GP-24M.

2.5 ACCESSORIES

1. Roof Protrusion Flashings: Pre-fabricated flanges composed of spun copper or aluminum as manufactured by Lexsuco, Thaler or approved equal.
2. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

1. Ensure that new penetrations are no larger than necessary. If penetrations are larger than necessary provide sufficient vapour barrier, insulation, sheathing and materials to complete scope of this Section.
2. Verify roof openings, curbs, pipes, conduit, sleeves, ducts, and vents through roof are solidly set, and reglets are in place.

3.2 MEMBRANE APPLICATION

1. Apply membrane and primer to manufacturer written instructions.
2. Apply membrane; lap and seal edges and ends permanently waterproof.
3. Apply membrane smooth, free from air pockets, wrinkles, or tears. Ensure full bond of membrane to substrate.
4. Extend membrane up vertical surfaces a minimum of 200 mm.
5. Extend membrane over vapour and air barrier of wall construction and seal.
6. Seal membrane around roof protrusions and penetrations.
7. Provide waterproof cut-off to membrane at end of day's operation. Remove cut-off before resuming roofing.

3.3 FLASHINGS AND ACCESSORIES

1. Apply flexible sheet base flashings to seal membrane to vertical elements.
2. Secure to reglets.

MODIFIED BITUMINOUS MEMBRANE ROOFING

3. Coordinate installation of roof scuppers, curbs and related flashings.
4. Seal flashings and flanges of items penetrating or protruding through the membrane.
5. Roof Drains: Install roof drains according to membrane manufacturer's recommendations and standard details.
6. Conduit Lines: Provide pre-manufactured one piece copper or aluminum flanges at all pipe, conduit, etc., passing through roofs of sizes as required.
7. Vent Stack Flashings: Install spun aluminum vent stack flashings at all soil pipes set in trowel coat of plastic cement and flashed into new roof system with 4 additional plies of felt and feather onto roof membrane.
8. Precast Pavers: Install precast pavers over insulation pad where indicated on drawings.
9. Expansion Joints: Cover structural roof expansion joints with two ply modified bitumen per the manufacturers recommendations and standard details and to allow for thermal expansion and contraction.

3.4 WASTE MANAGEMENT

1. Separate and recycle waste materials in accordance with the Waste Management Plan.
2. Fold up metal banding, flatten and place in designated areas for recycling.
3. Collect wood packing shims and pallets, place in designated area.

3.5 CLEANING

1. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
2. Repair or replace defaced or disfigured finishes caused by work of this section.

3.6 PROTECTION OF FINISHED WORK

1. Protect building surfaces against damage from roofing work.
2. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

FIRESTOPPING

PART 1 GENERAL

1.1 GENERAL INSTRUCTIONS

1. Conform to Division 01, General Requirements.

1.2 SECTION INCLUDES

1. Work Included: Provide firestopping and smoke seals for the Work.

1.3 REFERENCES

1. NFPA 101-00 - Life Safety Code
2. CAN/ULC S101-M89 - Standard Methods of Fire Endurance Tests of Building Construction and Materials
3. CAN/ULC S102-M88 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
4. ULC-S115-95 - Standard Method of Fire Tests of Firestop Systems
5. ULC Guide No. 40U19 - Firestop Systems
6. ULC Guide No. 40U19.13 - Firestop Systems Components
7. UL - Underwriters Laboratories of Northbrook, IL (UL tests conforming to ULC-S115 given cUL listing published by UL in their Products Certified for Canada (cUL) Directory

1.4 SUBMITTALS

1. Submit manufacturers specifications and technical data for each material including compositions, limitations, documentation conforming ULC and/or UL firestop system and manufacturers' installation instructions.
2. Submit fireproofing manufacturer's written verification that manufacturers have identified where firestopping is required, have selected correct firestop system and applicators have been trained by system manufacturers. Products, systems and assemblies have been installed in accordance with manufacturer's requirements.
3. Submit manufacturer's verification that installed firestopping and smoke seal materials comply with specified requirements.
4. Submit copies of ULC, Warnock Hersey and/or cUL Listing cards for review.

1.5 WARRANTY

1. Warrant work of this Section against defects and deficiencies for period of five (5) years in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no additional

FIRESTOPPING

expense to Owner. Defects include but are not limited to cracking, breakdown of bond, failure to stay in place or bleeding.

PART 2 PRODUCTS

2.1 MANUFACTURERS

1. Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and specifications:
 1. A/D Fire Protection Systems Inc.; www.adfire.com
 2. Canadian General Electric Company Limited; www.gesilicones.com
 3. Electrical Products Division/3M; www.3m.com
 4. Grace Construction Products; www.graceconstruction.com
 5. Instant Firestop Inc.
 6. Hilti (Canada) Limited; www.ca.hilti.com
 7. Johns Manville, Fire Protection Systems; www.jm.com
 8. M.W. McGill and Associates Ltd.
 9. Nelson Firestop Products.
 10. ThermoFire Systems Inc.
 11. Thomas & Betts Ltd.
 12. Tremco (Canada) Limited. www.tremcosealants.com

2.2 MATERIALS

1. Firestopping System 1 (JF Systems):
 1. This Firestopping System is primarily an expansion, control and perimeter seal without smoke resistance, and shall be non-combustible, semi-rigid, felt fire protection, 65 kg/m³ minimum density, depth, length and required width. Certified assembly of 1 of listed manufacturers and acceptable to Consultant. Provide sealant of spray firestopping over mineral wool.
 2. Blanket type firestopping shall be listed and labelled in accordance with ULC Guide No. 40-U19 or 40-U19.13, with reference to 'JF System Listings'.
 3. Where required by listing, impaling clips shall be heavy gauge galvanized wire or 25 mm wide x 0.607 mm (24 ga) galvanized steel, Z formed with horizontal bottom and dimensions conforming to location of firestopping and width of void to be filled. Ensure compression of joint do not damage clips.
2. Firestopping System 2: Same materials as in System 1, but without use of impaling clips and with smoke and fluid seal with hose stream resistance.

FIRESTOPPING

- Certified assembly of 1 of listed manufacturers and acceptable to Consultant.
3. Firestopping System 3: Fire, gas, fluid and hose stream resistant elastomeric sealant with movement capabilities, ULC labeled assembly of 1 of listed manufacturers and acceptable to Consultant. Materials shall have elastic characteristics where used at openings subject to movement. Intumescent pads may form part of this system, at Contractor's option.
 4. Firestopping System 4: Firestopping, gas, fluid and hose stream resistant seals at openings intended for ease of re-entry such as cables shall be an elastomeric seal or proprietary assembly of following types; a cementitious or rigid seal at such locations is not permitted. Certified assembly of 1 of listed manufacturers and acceptable to Consultant.
 5. Firestopping System 4-A: Where openings are considered large such as at cable trays and bus ducts. Certified assembly of 1 of listed manufacturers and acceptable to Consultant.
 6. Firestopping System 5 (Cavity Wall Compartment Closer and Firestopping): Strips of "RXL Safe" semi-rigid mineral fibre insulation by Roxul Inc. 75 mm wide by depth of cavity plus 13 mm with galvanized skewers for securement at 300 mm oc., or compressed 25% to fill depth of cavity.
 7. Firestopping System 6 (Electrical Outlet Boxes): Premolded red putty CP 617 by Hilti or equal.
 8. Primers: To manufacturer's recommendations for specific material, substrate and end use.
 9. Damming and Backup Materials, Supports and Anchoring Devices: Non-combustible, to manufacturer's recommendations in accordance with tested assembly being installed and as acceptable to authorities having jurisdiction. Sheet steel covers over temporarily unused sleeves in tenant and similar spaces shall be minimum 0.912 mm (20 ga) thick galvanized sheet steel formed to a tight fit over opening with specified firestopping materials installed beneath. Combustible materials are acceptable only if they are approved under ULC or UL systems, otherwise they should be removed after permanent firestop materials have cured.
 10. Pipe and Duct Insulation and Wrappings Compatible with Firestopping Systems: "Nelson WRP" by Nelson Electric Ltd. for use with Nelson Electric Ltd. firestops and "Instant Type PI" by Instant Firestop Inc. for use with Instant Firestop Inc. firestops; or "TREMstop WS" by Tremco Canada Limited.
 11. Intumescent Pads: AFSP 1077" by Grace Construction Products or "FSP Pads" by Nelson Electric, or "Instant Putty 200" by Instant Firestop Inc., or "Type PLW Firestop Pillow" by Electrovert Ltd.
 12. Re-Entry Pillows: Permanently pliable, AFSPIL Pillows" by Grace Construction Products or "Type PLW Firestop Pillow" by Electrovert; or "PLW" by Nelson Electric; or "TREMstop PS" by Tremco Canada Limited.

FIRESTOPPING

PART 3 EXECUTION

3.1 PREPARATION

1. Fully protect walls, windows, floors and other surfaces around areas to be firestopped from marring or damage. Mask where necessary to avoid spillage on to adjoining surfaces. Mask areas adjacent to openings, where necessary to prevent contamination or marring of adjacent surface materials. Remove masking after seal has been completed and an initial set has been achieved. Remove stains on adjacent surfaces as required.
2. Provide primer or surface conditioner if required by Product manufacturer. Prime surfaces in accordance with manufacturer's directions.
3. Verify openings, dimensions and surfaces conform to fire and smoke seal assembly.
4. Comply with manufacturer's recommended requirements for temperature, relative humidity, moisture content and presence of any sealer or release agents on substrate during application and curing of materials. Ensure surfaces are dry and frost free.
5. Remove combustible material and loose material detrimental to bond from edges of penetration. Clean, prime or otherwise prepare substrate material to manufacturer's recommendation.
6. Remove insulation from insulated pipe and duct where such pipes or ducts penetrate a fire separation unless ULC certified assembly permits such insulation to remain within assembly, or where mechanical trades have installed special fire rated insulated sleeves. Ensure continuity of thermal and vapour barriers where such are removed, altered or replaced, to satisfaction of Division 21, 22, 23 and Consultant.
7. Alternatively, ensure pipe and duct insulation and wrappings occurring within openings to receive firestopping and smoke seals under this Section are installed prior to work of this Section and insulation and wrappings within fire seals are ULC listed components of system to be installed under this Section, unless ULC certified assembly permits such other insulation and wrappings to remain within assembly. Coordinate work of this Section with Division 21, 22 and 23.
8. Do not apply firestop material to surfaces previously painted or treated with sealer, curing compound, water repellent to other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
9. Provide temporary forming, packing and bracing materials necessary to contain firestopping. Upon completion, remove forming and damming materials not required to remain as part of system.
10. Install damming and firestopping materials as per manufacturer's instructions.

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11. Examine sizes of penetrating service and sleeve or opening sizes with exact annular space calculations, anticipated movement and all conditions necessary to establish correct type, thickness and installation of back-up materials and seals.
12. Clean bonding surfaces to remove deleterious substances including dust, paint, rust, oil, grease, moisture, frost and other foreign matter which may otherwise impair effective bonding.

3.2 INSTALLATION

1. Mix and apply firestopping and smoke seals in accordance with manufacturer's instructions and tested designs to provide required fire (temperature and flame) rated seal, to prevent passage of smoke and where specifically designated, passage of fluids.
2. Provide temporary forming and packing as required. Apply materials with sufficient pressure to properly fill and consolidate mass to seal openings.
3. Tool or trowel exposed surfaces. Allow materials to cure by not covering up materials until full curing has taken place.
4. Where a designated system described hereinafter does not meet Code requirements for particular service condition, substitute with next higher system meeting required rating.
5. Notify Consultant when completed installations are ready for inspection and prior to concealing or enclosing firestopping and smoke seals.
6. System 1:
 1. Install fire rated joint firestopping by compressing material minimum of 25% to ensure complete sealing and to follow irregularities of concrete slabs at perimeter of building where junction occurs with back of cladding system. Apply firestopping sealant or spray over compressed mineral wool.
 2. Butt succeeding sections of firestopping material tightly up against preceding. Leave no voids.
 3. Provide firestopping between exterior wall cladding and concrete floor slab. Secure and support to suit design requirements.
 4. Use this System for joint seals through fire-resistance rated floor slabs, ceilings and roofs unless otherwise stipulated.
7. System 2:
 1. At fire-rated masonry walls and gypsum board partitions which extend nominally to within 19 mm (3/4") of underside of deck above, insert fire rated joint assembly firestopping material in 25% compression in accordance with ULC test requirements and manufacturer's instructions. Provide adequate depth of material to fill gap flush with

FIRESTOPPING

face of wall, except as otherwise specified. Apply firestopping sealant of spray over compressed mineral wool.

2. Insert at intersection of fire-resistance rated masonry and gypsum board partitions.
 3. Insert at both sides of control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 4. Where wall/slab junction is exposed in finished work, keep fibre back 9 mm (3/8") from face of block and apply fire-resistant sealant to gap, tooling to a concave joint.
 5. At perimeter slab locations where this system would otherwise be exposed in finished work and where smoke seal is required, provide cover spray material of thickness as recommended by manufacturer of System 3 material set flush with top of slab and tooled smooth. Minimum cover spray thickness 3 mm (1/8"). Where anticipated movement in joint width is inevitable, select sealant with elastic capabilities.
8. System 3:
1. This System establishes fire rated firestopping for service penetrations throughout the Project. Seal gaps and holes in fire-rated walls and slabs and composite construction through which conduit, wire, cables, ductwork, piping and all other protrusions pass as a result of work using fire-resistant penetration sealant. Include opening which have been formed, sleeved and cored.
 2. Apply at unpenetrated openings and sleeves installed for future use through fire-resistance rated assemblies.
 3. Apply this System between spaces having different air pressures. (See Mechanical Drawings for pressurized areas and locations of moving penetrants.)
 4. Apply at "wet" rooms supported by suspended slabs at locations over Electrical and Equipment Rooms or similar areas containing power devices in which future re-entry is not required.
 5. Apply at Mechanical Rooms and similar rooms having systems containing liquids, including piping runs, unless such rooms are located over slab-on-grade.
 6. Install System 3 materials at elevator shafts, duct shafts and other similar locations over occupied spaces.
 7. Install 6 mm to 9 mm (1/4" to 3/8") bead of firestop caulking at interface of retaining angles around fire dampers, where angles meet fire-rated assembly and between retaining angles and fire damper, both sides of penetration. At floor locations, sealant bead at top of assembly is adequate.

FIRESTOPPING

8. Where necessary, remove insulation from insulated pipe and duct where such services penetrate a fire separation unless certified assembly permits such insulation to remain within assembly. Apply wrapping materials as listed herein.
9. Install System 3 materials at open wall joints, including expansion joints between fire rated enclosures and assemblies.
9. Systems 4 and 4A: Install at following locations:
 1. At Electrical, Electrical Switchgear, Electrical Transformer Rooms and at Telephone Equipment Rooms requiring re-entry for additional services.
 2. Install at communications and computer cable penetration points throughout.
10. Accessories: At hollow fire-rated walls, apply intumescent pads to back surfaces and cable entry points of electrical boxes, panels and other service penetration points, ensuring close coordination with electrical, mechanical and drywall trades. Where greater dimension of panel exceeds 500 mm (20"), gypsum board trades construct fire-rated enclosure around recessed panels.
11. System 5: Maintain maximum cavity wall compartments to lesser of following 2 criteria by bridging gap between cavity back-up material and back face of brick with full-depth strips of compartment closer and firestopping material, securing in position with mechanical fasteners and sealing against firm, primary cavity materials:
 1. 10 m² (100 sq ft).
 2. Paragraph 3.1.11 of OBC.
12. System 6: Ensure box is cleaned of loose debris, dirt, oil, moisture, frost and wax. Remove label from one side of pad and place against box. Wrap pad around box and adhere to all exposed exterior sides of box.

3.3 INSPECTION AND TESTING

1. Perform a series of 5 fog tests to random locations as designated by Consultant. Should any penetration, joint or void, under jurisdiction of this Section, emit visible fog, make repairs and replace deficiencies and re-perform fog test at no additional cost to Owner.
2. Fog units (machines) shall have a formulation output range of (1.5 gal/hr). Formulation particle size 0.5 - 25 µm. Fogging agent shall be non-toxic, non-staining and shall provide a heavy fog at 30 ppm with a permissible airborne level concentration of 50 ppm.
3. Fog at a rate of 4 s/100 cu ft. Maintain fog density until inspection is complete.

FIRESTOPPING

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

3.4 CLEANING

1. Remove excess materials and debris and clean adjacent surfaces immediately after application to satisfaction of Consultant. Remove and or correct staining and discolouring of adjacent surfaces as directed.
2. Remove temporary dams after initial set of firestopping and smoke seal materials where such materials are left exposed in finished areas and flame spread rating of such materials exceed a value of 25, in accordance with CAN/ULC-S102-M.

3.5 CABLE TRAY PENETRATIONS

1. Seal cable tray penetrations with re-enterable matrices having a minimum compressive strength of 250 psi having a minimum FTH Rating of 1/2 hr for 500 MCM cables and 2 hr for 300 MCM cables.
2. Listings shall be for cable tray tests carried out having minimum 30% actual and/or 100% visual cable density.

END OF SECTION

JOINT SEALANTS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

Provide sealants and joint fillers for the Work.

1.2.2. Related Work Specified Elsewhere:

Provide the following work in conformance with this Section:

- | | |
|--|------------------|
| b. Bedding of thresholds: | Section 06 20 00 |
| c. Fire stopping and smoke seals: | Section 07 84 00 |
| d. Glazing: | Section 08 80 50 |
| e. Sealing of gypsum board partitions: | Section 09 21 16 |
| f. Mechanical Sealing: | Mech Divisions |
| g. Electrical Sealing: | Elec Divisions |

1.3. QUALITY ASSURANCE

1.3.1. Qualifications of Products: All products shall be packaged in conformance with the specified standards with every package bearing a label stating the standard to which the product conforms.

1.3.2. Qualifications of Subcontractor: Possess a copy of and be familiar with all standards specified. Have a minimum of 5 years' experience in the work specified.

1.4. SUBMITTALS

1.4.1. Samples: Submit samples of full colour range of all exposed products for colour choice by Architect.

1.4.2. Maintenance and Reference Data: Submit to Section 01 33 00 as specified therein.

JOINT SEALANTS

1.5. JOB CONDITIONS

- 1.5.1. Other Sections providing joints between elements to be sealed by or in conformance with this Section shall conform to the limits of movement of the specified sealant by the careful determination of acceptable lengths of element to be joined (spacing of joints) and establishment of sufficiently wide joints to accommodate anticipated movement in the finished Work.
- 1.5.2. Install sealants at temperatures above 4.4 ° C.
- 1.5.3. Inspection: Inspect work of other Sections upon which work of this Section depends and verify that conditions are suitable for this work to proceed

1.6. WARRANTY

- 1.6.1. Warrant sealant work for a total of Two Years.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Primer: As recommended by sealant manufacturer for type of surface being primed and conditions of service.
- 2.1.2. Joint Filler and Back-up:

Circular cross-section unless shown as slab or sheet, min. 25% wider than joint, semi-rigid: closed cell polyethylene or polyurethane product, Ethafoam by Dow Chemical of Canada Limited, or product of Hercules Inc., Delaware, U.S.A., rubber tubing or non-migrating plasticized vinyl having a shore 'A' hardness of 20 and tensile strength of 130 - 200 kPA, compatible with sealant and as recommended by sealant manufacturer.
- 2.1.3. Bond Breaker: As recommended for use by sealant manufacturer.
- 2.1.4. Vent Tubes: Rigid clear extruded plastic, min. 6mm ID and 9mm OD.
- 2.1.5. Sealant Colours:

Colours of exposed sealants as chosen by the Architect from manufacturer's complete range.
- 2.1.6. Sealant Types:
 - a. Type 1: Sealing Compound, One Component, Acrylic Base, Solvent Curing conforming to CGSB 19-GP-5M.
 - b. Type 2: Air barrier and sealant quality conforming to Thermal Insulation, Urethane, Spray in Place, CGSB 51-GP-23M.
 - c. Type 3: Latex Sealing Compound, One Component, acrylic latex conforming to Can/CSGB 19-GP-17M and ASTM C834, Type OP Grade -18degC;

JOINT SEALANTS

- d. Type 4: Sealing Compound, One Component, Acrylic Emulsion Base conforming to CAN/CGSB 19.17-M.
- e. Type 5: Sealing Compound, One Component, Silicone Base, Solvent Curing conforming to CGSB-19.18-M87; Dow Corning 795 (790 at concrete) or G.E. Silicones Silpruf.
- f. Type 6: Non-curing, non-skinning, non-oxidizing, non-bleeding Sealing and Bedding Compound for Acoustical Purposes and/or metal building sealant for concealed joints conforming to CGSB 19-GP-21M;
- g. Type 7: Sealing Compound, Mildew Resistant, for Tubs and Tile conforming to CGSB 19-GP-22M; Dow Corning 786 or G.E. Silicones Sanitary 1700.
- h. Type 8: Sealing Compound, Multicomponent, Chemical Curing conforming to CAN2-19.24-M80.
- i. Type 9: Tacky preformed tape of 100% solids butyl polyisobutylene base, cross-sectional size as required or as specified;
- j. Type 10: Tacky preformed tape of 100% solids vulcanized-rubber base or macro- polyisobutylene base with solid rubber bead centered in tape, cross-sectional size as required or as specified;
- k. Type 11: Preformed wedge or gasket in shape designed for specific installation condition of appropriate shore 'A' hardness of dense neoprene, EPDM or Santoprene PVC by Monsanto Canada Inc.
- l. Type 12: Expanding preformed foam sealer fabricated of open cell, high density polyurethane foam impregnated throughout with polymer modified asphalt, performance temperature range -40°C to 85°C (95°C short term), excellent resistance to UV, mildew, and aging, non-bleeding, 144 to 160 kg/m³ density, acceptable product: Emseal by Emseal Joint Systems Ltd.;

3. PART EXECUTION

3.1. PREPARATION

- 3.1.1. Check compatibility of proposed sealants with materials to be in contact with sealant and ensure durable seal is provided.
- 3.1.2. Clean joints and surfaces and ensure that they are dry and free of dust, loose mortar, oil, grease and other foreign material. Clean ferrous metals of rust, mill scale and foreign materials by wire brushing, grinding or sanding.
- 3.1.3. Provide bond breaker between sealant and other materials spanning joint where backup rod cannot be provided because of depth.
- 3.1.4. Where surfaces adjacent to joints are likely to become coated with sealant during applications, mask them prior to priming and caulking.

JOINT SEALANTS

- 3.1.5. Seal joints in surfaces to be painted before surfaces are painted. Where surfaces to be caulked are prime-painted in shop before caulking, check to make sure prime paint is compatible with primer and sealant. If they are incompatible, inform Architect and change primer and sealant to compatible types approved by Architect.

3.2. APPLICATION

- 3.2.1. Apply sealant using hand-operated guns fitted with suitable nozzles and equipment approved by sealant manufacturer. Apply in strict accordance with manufacturer's directions and recommendations.
- 3.2.2. Apply sealant under pressure in such a manner as to assure good adhesion to sides of joints and to completely fill all voids in the joint.
- 3.2.3. Form surface of sealant smooth, concave, free from ridges, wrinkles, sags, air pockets and embedded foreign matter.
- 3.2.4. Upon completion, remove masking and sealant smears and droppings from adjacent and other surfaces.
- 3.2.5. Install preformed expanding foam sealants in compressed state of width to provide final compression in service necessary to provide required acoustic-, air-, moisture-, or water- proof seal as per manufacturers recommendations and as specified in List following.

3.3. LIST OF TYPES AND USES OF SEALANTS

3.3.1.. Interior Joints:

- a. Not for glazing, not on exterior walls, not on interior of exterior window, door or screen frames, not in shower or washroom areas, not specifically for acoustic isolation: Type 3 or 8; paintable.
- b. Perimeter of mirrors, washroom accessories to wall and other dissimilar materials: Type 4.

3.3.2. Building Envelope Joints:

- a. Joints in Sheet Metal Air/Vapour Barrier: Sealant Type 6;
- b. Lap Joints in Plastic Sheet Vapour Barrier: Sealant Type 6;
- c. Securement Joints in Plastic Sheet Air/Vapour Barrier: Sealant Type 3;
- d. Joints in Air Barrier Sheathing Insulation and Joints Between Air/Vapour Barrier or Insulation Wythe and Frames of Windows, Doors or Equipment: Sealant Type 2
- e. Control Joints in Masonry: Type 4.
- f. Interior and Exterior Window, Door and Screen Frames: Sealant Type 4.
- g. Thresholds in Exterior and Vestibule Doors: Type 8, or 13 (watertight);

JOINT SEALANTS

- h. Roof: As supplied by roofing membrane manufacturer. Check compatibility of all sealants in contact with roof membrane or roof sealants;
 - i. Joints in Exterior and Interior Pavements:
Sealant Type 8, with a toughness when cured which resists damage due to mischief and traffic. Sealant Type 8 pourable in floor slab and floor finish expansion and crack control joints.
- 3.3.5. Joints in Shower Rooms and Washrooms: Sealant Type 7.
- 3.3.6. Sealing Partitions for Acoustical Isolation: Sealant Type 6.

END OF SECTION

STEEL DOORS FRAMES AND SCREENS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

1.1.1. Conform to Division 1, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

Supply steel doors, frames and screens to Sections installing them.

1.2.2. Related Sections:

- | | | |
|----|---|------------------|
| a. | Installation of steel doors, frames and hardware: | Section 06 20 00 |
| b. | Supply of hardware: | Section 08 70 00 |
| c. | Glazing of steel doors and frames: | Section 08 80 00 |

1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies:

Perform Work of this Section in accordance with requirements of latest edition of Canadian Manufacturing Specifications for Steel Doors and Frames, of Canadian Steel Door and Frame Manufacturers' Association (CSDFMA), except as otherwise specified herein or shown.

1.3.2. Coordination:

Give full cooperation to finish hardware distributor's representative during preparation of Shop Drawings and execution of shop fabrication.

1.4. SUBMITTALS

1.4.1. Shop Drawings:

- a. Indicate each type of door, transom panel, door frame and window frame, materials being supplied, sufficient detail to show door construction and anchorage, type of primer, cutouts and reinforcements for hardware, mortar boxes, anchors, fire and sound ratings and location of fastenings.
- b. Submit on sheets conforming to format of Canadian Steel Door and Frame Manufacturers' Association Guide. Manufacturer's numbering system shall correspond to Architect's numbering system.
- c. Draw frame profile details at scale not less than 1:5.

2. PART PRODUCTS

2.1. EXAMPLE MANUFACTURERS

STEEL DOORS FRAMES AND SCREENS

2.1.1. S.W. Fleming, Steldor, Daley, Ambico, Macotta or Daybar Industries Ltd.

2.1.2. Minimum Specification for Products: Canadian Steel Door and Frame Manufacturers' Association.

2.2. MATERIALS

2.2.1. Sheet Steel:

- a. Doors and frames: Wipe coated galvanized steel to requirements of ASTM A526-80 with zinc coating designation ZF075 to ASTM A525.
- b. Metal jamb anchors occurring in exterior walls: hot dipped galvanized sheet steel.
- c. Minimum core thickness to CSDFMA Specifications Table 1 and as follows:
 - a. Doors, frames and screens: 16ga
 - b. Anchors: 14ga
 - c. Stiffeners: 14ga

2.2.2. Core:

- a. Interior doors: 25mm resin impregnated rot resistant kraft honeycomb.
- b. Exterior doors: steel stiffened, all voids insulated with fiberglass or foam.

2.2.3. Glass: See Door and Frame Schedule

2.2.4. Miscellaneous:

- a. Door Bumpers/Silencers: Single stud rubber/neoprene type; acceptable type, Glynn-Johnson #64 of colour selected or Johnsonite Inc., or S.W. Fleming.
- b. Panel Fasteners: Concealed fasteners of hot dip galvanized steel, type to Provide accurate, secure installation.
- c. Glazing Stops: Formed channel, minimum 16mm height.

2.3. FABRICATION

2.3.1. General:

- 1. Prep doors and frames for (but not limited to) heavyweight hinges (minimum 4 per leaf greater than 915mm wide and / or 2300mm high), continuous hinges, concealed vertical rod and mortise lock case exit devices, cylindrical locksets, surface door closures and concealed overhead stops.

2.3.2. Frames and Glazed Screens:

- 1. Fabricate frames to profiles indicated.
- 2. Mitre corners of frames. Cut accurately and weld continuously on inside of frame profile.
- 3. Fabricate vertical members to open into heads to allow for mortar fill.

STEEL DOORS FRAMES AND SCREENS

4. Reinforce all frames greater than 900 mm in width with steel angles or channels to Provide continuous unwavering support under all conditions.
5. Mortise, reinforce, box, drill, and tap frames to receive hardware. Reinforce all frames for application of surface mounted closers and for automatic door operators, where scheduled. Protect strike and hinge reinforcements with guard boxes welded to frame. Obtain templates from Finish Hardware Supplier.
6. Provide two welded-in channel or angle spreaders per frame to ensure proper alignment.
7. Provide three rubber bumpers for each door frame.
8. Where frames terminate at finished floor, Provide floor plates for anchorage to floor.
9. Provide adjustable jamb anchors of appropriate type. For frames occurring in masonry walls, Provide minimum three anchors for each jamb up to 2260 mm in height. Provide additional anchors for higher frames in accordance with referenced standard.
10. For glazing, Provide accurately fitted removable steel channel glazing stops with butted corners, and fastened with countersunk Phillips oval head sheet metal screws. Place stops on inner non-secure side of frame.

2.3.3. Doors:

1. Fabricate each face of door from a single sheet of steel.
2. Continuously weld longitudinal edges and grind smooth.
3. Stiffen exterior doors vertically with stiffeners spot welded to face sheets at maximum 150 mm on centre.
4. Close top and bottom of door with recessed projection welded channel end closures. Provide steel top cap on exterior doors to protect against weather.
5. Provide 1 mm clearance at hinge jamb, 1.5 mm clearance at latchside and head, and 6 mm clearance between bottom of door and finished floor line, except where undercutting specified in Door Schedule. Bevel opening edge of single leaf doors 3 mm and of double doors 1.5 mm each.
6. Where door lights are indicated, Provide accurately fitted removable steel channel glazing stops with butted corners, fastened with countersunk Phillips oval head sheet metal screws. Place stops on inner non-secure side of door.
7. Fill internal spaces in exterior doors fully with specified insulation core material.
8. Mortise, reinforce, drill, and tap doors to receive hardware. Note that doors will be fitted with mortise lever locksets. Obtain templates from Finish Hardware supplier.
9. Reinforce stiles and rails of fully glazed doors with continuous channels.

2.3.4. Fire-rated Assemblies:

STEEL DOORS FRAMES AND SCREENS

1. Fabricate assemblies required to have a fire-resistance rating to requirements of testing and labeling agency.
 2. Supply assemblies required to have a fire-resistance rating complete with appropriate label of testing and labelling agency affixed in a visible but unobtrusive location.
- 2.3.5. Welding:
1. Grind exposed welds smooth and flush.
 2. Fill open joints, seams and depressions with filler or by continuous brazing or welding. Grind smooth to true arises and profiles, and sand down to smooth, true uniform finish.
- 2.3.6. Adjust and Clean:
- Promptly make good any disfigurement or damage caused by shipping and handling.

END OF SECTION

WOOD DOORS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

Supply plastic laminate faced wood doors.

1.2.2. Related Work Specified Elsewhere:

- | | |
|---|------------------|
| a. Installation of wood doors and hardware: | Section 06 20 00 |
| b. Supply of hardware: | Section 08 70 00 |
| c. Glazing of wood doors: | Section 08 80 00 |
| d. Supply of door grilles: | Division 24 |

1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies: Conform to the latest editions of the following:

- a. CSA 0132.2-Series 90, General Requirements for Wood Flush Doors.
- b. Architectural Woodwork Manufacturers Association of Canada "Quality Standards for Architectural Woodwork" (AWMAC).

1.4. SUBMITTALS

- 1.4.1. Shop Drawings: Submit Shop Drawings.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

- 1.5.1. Do not deliver doors to Site until Work of wet trades is complete and moisture readings of surfaces in proposed storage area are less than 18%.
- 1.5.2. Store doors flat on level surface in dry, well ventilated area inside building.
- 1.5.3. Cover top of pile with waterproof covering, but allow air circulation at sides.

1.6. WARRANTY

- 1.6.1. Warrant the Work of this Section against defect for a total of Three Years.

WOOD DOORS

- 1.6.2. Make good defects during warranty period by replacing defective doors in finish to match adjacent similar doors or of original door finish. Defects shall include, but not be limited to bubbling, delamination of faces or edges, warp, twist bow exceeding 6mm, and telegraphing of core. "Replace" as used herein includes installing hardware, finishing, hanging and fitting.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Conform to CSA 0132.2 for materials, except as specified otherwise herein.
- 2.1.2. Core Materials for Solid Core Doors:
Solid Eastern White Pine or Western Red Cedar conforming to CAN3-0188.1- M, Grade R.
- 2.1.3. Adhesive: CSA 0112 Series M, Type III.
- 2.1.4. Finish:
a. Plastic Laminate faced doors: Conforming to CAN3-A172-M, Standard Grade, 2mm thick, 0.50mm thick backing sheet, sanded one side by same manufacturer, colour and finish choice by Architect from Arborite, Formica, Nevamar or Wilsonart complete range.
- 2.1.5. Fire-rated Assemblies:
a. Fabricate assemblies required to have a fire-resistance rating to requirements of testing and labelling agency.
b. Supply assemblies required to have a fire-resistance rating complete with appropriate label of testing and labelling agency affixed in a visible but unobtrusive location.
- 2.1.6. Glass: See Door and Frame Schedule

2.2. FABRICATION AND MANUFACTURE

- 2.2.1. General:
a. Conform to CSA 0132.2 for solid core flush doors, except as specified otherwise herein.
b. Size doors for 2mm clearance of heads and jambs and 10mm at sills.
c. Prep rated doors for (but not limited to) heavyweight hinges (minimum 4 per leaf greater than 915mm wide and / or 2300mm high), continuous hinges, concealed vertical rod and mortise lock case exit devices, cylindrical locksets, and concealed overhead stops.
- 2.2.2. Flush Doors:

WOOD DOORS

- a. Core: Laminated wood framed or unframed core construction comprising narrow kiln dried wood strips not less than 40mm wide, grain running vertically and joints well staggered, electronically glue bonded;
- b. Edges: 19mm minimum thickness one piece full length Maple with plastic laminate faced jambs and painted head and underside edge.
- c. Sealing: Factory seal all door edges with one coat of stain sealer to closely match plastic laminate colour.
- d. Cutouts: Prepare doors in factory for any openings required. Fit loose stops and tack in place.

3. PART EXECUTION

3.1. INSTALLATION

- 3.1.1. Supply wood doors to Section 06 20 00, Finish Carpentry, for installation.

END OF SECTION

ALUMINUM DOORS, FRAMES and SCREENS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Double glazed entrance doors, hardware, frames, and screens.

1.2.2. Related Work Specified Elsewhere:

- | | |
|----------------------|------------------|
| a. Rough Framing: | Section 06 10 00 |
| b. Sealants: | Section 07 90 00 |
| c. Glass and Glazing | Section 08 80 50 |
| d. Gypsum Wallboard | Section 09 20 15 |

1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies:

Conform to requirements of the following:

- a. The Code, Part 4, Structural Design and part 5, Wind Water and Protection.
b. CAN3-S157-M, Strength Design In Aluminum;
c. CSA-W59.2-M, Welded Aluminum Construction;
d. CAN3 S16.1-M: For steel reinforcement and support brackets;
e. CAN/CSA-A440-M90 Windows;

1.4. SUBMITTALS

1.4.1. Shop Drawings:

- a. Submit Shop Drawings bearing seal of Ontario Registered Professional Structural Engineer responsible for design and fabrication.
b. Indicate reinforcing steel sizes and associated design loads.
c. Submit data sheets for Hardware.

1.5. WARRANTY

- 1.5.1. Warrant Work for a total of Two Years_Warrant insulating glass for a total of Ten Years.

ALUMINUM DOORS, FRAMES and SCREENS

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Aluminum Extrusions: AA 6063, T54 alloy and temper.
- 2.1.2. Finish: Clear anodized, to Aluminum Association AA-M12 C22 A31.
- 2.1.3. Interior Door Type and Example Manufacturer:
 - a. Entrance Doors:
 - 1. ThermaPorte 7700 by Alumicor.
 - 2. 190 Series by Kawneer.
 - 3. Approved equal.
- 2.1.4. Interior Frame and Screen Type and Example Manufacturer:
 - a. Frame Type:
 - 1. FlushGlaze TL1800 by Alumicor.
 - 2. TriFab VG Series 450 by Kawneer.
 - 3. Approved equal.
- 2.1.5. Hardware:
 - a. Butts unless stated otherwise in Door Schedule: Ball bearing, Stainless Steel, offset as required to accommodate full door swing at all doors 965mm and narrower.
 - b. Continuous Hinge: Continuous gear hinge, aluminum at all doors wider than 965mm.
 - c. Lever Handle Lockset: Adams Rite, Von Duprin or LCN or approved equal.
 - d. Latch Lock and strike plate: Adams Rite, Von Duprin or LCN or approved equal.
 - e. Closers: Adams Rite, Dorma or LCN or approved equal.
 - f. Weatherstripping including double door sweep.
- 2.1.6. Alum Breakshapes: 3mm thick, colour to match adjacent storefront / curtain wall frames.
- 2.1.7. Glazing: See Drawings and Section 08 80 00.
- 2.1.8. Sealants: Comply with Section 07 90 00.
- 2.1.9. Sills: Extruded aluminum c/w aluminum end caps, depth to suit. Colour to match frames.
- 2.1.10. Glass stops: lock-in screwless type.
- 2.1.11. Glazing tapes: macro-polyisobutylene, highly adhesive and elastic, with continuous built-in shim.

ALUMINUM DOORS, FRAMES and SCREENS

- 2.1.12. Weathering and glazing gaskets: extruded, black, closed cell or dense elastomer of durometer appropriate to function.
- 2.1.13. Fastening Devices: stainless steel with not less than 12% chromium content. Exposed screws or pop rivets are not acceptable.
- 2.1.14. Bituminous Paint: Conform to CGSB 1-GP-108M, Type 2.
- 2.1.15. Foamed In Place Insulation: Conform to Section 07 20 00.

2.2. FABRICATION

- 2.2.1. Take field measurements before starting fabrication.
- 2.2.2. Cut and mechanically fit joints with hairline contact.
- 2.2.3. Fabricate sections drilled, tapped, welded, holed or slotted as may be required for proper installation and fixing of components and accessories, and supplied complete with necessary anchors, clips, batts and screws.
- 2.2.4. Fabricate members with sharply defined profiles, straight, square and true with surfaces in proper planes and exposed finished surfaces and edges smooth and free from defects.
- 2.2.5. Fabricate framing, bracing, reinforcing, thermal breaks and anchors with structural properties adequate to safely sustain and withstand anticipated strains and stresses.
- 2.2.6. Design and fabricate clip angles and support brackets to withstand all loads.
- 2.2.7. Install bolts, where permitted, tight and thread nicked to prevent loosening of nuts.
- 2.2.8. Apply two shop coats of rust-inhibiting primer over all ungalvanized steel components.
- 2.2.9. Apply two shop coats of zinc chromate primer or bituminous paint to all surfaces where necessary to prevent corrosion, contact of dissimilar materials.
- 2.2.10. Foam open spaces in frames with insulation.

3. PART EXECUTION

3.1. INSTALLATION

- 3.1.1. Provide anchors to be built into structure to the appropriate Sections for setting in.
- 3.1.2. Seal joints between frame members and adjacent materials at window openings at outside and inside. Seal air and vapour barrier transition sheet around entire perimeter of each window frame. Comply with requirements of Section 07900, Sealants.
- 3.1.3. Supply fastenings and anchors required to be built in to Work of other Sections to other Sections as required, and direct their proper installation.

ALUMINUM DOORS, FRAMES and SCREENS

3.1.4. Provide extruded aluminum sills (with end caps) of proper size and thickness complete with concealed fastenings, to shed water and prevent entry of water into wall, and to suit wall condition. Make sills one continuous piece wherever practicable. Where length of sill necessitates joints to prevent oil-canning, or for other reasons, lap and make joints watertight.

3.1.5. Provide matching aluminum closer plates at exposed frame cavities.

3.2. GLAZING

3.2.1 Provide clearance equal to thickness of glass. Clean sealing surfaces at perimeter of glass, and sealing surfaces of rebates and stops, before applying any glazing material; use only solvents and cleaning agents recommended by glazing material manufacturer.

3.2.2. Centre glass in rebate to maintain specified clearances at perimeter on all four sides. Maintain centered position of glass in rebates on both sides of glass. Provide setting blocks as recommended by glass manufacturer as required, 70 to 90 points Shore "A" hardness, under each glass light; locate at quarter points.

3.3. ADJUST AND CLEAN

3.3.1. Remove foreign materials or droppings resulting from Work of this or other Sections.

3.3.2. Remove strippable protective coatings before they have thermoset, and leave glass, framing members, and adjacent Work clean and unblemished upon completion of Work.

3.3.3. Adjust all hardware for proper operation.

END OF SECTION

INTERIOR ALUMINUM SLIDING DOORS - MANUAL

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Interior aluminum, fully framed manual single sliding door c/w hardware and glazing.

1.2.2. Related Work Specified Elsewhere:

- a. Masonry: Section 04 20 00
b. Sealants: Section 07 90 00
c. Glass and Glazing Section 08 80 00
c. Gypsum Wallboard: Section 09 20 15

1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies:

Conform to requirements of the following:

- a. The Code, Part 4, Structural Design and part 5, Wind Water and Protection.
b. CAN3-S157-M83, Strength Design In Aluminum;
c. CSA-W59.2-M, Welded Aluminum Construction;
d. CAN3 S16.1-M: For steel reinforcement and support brackets;
e. CAN/CSA-A440-M90 Windows;
f. AMERICAN NATIONAL STANDARDS INSTITUTE;
1. ANSI Z97.1: Safety Glazing Materials Used in Buildings - Methods of Test.
2. ANSI A156.10: For Power Operated Pedestrian Doors; Sliding Doors section.

1.3.2. Qualifications of Fabricator and Installer:

- a. Minimum 10 years experience with installation of aluminum entrances.

1.4. SUBMITTALS

1.4.1. Shop Drawings and Submittals:

- a. Submit shop drawings as per Section 01 30 00.
b. Submit AAADM Certified Daily Safety Check.
d. Submit maintenance manual to General Contractor inclusion in Owner's Manuals.

INTERIOR ALUMINUM SLIDING DOORS - MANUAL

1.5. DESIGN REQUIREMENTS

- 1.5.1. Reinforce units to withstand handling stresses, temperature changes, the effect of shrinkage forces, dead and live loads, and related elements.
- 1.5.2. Design components to achieve sufficient freedom of movement of members to allow for thermal expansion and contraction within the range of air and surface temperatures as applicable to the location of the components without causing harmful buckling, opening of joints, distortion, undue stress on fasteners, breakage of sealants, or other detrimental effects.
- 1.5.3. Design light gauge aluminum Products to CSA CAN3-S157-M83.
- 1.5.4. Design and anchor work so that there will be no objectionable distortion or seriously stressed fastenings as the metal expands and contracts. Design and fabricate expansion joints to ensure that they will be, and remain, permanently watertight. Locate joints as shown on reviewed shop drawings.
- 1.5.5. Design mullions for maximum deflection of L/175.

1.6. DELIVERY, STORAGE and HANDLING

- 1.6.1. Brace and protect frame units to prevent distortion and damage in shipment and handling. Provide methods for lifting or hoisting units into place without causing damage.

1.7. WARRANTY

- 1.7.1. Warrant work for a total of Two Years. Warrant insulating glass for a total of Ten Years.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Aluminum Extrusions: AA 6063, T54 alloy and temper, 3mm (1//8") thick.
- 2.1.2. Finish: Clear Anodized finish: caustic etch exposed aluminum sections followed by anodic oxide treatment, to Aluminum Association AA-M12 C22 A31.
- 2.1.3. Door and Frame Type and Manufacturer:
 - a. Acceptable product and manufacturer:
 - 1. BESAM SL500 SA-PP – Surface applied, P-Panel, narrow stile single slide door system.
 - 2. Profiler-ICU Trackless Series, Type: 310 Single Slide by Horton Automatics. No threshold. Narrow stile profile with allowance for 25mm thick sealed glazing unit.

INTERIOR ALUMINUM SLIDING DOORS - MANUAL

3. Equal by Stanley Access Technologies or ASSA Abloy.
- b. Header: Sill to be aluminum with removable face plate.
- c. Carrier assemblies and overhead track: Manufacturer's standard carrier assembly that allows vertical adjustment of at least 3.2 mm (1/8"); consisting of urethane with precision steel lubricated ball-bearing wheels, operating on a continuous roller track. Support doors from carrier assembly by 50 mm (2") diameter anti-riser wheels with factory adjusted cantilever and pivot assembly. Minimum two ball-bearing roller wheels and two anti-rise rollers for each active leaf.
- d. Stile and rail door and sidelites:
 1. Fabricate from aluminum, 45 mm (1-3/4") deep with narrow. Incorporate concealed tie-rods that span full length of top and bottom rails or mechanically fasten corners with reinforcing brackets that are welded.
 2. Glazing stops and gaskets: Snap-on, extruded-security aluminum stops and preformed gaskets.
 3. Stile: Narrow stile; 63 mm (2 1/2") nominal width.
 4. Bottom rail: Minimum 100 mm (4") nominal height.
 5. Centre rail: 57 mm high (2 1/4"), located 1040mm (3'-5") above finished floor.
- e. Sidelites: Aluminum, 44 mm deep with narrow stile horizontal and vertical rails, 25mm horizontal intermediate muntins and 100mm bottom rail. Glazing prep for 25 mm glass at interior panels.
- f. Glass and glazing: 25mm sealed double glazed unit in accordance with Section 08 80 00.
- g. Frames and jambs: 44 mm (1-3/4") wide by 114 mm (4-1/2") deep.
- h. Breakaway feature: Provide release hardware that allows panel to swing out in direction of egress to full 90 degrees.
- i. Finish hardware:
 1. Positive latch: Manufacturer's standard non-keyed, spring loaded, latch that can secure sliding door panels to adjacent panels or jambs. Latch shall engage by closing action of door.
 2. Pulls: Provide two (2) manufacturer's standard off-set pulls.
- j. Make allowances for deflection of structure and temperature movement. Ensure that structural loads are not transmitted to aluminum work.
- k. Fit intersecting members to flush, hairline, and weather tight joints and mechanically fasten together.
- l. Conceal fastenings from view, unless otherwise indicated.
- m. Fabricate items fitting to the building from measurements taken on the Work as verified from the Work as built. Full responsibility for the proper coordination of the different components of the cladding and doors rests with this section.

INTERIOR ALUMINUM SLIDING DOORS - MANUAL

- n. Fabricate and assemble work of this section by skilled glazing installers. Do forming operations prior to finishing.
- o. Sealants: in accordance with Section 07 90 00.
- p. Stile and rail door and sidelites.

2.1.4. Fabrication

- a. Cut and mechanically fit joints with hairline contact.
- b. Cut and mechanically fit joints with hairline contact.
- c. Fabricate sections drilled, tapped, welded, holed or slotted as may be required for proper installation and fixing of components and accessories, and supplied complete with necessary anchors, clips, batts and screws.
- d. Fabricate members with sharply defined profiles, straight, square and true with surfaces in proper planes and exposed finished surfaces and edges smooth and free from defects.
- e. Fabricate framing, bracing, reinforcing, thermal breaks and anchors with structural properties adequate to safely sustain and withstand anticipated strains and stresses.
- f. Design and fabricate clip angles and support brackets to withstand all loads.
- g. Install bolts, where permitted, tight and thread nicked to prevent loosening of nuts.
- h. Apply two shop coats of rust-inhibiting primer over all ungalvanized steel components.
- i. Apply two shop coats of zinc chromate primer or bituminous paint to all surfaces where necessary to prevent corrosion, contact of dissimilar materials.

3. PART EXECUTION

3.1. INSTALLATION

- 3.1.1. Ensure that anchors and inserts, installed by others are adequate to meet specified requirements
- 3.1.2. Install in accordance with manufacturer's instructions; comply with ANSI A156.10.
- 3.1.3. Install work plumb, square, level, free from warp, twist and superimposed loads..
- 3.1.4. Fasten jambs at 450 mm (18") on centre maximum spacing with corrosion resistant anchors, and aluminum anchor plates as required.
- 3.1.5. Install hardware in accordance with templates.

INTERIOR ALUMINUM SLIDING DOORS - MANUAL

- 3.1.6. Apply clear sealant between frame members, sills and adjacent construction as a part of the work of this section and in accordance with Section 07 90 00.
- 3.1.7. Install hardware in accordance with templates.
- 3.1.8. Cleaning on completion of installation:
 - a. Remove deposits which affect appearance or operation of units.
 - b. Remove protective materials.
 - c. Clean surfaces by washing with clear water; or with water, and soap or detergent; followed by a clear water rinse.

END OF SECTION

FINISH HARDWARE

1. PART GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Conform to Division 01, General Requirements.

1.2 DESCRIPTION

- .1 Supply finish hardware.
- .2 Provide Finish Hardware Schedule.

1.3 RELATED SECTIONS

- .1 Installation of Hardware: Section 06 20 00
- .2 Steel Doors & Frames: Section 08 11 00
- .3 Wood Doors: Section 08 21 00

1.4 ALLOWANCES

- .1 Not applicable to this section.

1.5 REFERENCES

- .1 Recommended locations for Architectural Hardware for Standard Steel Doors and Frames - Door and Hardware Institute
- .2 Recommended locations for Architectural Hardware for Flush Wood Doors – Door and Hardware Institute
- .3 NFPA 80-Standard for Fire Doors and Windows
- .4 Sequence Format for Hardware Schedule – Door and Hardware Institute
- .5 Key Systems and Nomenclature - Door and Hardware Institute
- .6 Abbreviations and Symbols used in Architectural Door and Hardware Schedules and Specifications – Door and Hardware Institute

1.6 SUBMITTALS

- .1 Provide Hardware Schedule.
- .2 Provide product data sheets with the finish hardware schedule showing all items of hardware to be used on the project.
- .3 Samples: When requested, provide one sample of each hardware item complete with fasteners. Samples to be clearly labeled with their hardware schedule designation and manufacturers' name and model number. Samples will be incorporated into the work.
- .4 Templates: Furnish templates for distribution.
- .5 Keying Schedule: Provide keying schedule. Include all special keying notes and stamping instructions.
- .6 Operations and Maintenance Data: Prior to Substantial Performance, provide operation and maintenance information as follows:
 - .1 Maintenance instructions for each hardware item

FINISH HARDWARE

- .2 Catalogue cut sheets and Product Specifications for each product
- .3 Parts list for each product
- .4 Copy of final "as-built" finish hardware schedule
- .5 Copy of final keying schedule

1.7 WARRANTY

- .1 Provide the following warranties by the accepted manufacturers:

| Hardware Item | Length of Warranty |
|--|--------------------|
| Mortise Hinges | Lifetime |
| Locks (ND Series) | 7 yrs. |
| Exit Device | 3 yrs. |
| Door closers -mechanical | 10 yrs. |
| Door Operators - Electro mechanical | 2 yrs. |
| Door Hold open Devices - Electro mechanical | 2 yrs. |
| Overhead stops/holders | 2 yr. |
| Floor/Wall stops | 2 yr. |
| Electric Strikes/Key Switches/Power Supplies | 2 yr. |

1.9 MAINTENANCE

- .1 Maintenance Service: After the building is occupied arrange an appointment with the maintenance staff for instruction of proper use, servicing, adjusting and lubrication of hardware furnished. Submit to the Consultant a list of attendees and meeting date.

2. PART PRODUCTS

2.1 MANUFACTURERS

Products listed in the finishing hardware sets are from the manufacturers listed below:

| ITEM | MANUFACTURER NAME |
|-------------------------------|--|
| Full Mortise Hinges | Stanley or Schlage approved equal |
| Locksets, Latchsets/Deadbolts | Schlage or Ives approved equal |
| Exit Devices | Von Duprin or LCN approved equal |
| Surface/Flush Bolts | Ives or Glynn Johnson approved equal |
| Door Closers | LCN or Von Duprin approved equal |
| Overhead Door Holders/Stops | Glynn Johnson or Ives approved equal |
| Door Pulls/Flatware | Canadian Builders Hardware or Glynn Johnson approved equal |
| Wall/Floor Stops | Ives or Glynn Johnson approved equal |
| Weather/Smoke/Sound Seals | KN Crowder or Stanley, ASSA ABLOY or approved equal |

FINISH HARDWARE

| | |
|------------------------------------|--------------------------------------|
| Door Sweeps/Thresholds/Astragals | KN Crowder or Stanley approved equal |
| Automatic Door Operators/Actuators | LCN or Von Duprin approved equal |
| Electric Strikes | Von Duprin or LCN approved equal |
| Power Supplies | Von Duprin or LCN approved equal |

2.2 MATERIALS

- .1 Screws and Fasteners: All screws shall be matching finish to their product and shall be manufacturer's standard. Door closers, door holders and exit devices installed on fire rated wood doors and hollow metal doors shall be attached with sex nuts and bolts.

- .1 Hinges:
- ANSI A156.1, 2000. Supply hinges with NRP option on all doors where the hinge barrel is exposed on the secured side of the door. Comply with the manufacturer's published recommendations regarding number of hinges, weight, height and width of hinge.
- Provide three standard weight 114 mm high hinges on doors up to 915mm wide.
- Provide four heavy weight 127mm high hinges on doors greater than 915mm wide.
- Supply standard weight and heavy weight concealed bearing hinges on all doors equipped with door closers; ferrous (steel) material for all interior and/or fire-rated doors and stainless steel for exterior doors as listed in the hardware groups.

Continuous Hinges:

ANSI A156.26, 2000. Edge mount/guard continuous barrel-type aluminum hinges. Material 6063-T5 aluminum, clear satin finish (628). Cycle testing 1,500,000 repetitions exceeding ASTM standard 156.1, sized to door height, or; Edge mount/guard continuous barrel-type stainless steel hinges. Heavy duty 14 gauge 304 stainless steel. Cycle testing 1,500,00 repetitions exceeds ASTM standard 156.1. Hinge length to suit door height.

- .2 Surface/Flush Bolts:

Surface Bolts:

ANSI A156.16. Surface bolts to have 25mm throw for maximum security with concealed mounting that prevents vandalism. Constructed of heavy duty steel and ULC listed to required rating when used on the inactive door of a pair up to 2440mm in height.

Constant Latching Flush Bolts-Metal Doors:

ANSI A156.16. Constant latching flush bolts for metal doors to be ULC listed for required rating. Inactive door remains latched until the active door is opened, releasing the automatic bottom bolt and then the top bolt can be manually released. Inactive door will relatch automatically. Non-Handed with

FINISH HARDWARE

fire-rated models with auxiliary fire latch to eliminate the use of a bottom bolt. Supply dustproof strikes with all flushbolts.

.3 Locksets/Deadlocks/Privacy Sets: Smooth curved handle with sharp bend.

Grade 1 Deadbolt:

ANSI A156.5, 2001 Grade 1 deadbolt supplied with solid brass or bronze trim rings and 25mm throw, high strength steel alloy deadbolt with hardened steel roller that resists sawing and kick-in attacks. Metal shield protects bolt from attack through the door as well as hardened steel balls that protect mounting screws from drill attack.

Grade 1 Cylindrical:

ANSI A156.2, 1996, Series 4000 Grade 1 extra heavy duty residential, commercial, institutional and industrial applications. Latch bolts to be steel with minimum 12mm throw deadlocking on keyed and exterior functions. 19mm throw anti-friction latchbolt on pairs of fire doors. Provide manufacturer's standard wrought box strike for each latch or lock, with curved lip extended to protect frame. Locks and latchsets tested to exceed 3,000,000 cycles. Lock case to be steel. Locks to incorporate one piece spring cage and spindle. Precision solid brass 6-pin cylinder with nickel silver keys available in all Schlage keyways. All levers to be solid with no plastic inserts.

.4 Exit Devices/Device Trims/Mullions:

Narrow Style:

ANSI A156.3, 2001, Grade 1 cUL listed for panic hardware and fire exit hardware.

Supply exit devices with smooth mechanism case and fluid dampener to eliminate noise associated with exit device operations. Non-handed device with touchpad assemblies with no exposed fasteners and cast end caps, reinforced aluminum with stainless steel touchpad and raised edge to minimize pinching.

Heavy Duty:

ANSI A156.3, 2001, Grade 1 cUL listed for panic hardware and fire exit hardware. Supply exit devices and fire exit devices featuring coil compression springs on all device mechanism subassemblies and dead latching mechanisms for all active latchbolts. Supply exit devices with smooth mechanism case and fluid dampener to eliminate noise associated with exit device operations. Non-handed device with touchpad assemblies with no exposed fasteners and cast end caps, reinforced aluminum with stainless steel touchpad and raised edge to minimize pinching. Roller strikes to be standard on all rim and surface vertical rod devices. Doors greater than 915mm wide supply long bar exit devices, doors greater than 2150mm high supply extension rods were required. 1,000,000 cycle testing independently certified by ETL.

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Device Trim:

Supply device trim featuring recessed cylinder mounting and coil compression spring design with shear pin protection for all lever designs. Similar lever designs for exits as specified for locksets.

Concealed vertical rod latching where no center frame mullion.

.5 Door Closers:

Door closers to be Grade 1 ANSI A156. /UBC 7.2 and have the following features (see separate closer sections below for further information):

- fully hydraulic, rack and pinion action with high strength cast iron cylinders and one piece forged steel pistons.
- hydraulic fluid of a type requires no seasonal adjustments, and has constant temperature control from 49° C to -35° C.
- hydraulic regulation controlled by tamper-proof, non-critical screw valves, adjustable with a hex wrench.
- separate adjustments for backcheck, general speed and latch speed.
- include high efficiency, low friction pinion bearings.
- size 1 manual door closers to provide less than 5 pounds opening force on a 915mm door leaf.
- door closer with Pressure Relief Valves are not accepted.
- closers with painted finishes shall exceed a minimum 100-hour salt spray test, as described in ANSI A156. and ASTM B117.
- closers detailed with plated finishes shall include plated covers (or finish plates) , arms and visible fasteners.

Medium Duty Mechanical (Interior/Exterior):

ANSI A156.4, 2000, non-sized (1-6) and non-handed cylinder body to have 35mm piston diameter with 16mm single heat-treated shaft. Track closer cylinder body non-sized (2-4) or (1-2). Closers to have stamped main arm and forearm - forged steel main arm and forearm EDA and CUSH type arms). Optional arms to be interchangeable within the series of closers, except track arm type closers. Track arm type closers to have single lever arm with low friction track and roller assembly and provisions for an optional bumper to assist backcheck.

Heavy Duty Mechanical (Pull Side Mount):

ANSI A156.4, 2000, non-sized (1-5) and handed cylinder body to have 38mm piston diameter with 20mm double heat-treated shaft and certified to exceed ten million (10,000,000) full load operating cycles by a recognized independent testing laboratory. Track closers sized 1, 3 or 4. Closers to have forged steel main arm. Optional arms to be interchangeable within the series of closers, except track arm type closers. Track arm type closers to have single lever arm with low friction track and roller assembly and provisions for an optional bumper to assist backcheck.

Heavy Duty Mechanical (Top Jamb Mount):

ANSI A156.4, 2000, non-sized (1-5) and handed cylinder body to have 38mm

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piston diameter with 20mm double heat-treated shaft and certified to exceed ten million (10,000,000) full load operating cycles by a recognized independent testing laboratory. Track closers sized 1,3 or 4. Closers to have forged steel main arm. Optional arms to be interchangeable within the series of closers, except track arm type closers. Track arm type closers to have single lever arm with low friction track and roller assembly and provisions for an optional bumper to assist backcheck.

Heavy Duty Mechanical (Parallel Arm Mount):

ANSI 156.4, 2000, non-sized (1-5) and handed cylinder body to have 38mm piston diameter with 20mm double heat-treated shaft and certified to exceed ten million (10,000,000) full load operating cycles by a recognized independent testing laboratory. Track closers sized 1,3 or 4. Closers to have forged steel main arm and forearms. Optional arms to be interchangeable within the series of closers, except track arm type closers. Track arm type closers to have single lever arm with low friction track and roller assembly and provisions for an optional bumper to assist backcheck.

Heavy Duty Single Point Hold-Open (Pull and Push Side Mount):

ANSI A156.15, 2001, non-sized (1-4) and non-handed cylinder body to have 38mm piston diameter with 20mm double heat-treated shaft with adjustable single-point hold open function controlled by solenoid assembly located in a head frame mounted track. Track arm to have single lever arm with low friction track and roller assembly. Unit to have a momentary on/off switch board assembly for testing door release and also provides over-voltage protection.

Heavy Duty Electric Operator (Push Side Mount):

ANSI A156.19, 1997, non-sized (2-5) and non-handed cylinder body to have 38mm piston diameter with 20mm double heat-treated shaft. With forged steel main arm. Power operator to include:

- Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical code.
- "Second Chance" function: program within the on-board computer monitoring resistance during opening cycle. If resistance is present operator pauses for a few seconds, then attempts to open door again. If resistance does not exist door will open normally. However if resistance still exists, door will pause and the unit will time out and door will close.
- "Breakaway" drive system: System within the motor/clutch assembly. If the door is forced closed while in the opening cycle, the clutch slips preventing damage to the operator, door and frame.
- "Soft Start" motor control: required for controlled start once actuator is depressed to extend the service life of all drives components.
- "Built in Power Supply" to deliver 12V and 24V outputs up to a maximum of 1.0 amp.
- Certified by cUL for use on labeled doors.
- Independent adjustments for all electrically controlled functions within controller module.

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.6 Actuators:

Wall Type:

Wall plate switch to be hard-wired either 12VDC or 24VDC actuator with round, stainless steel touch plate in 110mm diameter. Engraved blue filled handicap symbol conforms to most accessibility codes. Units to include heavy grade components for vandal resistant mounting and weather resistant switch standard.

Jamb Type:

Jamb switch to be hard-wired either 12VDC or 24VDC actuator with rectangular stainless steel touch plate, 38mm wide by 110mm high. Engraved blue filled handicap symbol conforms to most accessibility codes. Designed to mount in a frame cutout projecting approximately 12mm from the frame. Units to include heavy grade components for vandal resistant mounting and weather resistant switch standard.

.7 Overhead Door Stops/Holders:

Heavy Duty Concealed Mounting:

ANSI A156.8, 2000, Grade 1. Concealed overhead stops/holders shall be non-handed for single or double-acting doors with a low profile channel, constructed of heavy gauge stainless steel material, is mortised in the door and jamb bracket is mortised in the doorframe. This allows for the unit to be fully concealed when door is in the closed position. Units to be field adjustable for function changes if required.

Medium-Duty Concealed Mounting:

ANSI A156.8, 2000, Grade 1. Concealed overhead stops/holders shall be non-handed for single/double-acting doors with a channel/slide-arm design and offset jamb bracket to allow for simple field modifications of functions. Unit to be fully concealed when door is in the closed position.

Medium-Duty Surface Mounting:

ANSI A156.8, 2000, Grade 1. Surface overhead stops/holders shall be non-handed for single-acting doors with a channel/slide-arm design and offset jamb bracket to allow for simple field modifications of functions. Channel to be surface mounted to the door with thru bolts and the jamb bracket is surface mounted to the jamb.

.8 Door Pulls/Kickplates:

Door Pulls: 25mm (1") diameter, stainless-steel;
Flatware: Stainless-steel, 1mm (.050 gauge).

Ives 8103EZHD Stright, 8145EZHD Off-set.

Kickplates:

0.050 gauge stainless steel material, flatware.

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.9 Floor/Wall Stops:

Floor Stops (Doors without Threshold):

ANSI A156.6, 2000. Floor stops to be 25mm overall height with 4.5mm base height for use on doors without thresholds. Heavy-duty cast dome stop constructed of brass/bronze with gray, non-marring rubber bumper.

Floor Stops (Doors with threshold or undercut doors)

ANSI A156.6, 2000. Floor stops to be 25mm overall height with 8mm base height for use on doors with thresholds or undercut doors. Heavy-duty cast dome stop constructed of brass/bronze with gray, non-marring rubber bumper.

Wall Stops (No Button on Locking Hardware):

ANSI A156.16, 1997. Wall stops to be constructed of heavy-duty brass base with special retainer cup that makes the rubber stop tamper resistant. Convex design of rubber bumper.

Wall Stops (Projecting Button on Locking Hardware):

ANSI A156.16, 1997. Wall stops to be constructed of heavy-duty brass base with special retainer cup that makes the rubber stop tamper resistant. Concave rubber bumper to avoid damage to locks with projecting buttons.

.10 Smoke/Sound Seals:

Swing Door: W-16N (jamb and head) and CT-748 (base) by KN Crowder or Stanley or LCN.

At Bi-parting doors: Pemko Seal Set Kit PEMKOSFKIT5 by ASSA ABLOY

| Item | Description | Location |
|-----------|-----------------------|--|
| 29394 | Gasket | Outer Jamb on door edge |
| 394 | Gasket | Outer Jamb on wall and Inner Jamb at Bi-parting doors |
| 950 | Metal Angle | Door Head mount to wall |
| PY900 | Gasket | Door Head mount to door |
| Planet SN | Automatic door bottom | Recess into door bottom |

.11 Weatherstrip/Door Sweeps:

Supply as Specified: W-24S (Door Sweep) by KN Crowder or Stanley or LCN.

.12 Thresholds: CT-44(Thermal break) by KN Crowder or Stanley or LCN.

Full depth of frame.

.13 Astragals: W.8.SS by KN Crowder or Stanley or LCN.

Full length of frame.

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- .1 Unless other wise specified, all finishes to be brushed chrome type 626.
- .2 Finishes are specified as follows:

| Item | BHMA# | Description | Base Materials |
|--------------------|-------|-----------------------|-----------------|
| Hinges | 630 | satin stainless steel | stainless steel |
| Hinges | 626 | satin chrome plated | brass/bronze |
| Hinges | 652 | satin chrome plated | steel |
| Lock Trim | 626 | satin chrome plated | brass/bronze |
| Exit Devices | 626 | satin chrome plated | brass/bronze |
| Dr Closer | 689 | powder coat aluminum | steel |
| Dr Pulls | 630 | satin stainless steel | stainless steel |
| Protective Plate | 630 | satin stainless steel | stainless steel |
| Door Stops/holders | | | |
| Overhead | 630 | satin stainless steel | stainless steel |
| Wall/Floor | 626 | satin chrome plated | brass/bronze |
| Thresholds | 628 | anodized aluminum | aluminum |
| Weatherstrip | 628 | anodized aluminum | aluminum |
| Miscellaneous | | | |
| Coat hooks | 626 | satin chrome plated | brass/bronze |
| Electric Strikes | 630 | satin stainless steel | stainless steel |
| Magnetic Locks | 628 | anodized aluminum | steel |

2.4 CYLINDERS, KEYING SYSTEMS AND KEY CONTROL

- .1 Provide temporary construction keying system during construction period. Permanent keys will be furnished to the Consultant prior to occupancy.
- .2 Permanent cylinders to be keyed by factory, combined in sets or subsets, master keyed or great grand master keyed, as directed by Owner. Permanent keys and cylinders shall be marked with the applicable blind code for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Patented". Keys and cylinder identification stamping to be approved by Consultant and Owner. Failure to properly comply with these requirements may be cause to require replacement of all or any part of the cylinders and keys involved as deemed necessary at no additional cost to the Owner.
- .3 Equip locks and cylinders with patent protected, full size cylinders with nickel silver blocking pin to check for patented feature on keys. Provide a minimum of six pins with nickel silver bottom pins. Cylinders must allow for multiplex master keying, combined to Owner's instructions.
- .4 Provide complete cross-index system, place keys on markers and hooks in the cabinet as determined by the final key schedule. Provide one each key cabinet and hinged panel type cabinet for wall mounting.
- .5 Deliver all permanent key blanks and other security keys direct to Consultant from factory by secure courier, return receipt requested. Failure to properly

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comply with these requirements may be cause to require replacement of all or any part of the cylinders and keys involved as deemed necessary at no additional cost to the Contract.

- .6 Key Material: Provide manufacturer's standard embossed keys of nickel silver to ensure durability.

3. PART EXECUTION

3.1 EXAMINATION

- .1 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.
- .2 Ensure that door frames and finished floor are sufficiently plumb and level to permit proper engagement and operation of hardware.

3.2 INSTALLATION

- .1 Install hardware at mounting heights as specified in the manufacturers templates or specific references in approved hardware schedule or approved elevation drawings.
- .2 Ensure that all locksets / latchsets / deadlocks are of the correct hand before installation to ensure that the cylinder is in the correct position. Handing is part of installation procedure.
- .3 Ensure that all exit devices are of the correct hand and adjust device cam for proper outside trim function prior to installation. Handing is part of installation procedure.
- .4 Delayed action door closers are to be adjusted to forty (40) second delay for handicapped accessibility and movement of materials. Time period to be approved by Owner.
- .5 Install head seal prior to installation of "PA"-parallel arm mounted door closers and push side mounted door stops/holders.
- .6 Counter sink through bolt of door pull under push plate during installation.
- .7 Mount all closers, automatic operators and hold-open devices with through bolts, as indicated in the finish hardware schedule.

3.3 FIELD QUALITY CONTROL

- .1 Before completion of the work but after the hardware has been installed, a certificate to the Consultant will be submitted stating that final inspection has been made and that hardware has been checked for installation and operation by a technician from the manufacturer and hardware Consultant.

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3.4 ADJUSTING AND CLEANING

- .1 Check and make final adjustments to each operating item of hardware on each door to ensure proper operation and function.
- .2 Instruct owner personnel in the proper operation, adjustment and maintenance of hardware.
- .3 Check all locked doors against approved keying schedule.

3.5 PROTECTION

- .1 Protect hardware from damage during construction period by removing and reinstalling or where necessary, using temporary hardware to maintain finish in new condition and maintain manufacturers warranty.

END OF SECTION

GLASS and GLAZING

PART 1 GENERAL

1.1. GENERAL REQUIREMENTS

1. Conform to Division 01, General Requirements.

1.2. SECTION INCLUDES

1. Glass and glazing for sections referencing this section for Products and installation.
2. Window Film.

1.3. RELATED SECTIONS

1. Section 07 90 00 - Joint Sealants: Sealant and back-up material.
2. Section 08 11 00 - Hollow Metal Doors: Glazed doors.
3. Section 08 21 00 - Wood Doors: Glazed doors.
4. Section 08 42 30 - Interior Aluminum Sliding Doors.

1.4. REFERENCES

1. ANSI Z97.1-04e1 - Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.
2. ASTM C542-05 - Specification for Lock-Strip Gaskets.
3. ASTM C864-05 - Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
4. ASTM C920-05 - Elastomeric Joint Sealants.
5. ASTM C1036-01 - Flat Glass.
6. ASTM C1172-03 - Laminated Architectural Flat Glass.
7. ASTM C1048-04 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
8. ASTM C1193-05a - Use of Joint Sealants.
9. ASTM C1503-01 - Silvered Flat Glass Mirror.
10. ASTM D412-06a - Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
11. ASTM D1149-99 - Test Method for Rubber Deterioration - Surface Ozone Cracking in a Chamber.
12. ASTM D2240-05 - Test Method for Rubber Property - Durometer Hardness.
13. ASTM E84-07 - Test Method for Surface Burning Characteristics of Building Materials.
14. ASTM E283-04 - Test Method For Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
15. ASTM E330-02 - Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
16. ASTM E773-01 - Test Method for Accelerated Weathering of Sealed Insulating Glass Units.
17. CAN/CGSB 12.1-M90 - Tempered or Laminated Safety Glass.
18. CAN/CGSB 12.2-M91 - Flat, Clear Sheet Glass.

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19. CAN/CGSB 12.3-M91 - Flat, Clear Float Glass.
20. CAN/CGSB 12.4-M91 - Heat Absorbing Glass.
21. CAN/CGSB 12.6-M91 - Transparent (One-Way) Mirrors.
22. CAN/CGSB 12.8-97 - Insulating Glass Units.
23. CAN/CGSB 12.9-M91 - Spandrel Glass.
24. CAN/CGSB 12.10-M76 - Glass, Light and Heat Reflecting.
25. CAN/CGSB 12.11-M90 - Wired Safety Glass.
26. CAN/CGSB 12.12-M90 - Plastic Safety Glazing.
27. CAN/CGSB 12.13-M91 - Patterned Glass.
28. CAN/CGSB 12.20-M89 - Structural Design of Glass for Buildings.
29. CGSB 19-GP-5M - Sealing Compound, One Component, Acrylic Base, Solvent Curing (Incorporating Amendment No. 1)
30. GANA (Glass Association of North America)
31. Glazing Manual (2004).
32. FGMA Sealant Manual.
33. Laminated Glazing Reference Manual (2006).
34. IGMAC (Insulating Glass Manufacturers Association of Canada) - Sealed Insulating Glass: Certification Program.
35. IGMA (Insulating Glass Manufacturers Alliance).
36. LSGA (Laminators Safety Glass Association) Laminated Glass Design Guide 2000.

1.5. PERFORMANCE REQUIREMENTS

1. Provide glass and glazing materials for continuity of building enclosure vapour retarder and air barrier:
 1. To utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapour retarder seal.
 2. To maintain a continuous air barrier and vapour retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.
2. Heat strengthen or temper all glass as required in order to meet the wind loads, failure probability specified or to accommodate thermal stresses and as required to meet building regulations.
3. Temper glass within 457mm of the floor.
4. Design horizontal rails and glazing up to 1100mm above finished floor in accordance with OBC requirements for guards.

1.6. SUBMITTALS

1. Product Data on Glass and Plastic Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
2. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colours.
3. Samples: Submit three (3) samples 300mm x 300 mm in size, exemplifying glass, plastic units, colouration and design.

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4. Samples: Submit 150mm long bead of glazing sealant, of each colour as selected by the architect.
5. Certificates: Certify that Products meet or exceed specified requirements.
6. Manufacturer's Certificate: Certify that sealed insulated glass, meets or exceeds specified requirements.

1.7. QUALITY ASSURANCE

1. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, GANA Laminated Glazing Reference Manual, IGMA and in accordance with the building code (Latest edition).
2. Maintain one (1) copy on site.

1.8. ENVIRONMENTAL REQUIREMENTS

1. Do not install glazing when ambient temperature is less than 10 degrees C (50 degrees F).
2. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.9. WARRANTY

1. Section 01 78 10: Warranties.
2. Provide a five (5) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
3. Provide a five (5) year warranty to include coverage for delamination of laminated glass and replacement of same.

PART 2 PRODUCTS

2.1. MANUFACTURERS - FLAT GLASS MATERIALS

1. Okalux Industries.
2. Other acceptable manufacturers offering functionally and aesthetically equivalent products;
 1. Guardian Glass.
 2. Old Castle Glass.
 3. Trulite Glass.
 4. Solera Glass.
3. Glass Types:
 1. GL1: Float Glass: to CAN/CGSB-12.3-M , clear, 6mm thick;
GL1a: 9mm thick;
GL1b: 12mm thick.
 2. GL2: Tempered glass: to CAN/CGSB-12.1-M ,Category II, Type 2
tempered, Class B, clear, minimum 6mm thick;
GL2a: 9mm thick;
GL2b: 12mm thick.

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3. GL3: Wired Glass: to CAN/CGSB-12.11-M, Type 1, Style 3, minimum 6mm thick;
GL3a: 9mm thick;
GL3b: 12mm thick.
4. GL4: Heat Absorbing Glass: to CAN/CGSB-12.4-M, minimum 6mm thick;
GL4a: 9mm thick;
GL4b: 12mm thick.
5. GL5: Silvered Mirror Glass: ASTM C1503, min. 6mm thick float glass "AA" quality, polished plate glass with 2 silvering coats, an electro-plated copper backing, and 1 coat of protective paint, or silvering quality and copper backed to requirements of CAN/CGSB-12.5-M86;
GL5a: 9mm thick;
GL5b: 12mm thick.
6. GL6: Laminated safety Glass: Type 1, Class B, Category II, total 6mm thick, clear float glass. Laminate with minimum 0.060 clear PVB film between panes;
GL6a: 3mm + 6mm with PVB of thicknesses of 0.03;
GL6b: 6mm + 6mm with PVB of thicknesses of 0.09.
7. GL7: Back painted Glass: CAN/CGSB 12.9, minimum 6mm thick, float or plate, tempered, with ceramic coating of colour selected by the Consultant;
8. GL8: Fire Rated Ceramic Glass:
 1. Tested in accordance with CAN4-S104-M and CAN4-S106-M.
 2. FireLite Plus : 20 minute to 3 Hours fire rated, impact safety rated glass ceramic by TGP Technical Glass Products - Precision Glass Services Inc.
10. GL9: Heat Absorbing Glass: CAN/CGSB-12.4-M91, minimum 6mm thick.
11. GL10: Lead Glass: Lead barium type glass with 60 percent heavy metal oxide, including minimum 55percent PbO. Minimum 7mm thick.
12. GL11: Two-way Mirror: Polycarbonate, 6mm thick.
13. Window Film: Opaque White Film, gloss finish, Writerglass by Levey Industries.

2.2. MANUFACTURERS - SEALED INSULATING GLASS UNITS

1. Acceptable manufacturers:
 1. Guardian Glass;
 2. Viracon Glass;

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3. Old Castle Glass;
 4. Trulite Industries
 5. AFGD Glass Inc.; www.afgd.com
 6. PPG Canada Inc. www.ppg.com
2. Sealed Insulating Glazing Units: Factory sealed, double glazed units conforming to CAN2-12.8-M.
 1. GL X1: Vision Unit
Outboard glass - 6mm clear tempered glass,
12mm superspacer and argon filled air space,
Inboard glass - 6mm clear tempered glass.
 2. GL X2: Vision Unit
Outboard glass - 6mm clear tempered glass,
18mm superspacer and argon filled air space,
Inboard glass - 6mm clear tempered glass
 3. Warm edge non-metallic polyisobutylene or thermo plastic spacer.
SuperSpacer by Edgetech or I-Spacer by Technoform or equal.
 4. Mitred corners.
 5. Edge Seal Material: grey colour.
 6. Design horizontal rails and glazing up to 1100mm above finished floor in accordance with Code requirements for guards.
- 2.3. GLAZING COMPOUNDS
1. Silicone Sealant: Dow 790 or approved equal. Colour as selected by Architect.
 2. Spectrum Pro-Glaze. Color as selected by Architect.
 3. Dow 995. Colour as selected by Architect.
- 2.4. GLAZING ACCESSORIES
1. Manufacturer as mentioned below for each accessory.
 2. Lock Strip Gaskets: ASTM C542, ozone-resistant neoprene compound, with lock-strip (zipper) component that friction-fits into position to retain glass pane/unit, H-shape, or reglet type, tensile strength of 14 MPa (2000 psi) tested to ASTM D412, Durometer hardness of 75 tested to ASTM D2240, sized to accommodate glass thickness.
 3. Setting Blocks: 40 to 60; 80 to 90 Shore A durometer hardness tested to ASTM D2240, EPDM neoprene rubber by Good year Industrial Products or approved equal. Length of 25 mm for each square metre of glazing or minimum 100 mm x width of glazing rabbet space minus 1.5 mm x height to suit glazing method and pane weight and area.
 4. Spacer Shims: Neoprene, 40 to 50; 50 & 80 Shore 'A' durometer hardness + - 5 respectively EPDM neoprene rubber by Goodyear Industrial Products. Resistance to sunlight, weathering, oxidization and permanent

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- deformation under load and compatibility with all materials in the glazing system, shall be the prime essential of spacers, shims and setting blocks.
5. Glazing Tape: "440 Tape" by Tremco Ltd., or approved equal
 6. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapour retarder seal.
 7. Mirror adhesive: "Mirro-Mastic" by Palmer products Corporation or approved equal.
 8. Stainless Steel 'J' Strip: Type #302, #4 brushed finish, non-magnetic, 16 ga thick.
 9. Glazing Gaskets: Black Neoprene compression gasket of sufficient thickness to suit glazing channel retaining slot to be under 25% compression minimum when installed.
 10. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1. EXAMINATION

1. Verify that openings for glazing are correctly sized and within tolerance.
2. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2. PREPARATION

1. Clean contact surfaces with solvent and wipe dry.
2. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
3. Prime surfaces scheduled to receive sealant.
4. Install sealant in accordance with manufacturer's written instructions.

3.3. INSTALLATION

1. Install glazing in accordance with material manufacturer's directions.
2. Glaze in temperatures above +5 degree C.
3. Comply with FGMA (Flat glass marketing Assoc.) glazing manual.
4. Orient heat strengthened and tempered glass so that roller marks are horizontal.

3.4. EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

1. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with sealant.
2. Place setting blocks at 1/3 points with edge block no more than 150 mm from corners.
3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

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4. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
5. Trim protruding tape edge.

3.5. INSTALLATION - EXTERIOR BUTT GLAZED METHOD (SEALANT ONLY)

1. Temporarily brace glass in position for duration of glazing process. Mask edges of glass at adjoining glass edges and between glass edges and framing members.
2. Temporarily secure a small diameter non-adhering foamed rod on back side of joint.
3. Apply sealant to open side of joint in continuous operation; thoroughly fill the joint without displacing the foam rod. Tool the sealant surface smooth to concave profile.
4. Permit sealant to cure then remove foam backer rod. Apply sealant to opposite side, tool smooth to concave profile.
5. Remove masking tape.

3.6. INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

1. Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.
2. Place setting blocks at 1/3 points with edge block no more than 150mm corners.
3. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
4. Place glazing tape on free perimeter of glazing in same manner described above.
5. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
6. Knife trim protruding tape.

3.7. INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

1. Cut glazing tape to length and install against permanent stops, projecting 1.6 mm above sight line.
2. Place setting blocks at 1/3 points with edge block no more than 150mm from corners.
3. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
4. Install removable stops, spacer shims inserted between glazing and applied stops at 600 mm and 6 mm below sight line.
5. Fill gaps between pane and applied stop with silicone type sealant to depth equal to bite on glazing, to uniform and level line.
6. Trim protruding tape edge.

3.8. INSTALLATION - PLASTIC FILM

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1. Install plastic film with adhesive, applied in accordance with film manufacturer's written instructions.
2. Place without air bubbles, creases or visible distortion.
3. Fit tight to glass perimeter with razor cut edge.

3.9. FIELD QUALITY CONTROL

1. Inspection will monitor quality of glazing.

3.10. MANUFACTURER'S FIELD SERVICES

1. Glass and glazing product manufacturers to provide field surveillance of the installation of their Products.
2. Monitor and report installation procedures & unacceptable conditions.

3.11. CLEANING

1. Remove glazing materials from finish surfaces.
2. Remove labels after Work is complete.
3. Clean glass and adjacent surfaces.

3.12. PROTECTION OF FINISHED WORK

1. After installation, mark pane with an 'X' by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

END OF SECTION

1. PART GENERAL

1.1.1. Conform to Division 01, General Requirements.

1.2.1. Work Included:

- ### 1.2.2. Related Work Specified Elsewhere:

- ### 1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies

- a. CSSBI Light Weight Steel Framing Manual.
- b. CSA A82.21-M, Gypsum and Terms Relating to Gypsum Products;
- c. CSA A82.27-M, Gypsum Board Products;
- d. CSA A82.31-M, Gypsum Board Application;
- e. ASTM C645-88, Specification for Non-load Bearing Steel Studs, Runners, and Rigid Furring Channels for Screw Application of Gypsum Board.
- f. ASTM E336, Method for Measurement of Airborne Sound Insulation In Buildings;
- g. ASTM E413, Classification for Rating Sound Insulation.

1.3.3. Allowable Tolerances:

- ## 1.4 SUBMITTALS

1.4.1. Shop Drawings: Submit Shop Drawings, showing all elements of adjacent walls,

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floors and roof framing systems and calculations for systems showing design loads and deflections, bearing the stamp and seal of a Professional Engineer licensed in the Province of Ontario

1.5. JOB CONDITIONS

- 1.5.1. Commence this work only after air temperature has been maintained at 13°C to 21°C for at least 24 hours before and can be maintained at same until joint cement and adhesives are fully cured, with proper ventilation to provide dry condition.
- 1.5.2. Provide adequate ventilation to eliminate excessive moisture before commencing and during work to ensure proper drying of joint filler. Do not force dry joint treatment.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Gypsum Board: Conforming to CSA A82.27-M, 1.2m wide by longest lengths practicable.
Thickness, unless shown or specified otherwise on Drawings:
Standard board: 15.6mm at walls;
Standard board: 15.6mm at ceilings;
Fire-rated board: 15.6mm, Type X at fire rated assemblies;
Moisture Resistant board: 12.7mm denshield at tile and 15.6mm Type X TileBacker at fire rated assemblies ;
Moisture Resistant board: 12.7mm greenboard at washrooms;
Abuse resistant board: 12.7mm fiberock, 15.6mm Type X at fire rated assemblies.
- 2.1.2. Steel Studs: Min 0.53mm core, Z275 galvanized, with min. 31.8mm knurled faces and min 6mm return, knock-outs in web for horizontal services and bracing. Increase core thickness and stud depth for heights over 2400mm as indicated below:
 - a. 92mm x 25ga 3430mm.
 - b. 92mm x 20ga 4270mm.
 - c. 92mm x 16ga 5490mm.
 - d. 152mm x 25ga 4880mm.
 - e. 152mm x 20ga 6400mm.
 - f. 152mm x 16ga 7600mm.
- 2.1.3. Structural Steel Studs: 16 gauge, Z275 galvanized, depth as indicated.

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- 2.1.4. Stud Runner Channels: As per studs with min. 25mm flange, widths to suit.
- 2.1.5. Furring Channels: 22.2mm deep, 35mm knurled face, min. 0.53 core, Z275 galvanized.
- 2.1.6. Ceiling Carrying Channels: Cold rolled, 0.606 kg/m, 38mm x 15mm min., Z275 galvanized.
- 2.1.7. Tie Wire: Min. 1.588mm soft annealed galvanized steel.
- 2.1.8. Corner and Casing Bead: Min 0.38 mm core, Z275 galvanized, perforated flanges.
- 2.1.9. Screws: Self drilling, self-tapping, gypsum wallboard screws. Purpose made for penetrating studs.
- 2.1.10. Reinforcing Tape: As recommended by board manufacturer.
- 2.1.11. Joint Treatment Cement: Joint, topping and laminating compounds as recommended by board manufacturer.
- 2.1.12. Control Joint: Of minimum 0.53mm steel core, Z275 galvanized, perforated flanges.
- 2.1.13. Acoustic Insulation: as per Section 07 20 00.

3. PART EXECUTION

3.1. INSTALLATION

3.1.1. General:

- a. Conform to latest edition of CSA A82.31-M, except as otherwise specified herein.
- b. Co-operate with mechanical, electrical and other trades to accommodate fixtures, fittings and other items in wallboard areas.

3.1.2. Metal Stud Framing:

- a. Install metal studs at 400mm maximum spacing and at every 400mm centre across any wall surface.
- b. Install true, straight and square with wall plane.
- c. Provide full stud framing around all openings.
- d. Provide double studs each side of all openings and infill studs above and below openings as per Sentence "a." above.
- e. Provide double studs at head and sill of all openings under 1200mm wide.
- f. Provide reinforced box stud assemblies at all openings over 1200mm wide.
- g. Fabricate wall panels with screwed on top bottom runner channels.

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- h. Erect wall stud panels to provide for finished Work within specified tolerance.
 - i. Brace with secured cross-bridging at every 1200mm vertically all walls that exceed 2700mm.
 - j. Brace as above walls between 2400mm high and 2700mm high with one row of cross-bracing at mid-height.
 - k. At acoustical walls, bed both edges of perimeter studs and runners in bead of sealant Type 5 (Section 07 90 00).
- 3.1.3. Ceiling Framing:
- a. Carrying Channels: Where ducts are large or where combination of ducts, or combination of ducts and other items interfere so that hanger spacing exceeds 1200mm, increase size of main runner channels accordingly to sustain increased loading and span. Space channels at maximum 1200mm o.c. and not more than 150mm from boundary walls, interruptions of continuity and changes in direction. Where splices are necessary, lap members at least 200mm and wire each end with minimum double strand of tie wire. Avoid clustering or lining up splices. Attach channels to rod hangers by bending hanger sharply under bottom flange of runner and securely wire in place with a saddle tie.
 - b. Cross Furring: Erect wallboard furring channels at right angles to carrying channels. Space wallboard furring channels at 600mm o.c. and not more than 150mm from boundary walls, interruptions in ceiling continuity and changes in direction. Secure wallboard furring channels to each support with a double strand of tie wire or with clip approved by manufacturer of furring components. Splice joints by nesting and tying channels together.
- 3.1.4. Moisture Resistant Board:
- Provide moisture resistant board at all washroom, changeroom and shower locations. Erect board with long dimension at right angles to supports. Locate end joints over supporting members.
- 3.1.5. Gypsum Board; Application:
- a. Ceilings and Bulkheads: Apply gypsum board with screws. Erect wallboard with long dimension at right angles to supports, stagger joints when applied over plywood protection board. Locate end joints over supporting members. Space screws at 200mm o.c.
 - b. Walls: Apply gypsum board to studs and strapping with screws. Erect board with long dimension at right angles to supports. Locate end joints over supporting members. Locate vertical joints at least 300mm from the jamb lines of openings. Space screws at 200mm o.c. at board edges and 300mm o.c. on board field. Leave minimum 10mm gap between top of board and structure above to accommodate deflection of structure.

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- c. Fire Protection of Beams and Ducts: 2 layers of 15mm fire rated board on studs or furring at 400mm maximum spacing with board secured to framing with screws at maximum 150mm centres and wire mesh between layers of board if required.
 - d. Ceiling and Partition Fasteners: Perimeter screws shall be not less than 9mm nor more than 13mm from edges and ends, and shall be opposite the screws on adjacent boards. Screws shall be driven with a power screw gun and set with countersunk head slightly below the surface of the board.
- 3.1.6. Access Doors:
- a. Build-in doors supplied by Mechanical Division, where required in wallboard installations, in accordance with manufacturer's recommendations, to match and blend with surrounding surfaces if exposed.
- 3.1.7. Control Joints:
- a. In the absence of Drawing notations, Provide control joints in the following approved locations:
 - 1. Where gypsum board is installed over masonry control joints,
 - 2. Abutting structural elements,
 - 3. Dissimilar walls and ceilings,
 - 4. Changes in substrate construction,
 - 5. Approximate 10m spacing on long partition runs,
 - 6. Approximate 15m spacing on large ceilings, and
 - 7. Changes in superficial area.
 - b. Install in accordance with manufacturer's instructions.
 - c. Double furring members or studs at control joints, placing one furring member or stud on each side of control joint.
- 3.1.8. Finishing:
- a. Finish all joints.
 - b. Plaster Beads: Install casing beads where gypsum wallboard butts against a surface having no form concealing its juncture, and where shown. Erect casing beads plumb or level with minimum number of joints. Do not use scrap pieces.
 - c. Joint Treatment: Filling shall be done either manually, using the tools of the trade, or by a mechanical taping and filling machine of proven efficiency. Apply joint filler, tape and topping cement according to manufacturer's directions. The finish Work shall be smooth, seamless, plumb, true and flush, having square, neat corners.

END OF SECTION

ACOUSTICAL TILE CEILINGS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide suspended ceiling system, hangers, tees, tiles and acoustical and non-acoustical ceiling panels and systems for a complete acoustic ceiling.
- b. Provide metal ceiling system at interior locations and exterior soffits.

1.2.2. Related Work Specified Elsewhere:

- a. Gypsum board ceilings: Section 09 20 15
- b. Mechanical: Division 24
- c. Electrical: Division 26

1.3. QUALITY ASSURANCE

Acoustic Ceiling System to be ASTM 635 Light Duty Standard, installed in accordance with ASTM 636.

1.4. SUBMITTALS

- 1.4.1. Shop Drawings: Submit Shop Drawings indicating overall layout, pattern, and details
- 1.4.2. Samples: Submit duplicate full size samples of each type acoustical units of all patterns available in specified acoustic tiles to Architect for final selection.
- 1.4.3. Maintenance Materials: Supply a minimum of one full carton of each type of acoustic tile, packed in original cardboard cartons, marked with manufacturer and product name, for future repairs and place where direct by the Architect
- 1.4.4. Reference Data: Provide finish materials catalogue cuts and maintenance instructions for insertion in Operating Manuals and Reference Data, Section 01 33 00.

1.5 MOCK-UP

- 1.5.1. Construct mock-ups in accordance with Section 01 45 01 - Quality Control.
- 1.5.2. Construct mock-up where directed.
- 1.5.3. Allow two (2) working days for inspection of mock-up by Owner's Representative before proceeding with ceiling work.

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- 1.5.4. When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

- 1.6. Environmental Requirements

- 1.6.1. Permit wet work to dry before commencement of installation.
- 1.6.2. Maintain uniform minimum temperature of 15°C and humidity of 20 - 40% before and during installation.
- 1.6.3. Store materials in work area 48 hours prior to installation.

- 1.7. Extra Materials

- 1.7.1. Provide extra materials of acoustic units in accordance with Section 01 77 01 - Closeout Submittals.
- 1.7.2. Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.
- 1.7.3. Extra materials to be from same production run as installed materials.
- 1.7.4. Clearly identify each type of acoustic unit, including colour and texture.
- 1.7.5. Deliver to Owner's Representative, upon completion of the work of this section.
- 1.7.6. Store where directed by Owner's Representative.

- 1.8. Closeout Submittals

- 1.8.1. Provide maintenance data for acoustical ceilings for incorporation into manuals.

2. PART PRODUCTS

- 2.1. MATERIALS

- 2.1.1. Acoustic Tile: Noted as 'ACT1' and 'ACT2' on Drawings - See Room Finish Schedule on Drawings for Series and manufacturer.
- 2.1.2. Acoustic Metal Ceiling (MC1 and MC2): See Room Finish Schedule for Series and manufacturer.
- 2.1.3. Suspension system: Torsion spring system consisting of main tees and cross tees complete with panel location fin for panel alignment Ceilenico by Decoustics, or approved alternate.

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- a. Finish: All metal products steel galvanized to Z275. prepaint all exposed surfaces, CGSB 31-GP-116M, and then a baked-on factory finish with satin sheen enamel in white to match acoustic tile.
- b. Main Tees: Nominal 3600mm long, rectangular bulb at top of web, 38mm high web, 19mm face width designed to lock into consecutive lengths to function structurally as a single unit with face at joint perfectly aligned and presenting a tight inconspicuous seam.
- c. Cross Tees: 610mm long, same design as main tee, except designed to connect at main tee to form positive lock without play, loss or gain in grid dimensions with offset over-ride of face over main tee face flange to provide flush tee faces at joints.
- d. Edge Moulding: Min. of 0.46mm thick steel, 14mm wide legs, capable of supporting all superimposed loads.
- e. Hold-Down Clips: Of 0.42mm thick spring steel as recommended by acoustic tile manufacturer, and special access clips where specified
- f. Fixture Clips: As recommended by acoustic tile manufacturer.
- g. Tie Wire: Min. 1.59mm soft annealed steel wire.

3. PART EXECUTION

3.1. PREPARATION

- 3.1.1. Co-ordinate with Section 09 12 00 to ensure adequate and properly placed hangers.
- 3.1.2. Co-operate with mechanical, electrical and other trades to accommodate fixtures, fittings and other items in acoustic ceilings.

3.2. INSTALLATION

- 3.2.1. Neatly and symmetrically fit and run suspended ceiling to true lines, evenly balance in all areas to pattern as directed.
- 3.2.2. Unless noted on drawings, centre ceiling system on room axis leaving equal border tiles or panels not less than 1/2 a full width.
- 3.2.3. Cut recess into tiles at partition walls that are to be set up into tiles. Seal cut portion of tile with paint to match tile finish.
- 3.2.4. Recessed items shall re be centered on acoustical panels, except where indicated otherwise. Consult with mechanical and electrical trades to co-ordinate the work. Provide support where required.
- 3.2.5. Turn bottom of hanger rods or straps upwards at tees and securely wrap 3 times with tie wire, or wrap hanger wire around tees and double twist tie.

ACOUSTICAL TILE CEILINGS

- 3.2.6. Run main tees at right angles to length of light fixtures.
- 3.2.7. Space main tees 600mm o.c. in one direction and securely tie to hangers.
- 3.2.8. Space cross tees 1220mm o.c. at right angles to the main tees and properly lock at intersections.
- 3.2.9. Level the suspended systems with a maximum tolerance of 1/8" (3mm) over 3600mm and 6mm over all.
- 3.2.10. Use the longest practical lengths of tees, furring and running channels to minimize joints. Make joints square, tight, flush and reinforced with concealed splines. Assemble framework to form a rigid and interlocking system.
- 3.2.11. Use edge moulding where ceiling abuts vertical surface.
- 3.2.12. Join abutting sections of main tees to unify sections structurally and present an unnoticeable joint.
- 3.2.13. Intersections of all tees and edge moulding shall be flush on the exposed surface.
- 3.2.14. Provide fixture clips at all four corners of electrical fixtures.

END OF SECTION

ACOUSTIC WALL PANELS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

Provide acoustic wall panels including mounting and suspension systems.

1.2.2. Related Work Specified Elsewhere:

- a. Suspension hooks Section 06 10 00
- b. Gypsum Board Section 09 20 15

1.3. SUBMITTALS

- 1.3.1. Shop Drawings: Submit in accordance with Section 01 30 00.

- 1.3.2. Samples: Submit samples of all patterns and colours available for selection by Architect.

- 1.3.3. Product Test Report: From qualified testing agency indicating panels comply with requirements.

1.4. QUALITY ASSURANCE

- 1.4.1. Fire Test Report: Provide acoustic wall panels with Class A Flammability rating and the following surface-burning characteristics as per ASTM E 84:

- a. Flame spread: 25 or less.
- b. Smoke developed: 450 or less.

- 1.4.2. Fire Test Report: Provide acoustical test report indicating the wall panels meet 0.85 NRC per ASTM C-423

1.5. WARRANTY

Warrant panels and installation for a period of 2 years.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Acoustic Wall Panels: Noted as 'AWP1' on Drawings - See Room Finish Schedule on Drawings for Series and manufacturer

- 2.1.2. Mounting: Metal impaling clips designed to support weight of panels, mechanically attached to wall substrate to manufacturers standard pattern with base support brackets where required for additional support.

ACOUSTIC WALL PANELS

3. PART EXECUTION

3.1. FABRICATION

- 3.1.1. Fabricate panels to largest sizes possible.
- 3.1.2. Reinforce back of ceiling panels to prevent warpage.

3.2. INSTALLATION

- 3.2.1. Install wall and ceiling panels in accordance with manufacturer's written instructions.
- 3.2.2. Wall Panels:
 - a. Install wall panels on concealed vertical furring and horizontal rail mounting for free air movement behind panels.

END OF SECTION

ACOUSTIC CEILING PANELS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

Provide acoustic ceiling panels including mounting and suspension systems.

1.2.2. Related Work Specified Elsewhere:

- a. Suspension hooks Section 06 10 00
- b. Gypsum Board Section 09 20 15

1.3. SUBMITTALS

1.3.1. Shop Drawings: Submit in accordance with Section 01 30 00.

1.3.2. Samples: Submit samples of all patterns and colours available for selection by Architect.

1.3.3. Product Test Report: From qualified testing agency indicating panels comply with requirements.

1.4. QUALITY ASSURANCE

1.4.1. Fire Test Report: Provide acoustic wall panels with Class A Flammability rating and the following surface-burning characteristics as per ASTM E 84:

- a. Flame spread: 25 or less.
- b. Smoke developed: 450 or less.

1.4.2. Fire Test Report: Provide acoustical test report indicating the wall panels meet 0.85 NRC per ASTM C-423

1.5. WARRANTY

Warrant panels and installation for a period of 2 years.

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. Acoustic Ceiling Panels: Noted as Acoustic Panel (AP) on Drawings - See Room Finish Schedule on Drawings for Series and manufacturer.

2.1.2. Mounting: Mechanically fasten to underside of the interior core of the existing concrete waffle slabs.

ACOUSTIC CEILING PANELS

3. PART EXECUTION

3.1. PRE-FABRICATION

3.1.1. Site measure all panel size locations prior to fabrication.

3.1. FABRICATION

3.1.1. Shop fabricate panels to custom sizes as measured on site.

3.1.2. Reinforce back of ceiling panels to prevent warpage.

3.2. INSTALLATION

3.2.1. Install wall and ceiling panels in accordance with manufacturer's written instructions.

END OF SECTION

RUBBER SHEET FLOORING

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

Provide rubber sheet flooring, base, sub-floor preparation.

1.3. REFERENCE STANDARDS

- a. ASTM F1859 Rubber Sheet Floor Covering Without Backing.

1.4. SUBMITTALS

1.4.1. Samples:

- a. Submit samples in accordance with Section 01 30 00.
- a. Submit duplicate 200mm x 250mm samples of all flooring materials, in specified colours and patterns.
- a. Submit duplicate 102mm x 102mm samples of prefabricated bases.

1.4.2. Maintenance Materials:

Supply 2% (accent) to 5% (field) extra tiles of each colour in unopened packages for future repairs. Place where directed.

1.4.3. Reference Data:

Submit complete list of Products, colours and patterns used to Operating Manuals and Reference Data specified in Section 01 30 00 as specified therein.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Rubber Sheet Flooring: Noted as 'RF1, RF2 and RF3' on Drawings, 2mm thick - See Drawings for manufacturer, series and colours.
- 2.1.2. Rubber Base: by flooring Manufacturer. Match sheet flooring colour and pattern.
- 2.1.3. Welding Rods: by flooring Manufacturer. Match sheet flooring colour.
- 2.1.4. Tactile Warning Strips: Manufactured by Johnsonite or Allstate or Roppe, colour and series selected by Consultant from complete range, conforming to most recent ISO 23599:2012:

RUBBER SHEET FLOORING

- 2.1.5. Primer: As recommended by adhesive manufacturer.
- 2.1.6. Adhesives: As recommended by manufacturers
- 2.1.7. Levelling underlayment:
Ardex 'Liquid BackerBoard Self-Levelling Underlayment' complete with Ardex 51' primer, Surface Preparation 567 by TEC, or approved equal by Reardon Co. or Mapei, non-shrink compound.
- 2.1.8. Thresholds and Edge Reducer Strips: One piece, PVC by Johnsonite or Allstate or Roppe.
 - a. SLTC-XX-A at 1/4" to 1/8" materials. Slim Line Transition at curved floor transitions
 - b. CTA-XX-A at 1/4" to 1/8" materials. Transition Adaptor
 - c. CTA-XX-HT at 1/4" to 0.08"/2mm. Wheeled Traffic Transition
 - d. CTA-XX-J at 1/4" to floor. Wheeled Traffic Transition
 - e. CTA-XX-N at 1/8" to 1/8" materials. Wheeled Traffic Transition

3. PART EXECUTION

3.1. PREPARATION

- 3.1.1. Prepare sub-floor in accordance with recognized industry standards and established in Manufacturer's installation instructions. Use only preparation materials that are acceptable to the Manufacturer's specification criteria.
 - a. Mechanically remove all substances from sub-floor that would interfere with or be harmful to the installation.
 - b. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects following written manufacturer's instructions
- 3.1.2. Verify that sub-floor is smooth, level, and flat within specified tolerances of ASTM F710 and other relevant guidelines.
- 3.1.3. Verify that substrate surface is dust-free. Installing parties shall not use petroleum- or wax-based sweeping compounds.
- 3.1.4. Verify that concrete surfaces are ready for installation by following industry standards and the manufacturer's installation guidelines.
- 3.1.5. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2. INSTALLATION

- 3.2.1. Resilient Sheet Flooring Application:
 - a. Apply adhesive uniformly with an approved notch tooth spreader at the recommended rate. Do not spread more adhesive than can be covered before initial set takes place.

RUBBER SHEET FLOORING

- b. Lay flooring with seams parallel to building lines and parallel to each other, to produce a minimum number of seams. "Piecing-in" with scrap or leftover material will not be accepted.
- c. Double cut sheet joints and continuously cold weld in rooms indicated on Drawings.
- d. Run patterned sheets parallel to corridor traffic, and parallel to long dimension of rooms. Border widths minimum 1/3 width of full material width.
- e. Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- f. Roll floor in accordance with manufacturer's recommendations to ensure adhesion and elimination of air pockets.

3.2.3. Base:

- a. Install bases in accordance with manufacturer's recommendations.
- b. Use full length pieces, accumulated short lengths not permitted.
- c. Butt joints and keep flush without gaps.

3.2.4. Thresholds and Edge Reducer Strip:

- a. At edge of dissimilar floor finishes, resilient and other flooring, other than carpet, Provide one piece thresholds and edge reducer strips.
- b. Secure in place with adhesive to manufacturer's recommendations.

3.3. ADJUST AND CLEAN

3.3.1. Clean:

Remove surplus adhesive from face of tiles and base as Work progresses. As soon as possible after adhesive has set thoroughly, clean tile and base surfaces in accordance with manufacturer's directions.

END OF SECTION

RESILIENT TILE FLOORING

†1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

Provide resilient tile flooring, resilient base, interior thresholds and edge reducer strips.

1.3. SUBMITTALS

- 1.3.1. Samples: Submit samples in accordance with Section 01300.

- 1.3.2. Maintenance Materials: Supply 5% (field) extra tiles of each colour in unopened packages for future repairs. Place where directed.

- 1.3.3. Reference Data: Submit complete list of products, colours and patterns used to Operating Manuals and Reference Data specified in Section 01300 as specified therein.

1.4. JOB CONDITIONS

- 1.4.1. Environmental Conditions: Temperature of room, floor surface and materials not less than 21°C for 48 hours before, during and for 48 hours after installation.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Resilient Tile Flooring: Noted as 'LVT' on Drawings, See Drawings for manufacturer, series and colours.

- 2.1.2. Resilient Base: 100% PVC, 102mm high x 30m roll lengths x 3mm thick with grooved back and standard toe, and pigment in up to 3 standard colours, conforming to CAN/CSA-A126.5:

- 2.1.3. Thresholds and Edge Reducer Strips: One piece, PVC by Johnsonite or Allstate or Roppe.

a. SLTC-XX-A at 1/4" to 1/8" materials. Slim Line Transition at curved floor transitions

b. CTA-XX-A at 1/4" to 1/8" materials. Transition Adaptor

c. CTA-XX-HT at 1/4" to 0.08"/2mm. Wheeled Traffic Transition

d. CTA-XX-J at 1/4" to floor. Wheeled Traffic Transition

e. CTA-XX-N at 1/8" to 1/8" materials. Wheeled Traffic Transition

RESILIENT TILE FLOORING

2.1.4. Primer: As recommended by adhesive manufacturer.

2.1.5. Adhesives: As recommended by manufacturers

2.1.6. Levelling underlayment:

Ardex 'Liquid BackerBoard Self-Levelling Underlayment' complete with Ardex 51' primer, Surface Preparation 567 by TEC, or approved equal by Reardon Co. or Mapei, non-shrink compound.

3. PART EXECUTION

3.1. PREPARATION

3.1.1. Prepare sub-floor in accordance with recognized industry standards and established in Manufacturer's installation instructions. Use only preparation materials that are acceptable to the Manufacturer's specification criteria.

- a. Mechanically remove all substances from sub-floor that would interfere with or be harmful to the installation.
- b. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects following written manufacturer's instructions

3.1.2. Verify that sub-floor is smooth, level, and flat within specified tolerances of ASTM F710 and other relevant guidelines.

3.1.3. Verify that substrate surface is dust-free. Installing parties shall not use petroleum- or wax-based sweeping compounds.

3.1.4. Verify that concrete surfaces are ready for installation by following industry standards and the manufacturer's installation guidelines.

3.1.5. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2. INSTALLATION

3.2.1. General:

Apply adhesive uniformly with an approved notcht tooth spreader at the recommended rate. Do not spread more adhesive than can be covered before initial set takes place. Use waterproof adhesive on concrete slabs on grade.

3.2.2. Tile:

- a. Lay true, level and even with tight aligned joints.
- b. Carefully scribe, cut and fit to walls, doorways, and around all permanent fixtures and openings. When resilient tile terminates against other flooring at doorways, terminate tile under door in its closed position.
- c. Lay tile with grain running in one direction. Spread varying colours across field to present an even colouring to entire field.

RESILIENT TILE FLOORING

- d. Roll floor in accordance with manufacturer's recommendations to ensure adhesion and elimination of air pockets.
- e. Lay in 1/8" accent Arteca Advanced Stones, Concrete Medium CN34Q

3.2.3. Base:

- a. Install resilient bases in accordance with manufacturer's recommendations.
- b. Use preformed external angle pieces and stops.
- c. Use full length pieces, accumulated short lengths not permitted.
- d. Butt joints and keep flush without gaps.

3.2.4. Thresholds and Edge Reducer Strip:

- a. At edge of dissimilar floor finishes, resilient and other flooring, other than carpet, provide one piece thresholds and edge reducer strips.
- b. Secure in place with adhesive to manufacturer's recommendations.

3.3. ADJUST AND CLEAN

3.3.1. Clean:

Remove surplus adhesive from face of tiles and base as work progresses. As soon as possible after adhesive has set thoroughly, clean tile and base surfaces in accordance with manufacturer's directions.

END OF SECTION

CARPET TILE

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide carpet tile for the Work
- b. Provide sub-floor preparation.

1.2.2. Related Work Specified Elsewhere:

- a. Resilient Base: Section 09 65 20
- b. Gypsum Wallboard: Section 09 20 15

1.3. QUALITY ASSURANCE

1.3.1. Requirements of Regulatory Agencies:

- a. CGSB 4-GP-129, Carpets, Commercial;
- b. CGSB 4-GP-156, Direct Glue Down Carpet, Guide to Selection and Installation;
- c. CGSB 20-GP-23M, Cashion Carpet, Flexible Polymeric Material.
- d. CAN/ULC-S102.2-M88, Canadian Flammability Testing.

1.4. SUBMITTALS

1.4.1. Samples:

- a. Provide samples of full carpet colour and texture range to Architect for choice.
- b. Prior to ordering carpet, submit samples of carpet and accessories to the Architect for approval, minimum 500mm x 500mm for each type and colour of carpet to be used.

1.4.2. Maintenance Materials:

Deliver and store where directed; 3% extra stock of carpet proportioned to colours and textures installed.

1.4.3. Maintenance Data:

Submit data to Operating Manuals and Reference Data, Section 01300.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

- 1.5.1. Delivery: Deliver carpet to Site clearly tagged to show installation location suited for best colour matching.

CARPET TILE

- 1.5.2. Storage: Store in a heated area maintained at minimum temperature of 10°C, or at such temperature as recommended by the product manufacturer.

1.6. JOB CONDITIONS

- 1.6.1. Protection: Restrict traffic by other Sections during installation

1.7. WARRANTY

1.7.1. Product:

Warrant carpet for a total period of Fifteen Years against wear, edge ravel, zippering, backing resiliency, static control and delamination including full product replacement in areas of wear to include the whole room when defined by 3 interior walls or visible area of open office. Warranty not to be pro-rated and to include product re-installation.

1.7.2. Installation:

Warrant installation for a total period of Two years, including seaming and delamination.

2. PART PRODUCTS

2.1. MATERIAL

- 2.1.1. Carpet Tile: Noted as CPT1 - See Drawings for manufacturer, series and colours.
- 2.1.2. Adhesive System: Water based as recommended by carpet manufacturer.
- 2.1.4. Seam Cement: Water based as recommended by carpet manufacturer.
- 2.1.5. Edge Adaptors: SLTC-XX-A carpet to Vinyl Plank or similar to meet site conditions. Colour by Architect from complete range.
- 2.1.6. Binder Bars: Aluminum, screw-down type as recommended by carpet manufacturer.

3. PART EXECUTION

3.1. EXAMINATION

- 3.1.1. Examine Work of other Sections affecting Work of this Section, and report any defects or discrepancies to the Consultant.
- 3.1.2. Commencement of installation shall constitute acceptance of substrates as satisfactory.

CARPET TILE

3.2. PREPARATION

- 3.2.1. Prepare sub-floor in accordance with recognized industry standards and established in Manufacturer's installation instructions. Use only preparation materials that are acceptable to the Manufacturer's specification criteria.
 - a. Mechanically remove all substances from sub-floor that would interfere with or be harmful to the installation.
 - b. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects following written manufacturer's instructions
- 3.1.2. Verify that sub-floor is smooth, level, and flat within specified tolerances of ASTM F710 and other relevant guidelines.
- 3.1.3. Verify that substrate surface is dust-free. Installing parties shall not use petroleum- or wax-based sweeping compounds.
- 3.1.4. Verify that concrete surfaces are ready for installation by following industry standards and the manufacturer's installation guidelines.
- 3.1.5. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.3. INSTALLATION

- 3.3.1. Install work of this Section after all Sections have completed their Work and just prior to completion of the Project.
- 3.3.2. Install materials in strict accordance with manufacturer's directions.
- 3.3.3. Lay carpet smooth and level, free from ridging, pulling, drifting or other imperfections detrimental to appearance or wearing qualities.
- 3.3.4. Roll carpet with 56.70 kg roller to ensure complete contact with the adhesive.
- 3.3.5. Lay pile in the same direction in any one area.
- 3.3.7. Neatly cut carpet for floor outlets, trench ducts and similar items.
- 3.3.8. Lay carpet with seams parallel to walls unless indicated otherwise.
- 3.3.9. Position edges of carpet in door openings, under door, in its closed position
- 3.3.10. Protect exposed edges of carpet with edging binder bars.

3.4. ADJUST AND CLEAN

- 3.4.1. Cleaning:
 - a. Immediately following installation, inspection and approval of work, vacuum-clean carpet and remove debris.
- 3.4.2. Protection of Completed Work:

CARPET TILE

- a. Cover the entire carpeted area with plastic covering held in place by masking tape at the seams and stay-tacking around the perimeter.
- b. Do not remove carpet protection until directed by the Consultant.

END OF SECTION

PAINTING

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Exterior - Apply paint to ferrous (non-galvanized) metal and other surfaces.
- b. Interior - Work shall generally include the following:
 - 1. Paint all surfaces and objects within new and existing rooms, except where specifically indicated or specified otherwise. This includes grilles, pipes, ducts, etc.
 - 2. In areas indicated as unfinished on Room Finish Schedule, painting is still required at doors and frames, elevator doors and trim (if applicable), exposed unprimed structural steel, and other items normally requiring protection.
 - 3. Do not paint acoustical ceilings, architectural woodwork, manufactured casework, chalkboards, their trim, windows and window frames, baked enamel finished metals, toilet partitions, aluminum, copper, plastic laminate, hardware or other surfaces obviously not intended to be painted, unless otherwise specifically stated.

1.2.2. Related Work Specified Elsewhere:

- a. Shop priming is provided on some items by their respective Sections,
- b. Identification and lettering of mechanical Work: Divisions 20 - 25

1.3. QUALITY ASSURANCE

- 1.3.1. Comply with requirements of Ontario Painting Contractors Association (OPCA) Master Painters Institute (MPI) Architectural Specifications Manual, latest edition.

- 1.3.2. Engage a qualified independent inspector, with MPI Level 3 certification and acceptable to the Architect, to verify that Work conforms to Contract Documents. Include cost of inspection in Contract.

1.3.2. Job Mock-Up:

- a. Prepare small sample room for painted finish, giving prime coat to one wall, two coats to second wall, and three coats to third wall. Leave sample room for that purpose until majority of Work is finished. Each coat to be tinted a different colour from previous coat.
- b. Prepare small one wall mock-up for each individual paint colour as requested by Architect.

PAINTING

1.4. MATERIAL STANDARDS

1.4.1. Conforming to ECP-07-89/ECP-12-89

| | |
|--|------------------|
| Interior Latex Type, Flat Paint | CAN/CGSB-1.100-M |
| Primer-Sealer, Wall, Interior Latex Type | CAN/CGSB-1.119-M |
| Paint, Exterior, Latex Type, Flat | CGSB 1-GP-138M |
| Emulsion Type Filler Masonry Block | CAN/CGSB-1.188-M |
| Interior Semigloss Latex Paint | CAN/CGSB-1.195-M |
| Primer, Exterior, Latex Type | CGSB 1-GP-203Ma |
| Stain, Pigmented, Exterior Latex Type | CGSB 1-GP-204M |

1.5. SUBMITTALS

1.5.1. List of Materials:

Before ordering materials, submit in writing a complete list of all types and brands of materials to be used for this job and adjacent to each type state surface and/or location of application. Paint list shall bear manufacturer's certification that materials listed are premium quality. Do not order materials or commence Work until list is approved by Architect. On request of Architect, produce invoices from time to time covering all materials on job.

1.5.2. Samples: Provide 300mm x 300mm samples of each coat of each paint colour as selected by the Architect. Work must match approved samples

1.5.3. Reference Data: Provide data to Operating Manuals and Reference Data.

1.5.4. Maintenance Materials:

Provide the Owner with all opened, but not completely used materials in resealed containers, minimum 2 litres of each colour, marked with colour number for maintenance purposes.

1.6. JOB CONDITIONS

1.6.1. Inspection: Inspect all surfaces before commencement of this Work and verify their readiness for this Work.

1.6.2. Scheduling:

Commence interior Work only when building is completely enclosed and sealed, all Sections creating dirt have completed their Work, room doors are installed, heating and ventilation is provided or permanent systems are working and Work areas can be closed to traffic until Work cures.

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1.6.3. Environmental Requirements:

Follow manufacturer's recommendations. Do not paint exterior surfaces during cold, windy, rainy or frosty weather when temperature is likely to drop below 10 deg C, when surfaces are damp or exposed to hot sun. Interior temperatures shall be at least 15 deg C, 21 deg C preferable, before commencing interior Work.

1.7. WARRANTY

1.7.1. Provide OPCA 2 year warranty.

2. PART PRODUCTS

2.1. MATERIALS

2.1.1. Standards:

a. Water Based Paint Standard:

1. In accordance with Environmental Choice Program guideline ECP-07-89, water based paint shall be formulated or manufactured free from formaldehyde, halogenated solvents, aromatic hydrocarbons, mercury or mercury compounds, or be tinted with pigments of lead, cadmium, chromium VI and their oxides.
2. Paint must have Flash Point of 61.0 deg C or greater, and not contain Volatile Organic Compounds in excess of 250 grams per litre (g/L).

b. Solvent Base Paint Standard:

1. In accordance with ECP guideline ECP-12-89, solvent based paint shall not be formulated with formaldehyde, halogenated solvents, aromatic hydrocarbons in excess of 10% of weight, mercury or mercury compounds, or be tinted with pigments of lead, cadmium, chromium VI and their oxides.
2. Paint shall have Flash Point of 37.8 deg C or greater, and not contain Volatile Organic Compounds in excess of 380 g/L.

2.1.2. Manufacturer:

The quality of paint shall be equal to the ECO label formulas prepared by Benjamin Moore "Pristine EcoSpec", Canadian Industries Limited EcoLogo, Glidden, Para Paints Eco Logo, Sherwin Williams EcoLogo, or approved similar, and applied in strict accordance with the manufacturer's directions.

2.1.3. Colours:

Refer to room finish legend.

PAINTING

3. PART EXECUTION

3.1. PREPARATION

3.1.1. Protection:

- a. Use sufficient drop cloths and protective coverings for full protection of floors and Work not being painted. Clean any components paint spotted or soiled.

3.1.2. Coating Removal:

- a. Apply to manufacturers written instructions. Repeat as required for complete removal of existing paints from glazed blocks and mortar joints.

3.1.3. Surface Preparation:

- a. Surfaces shall be dry, clean, smooth, free from dust, dirt, grease, rust, loose crystals, or extraneous matter. Wire brush metal castings before first coat.
- b. Check non-metallic surfaces with moisture meter, do not proceed if reading is higher than 12-15% without written directions. If substrate is steel, do not apply coatings over moisture or when surface temperature is within 3 degrees Celcius of dew point.
- c. Wash unpainted or shop painted metal free of grease, dirt or oil; remove rust; then prime or spot prime where material is exposed, with rust inhibitive primer. Feather our edges to make touch up paint inconspicuous.
- d. Allow galvanized metal to weather minimum of 26 weeks and Xylene clean or abrade surface with bronze wool prior to coating.
- e. Test masonry surfaces to be painted for alkalinity. Ensure neutral pH before painting.
- f. If concrete to be painted is less than 26 weeks old, etch normal concrete surfaces with muriatic acid solution (1 part commercial 331.45% to 3 parts water). Rinse 2 or 3 times with clean water and bring pH of surface to neutral using Tri-Sodium-Phosphate (TSP) and flush and allow to dry to moisture content of 12-15% or less, read with electronic moisture meter. Confirm that no curing agents have been used on surfaces to be painted.
- g. Inspect millwork to assure surfaces are smooth, free from machine or surface marks and that nailheads have been countersunk. Seal all knots and sapwood where painted.
- h. Ensure shop sealer has been applied to glue-laminated beams.
- i. Inspect gypsum board to ensure joints are completely filled and sanded smooth. Fill small nicks or holes with patching compound and sand smooth. Remove dust prior to painting.
- j. Nail holes, splits or scratches shall be puttied or speckled smooth after prime coat. Where same occurs on transparent finish, putty shall be coloured to match finish.

PAINTING

- k. If woodwork, metal or any other surface to be finished, cannot be put in proper condition for finishing by customary cleaning, sanding, puttying operations, notify Architect in writing, or assume responsibility for and rectify any unsatisfactory finish resulting.
- l. For exposed steel in high humidity areas, prepare steel in accordance with Steel Structures Painting Council Standard SSPC.SP 6 for a Commercial Blast.

3.2. APPLICATION

- 3.2.1. Use same brand of paint for primer, intermediate and finish coats. Use approved sealer for knots and sappy areas under enamels.
- 3.2.2. Permit paint to dry before applying succeeding coats. Touch-up suction spots after application of first coat. Sand lightly between coats with No. 120 sandpaper.
- 3.2.3. Painting coats specified are intended to cover surfaces completely. If materials and colours require additional coats to ensure adequate and uniform coverage, apply further coats until complete satisfactory coverage is achieved. Minimum finish shall be Premium (three coats) as defined by OPCA. Some deep hues or bright colours may require four coats.
- 3.2.4. Areas exhibiting incomplete or unsatisfactory coverage shall have entire plane painted. Patching not acceptable. Paint entire plane of areas which have been cut and patched.
- 3.2.5. Work application:
 - a. By skilled tradespeople in accordance with manufacturer's directions and supervision;
 - b. In dust-free and suitable conditions for production of good results;
 - c. Even, uniform in sheen, colour and texture, free from brush or roller marks, sags, crawls, runs or other defects.
- 3.2.6. Apply materials by brush or roller. Airless spray painting may be permitted in specific areas but Architect must be consulted and approve each area before Work commences. Architect may at any time prohibit use of spray painting for such reasons as carelessness, poor masking or protective measures, drifting paint fog, disturbance to other trades or failure to obtain dense, even opaque finish.
- 3.2.7. Mechanical and Electrical Work:
 - a. Paint all convectors, grilles, conduit, pipes, ducts, panels, switch boxes, access panels, mechanical and electrical equipment which are not prefinished. Remove grilles, covers, access panels for mechanical and electrical systems from installed location and paint separately, if these items are not prefinished.
 - b. Paint Work to match surfaces they are seen against unless directed otherwise.
 - c. Finish interior surface of ventilation ducts where visible through grilles, diffusers, louvres, etc. Apply two coats of flatblack paint to limit of site line.

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- d. Protect gauges, identification plates and similar items from being painted over or paint splattered.

3.3. GENERAL FINISHING:

- 3.3.1. Apply primer coat to unprimed ferrous metal surfaces.
- 3.3.2. Prime woodwork designated for painting immediately upon delivery to site. Prime all surfaces of such woodwork, whether exposed or not, before installation. Back prime woodwork which is to receive transparent finish with 1 coat of transparent finish reduced 25%.
- 3.3.3. Re-seal all cut edges of wood to be painted or finished, if material was cut subsequent to initial sealing. Ensure tops and bottoms of wood doors sealed.

3.4. LIST OF FINISHES:

- a. Exterior Galvanized Steel: Unpainted.
- b. Exterior Steel: Rust inhibitor paint by Tremclad or Rustolium or Devoe.
- c. Interior and Exterior Metal (Ferrous): Exposed Structural and Miscellaneous Steel:
 - 1 coat shop applied, oil Alkyd primer (metal surfaces already primed need only touchup),
 - 1 coat 100% Acrylic emulsion, waterborne, corrosion resistant paint as tie-coat at 1.5 - 2 mils Dry Film Thickness (DFT).
 - 2 coats semi-gloss Acrylic emulsion finish at 1.2 mils/coat DFT. Total 3.9 - 4.4mils DFT.
- d. Interior Galvanized Steel (Hollow Metal Doors, Screens and Deck):
 - 1 coat 100% Acrylic emulsion, waterborne, corrosion resistant primer at 2 mils DFT.
 - 2 coats water reducible Latex house and trim paint at 1.2 mils/coat DFT. Total 4.4mils DFT. Semi-gloss finish at doors and screens/Flat finish at steel deck.
- e. Gypsum Board:
 - 1 coat Latex primer sealer at 1.0mil DFT.
 - 2 coats interior Latex enamel at 1.5mils/coat DFT. Total 4.0mils DFT.
- f. Painted Woodwork:
 - 1 coat undercoater, low-odour, pigmented, interior alkyd primer at 1.5mil DFT. VOC complying. Back paint wood base.
 - 2 coats interior Latex enamel at 1.5mils/coat DFT. Total 4.5mils DFT.
- g. Clear Finish for Wood: Penetrating wood stain by Behr, Minwax or Sikkens or Sansin for glulam and CLT.
 - 1 coat stain.
 - 2 coats water based Urethane gloss varnish at 2.0mils/coat. Total 4.0mils DFT.
- h. Knot and Sapwood Sealer: White shellac.
- i. Concrete Block:

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- 1 coat high-solids, pigmented block filler used full body, VOC complying, 3mils DFT.
- 2 coats vinyl acrylic Latex enamel, VOC complying, 1.5 mils/coat DFT. Total 6mils DFT.
- j. Painted Concrete:
 - 2 coats high-solids purpose made floor paint with non-slip surface.
- k. Insulated and Uninsulated Pipes, Ducts, Conduit, Valves, Fittings and Equipment and Ancillary Items where "Exposed" in Completed Work:
 - 1. Insulated Work: 1 coat Latex primer sealer, 1 mil DFT. 2 coats interior Latex enamel, 1.5mils/coat. Total 4.0mils DFT.
 - 2. Non-insulated Work: 1 coat structural steel primer, 1 mil DFT. 2 coats interior Latex enamel, 1.5mils/coat. Total 4.0mils DFT.
- l. Specific Areas:
 - 1. Existing previously painted walls: including Concrete block, drywall, vinyl faced and Interior Metal (Ferrous) surfaces:
 - a. Prepare existing paint by removing all loose and peeling paint. Prep surfaces to be gloss free and clean of grease and dirt. Sand entire surface using 80 – 100 grit sandpaper followed by a wash of TSP and water and rinsed with clean warm water and allowed to dry.
 - b. Apply:
 - 1 coat Devflex 4020 primer by Devoe or ICI Paints (Canada) Inc. or Sherwin-Williams, backroll to force and fill all pin holes to 3 mils DFT,
 - 2 coats Devflex 4216 to 5mils DFT by Devoe or ICI Paints (Canada) Inc. or Sherwin-Williams.

3.5. FIELD QUALITY CONTROL

- 3.5.1. Submit to OPCA, at least 4 weeks prior to commencement of Work on OPCA forms:
 - a. Request for Assignment of Inspector.
 - b. List of Paint Products.
- 3.5.2. Provide and pay for OPCA inspector to requirements of Chapter 7 of OPCA Manual and submit written reports to Consultant.

END OF SECTION

EPOXY COATINGS

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide Epoxy paint coatings for the Work.

1.2.2. Related Work:

- a. Gypsum Board: Section 09 20 15

1.3. REFERENCES

1.3.1. Conform to the following:

- a. ASTM E84-04 - Test Method for Surface Burning Characteristics of Building Materials
- b. ASTM F1869-04- Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- c. CAN/CGSB-1.146-99-Cold Cured, Gloss Epoxy Coating
- d. CAN/CGSB-1.153-M90-High Build, Gloss, Epoxy Coating
- e. CAN/CGSB-1.186-M89-High Performance Glazed Coating System, Interior
- f. CAN/CGSB-19.13-M87-Sealing Compound, One-Component, Elastomeric, Chemical Curing
- g. CAN/CGSB-19.24-M90- Multicomponent, Chemical-Curing Sealing Compound
- h. MPI- The Master Painters Institute
- i. OPCA - Ontario Painting Contractors Association
- j. ULC- Underwriters' Laboratories of Canada

1.4. SUBMITTALS

- 1.4.1. Submit 300 mm x 300 mm (12" x 12") samples of each type of wall coating on specified sub-strata showing stages of application. Submit additional samples until approval is obtained. Make corrections to mix as required to secure correct colour and texture. Label sample(s) with Project name and number, applicator, names of material and manufacturer, area where material will be applied, date of sample, colour, texture and mix proportion.

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- 1.4.2. Maintenance Data: Submit maintenance manuals in accordance with Section 01 30 00. Provide specific instructions for maintenance, preservation, cleaning and adequate warning of maintenance practices or materials detrimental to finish surfaces.
- 1.4.3. Maintenance Materials: Provide the Owner with all opened, but not completely used materials in resealed containers, minimum 2 litres of each colour, marked with colour number for maintenance purposes.

1.5. QUALITY ASSURANCE

- 1.5.1. Conform to the Occupational Health and Safety Act requirements and ensure that applicators wear appropriate, properly fitted organic vapour respirator during and after application.
- 1.5.2. Job Mock-Up:
 - a. Prepare small sample room for painted finish, giving prime coat to one wall, two coats to second wall, and three coats to third wall. Leave sample room for that purpose until majority of Work is finished. Each coat to be tinted a different colour from previous coat.
 - b. Prepare small one wall mock-up for each individual paint colour as requested by Architect.

1.6. JOB CONDITIONS

- 1.6.1. Commence interior Work only when building is completely enclosed and sealed, all Sections creating dirt have completed their Work, room doors are installed, heating and ventilation is provided or permanent systems are working and Work areas can be closed to traffic until Work cures.
- 1.6.2. Test substrate for moisture content using moisture meter. Do not apply coatings over substrate materials that contain over 3% moisture. Obtain approval of coating manufacturer of moisture content of substrate before proceeding with application..
- 1.6.3. Test cementitious substrates for alkalinity in accordance with coating manufacturer's recommendations.
- 1.6.4. Maintain well-lit, dust-free and well-ventilated area. Provide controlled ventilation to exterior of the building during application and drying by means of temporary ducting and exhaust fans.
- 1.6.3. Post "Wet Coating" signs while work is in progress and while coatings are curing. Ensure spark-proof electrical equipment is used in areas where flammable materials are being applied. Prevent use of open flames or equipment that may cause sparks during this phase of work.

EPOXY COATINGS

1.7. WARRANTY

- 1.7.1. Warrant work of this Section against defects and deficiencies for period of 3 years in accordance with General Conditions of the Contract. Promptly correct defects and deficiencies which become apparent within warranty period, to satisfaction of/and at no expense to Owner. Defects include, but not be limited to, crazing, blistering, fading, bond failure and softening. Damage due to structural failure of base, surface, water seepage or abnormal abuse is exempted from warranty.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Epoxy Paint: Provide water based epoxy coating in accordance with MPI #115.
- a. Acceptable Products:
 - 1. Devoe Tru-Glaze 4418 Waterborne Acrylic Epoxy Coating by ICI Canada Inc.;
 - 2. M43/M44 Acrylic Epoxy Gloss Coating by Benjamin Moore & Co., Limited;
 - 3. ATA-1XX Aqua Tile Water Base Epoxy by Para Paints;
 - 4. Aquapon WB WaterBorne Epoxy 98 Line" by PPG Canada Inc.
 - b. Acceptable Manufacturers:
 - 1. Benjamin Moore & Co., Limited; www.benjaminmoore.ca
 - 2. Duochem Inc.; www.duochem.com
 - 3. ICI Canada Inc.; www.specifyici.com
 - 4. Niagara Protective Coatings; www.niaccoat.com.
 - 5. Para Paints; www.para.com.
 - 6. Sherwin-Willimas Company; www.sherwin-williams.com
 - 7. Sherwin-Willimas Company; www.sherwin-williams.com
 - 8. Stonhard; www.stonhard.com
 - c. Sealant: Multi-component type, CAN/CGSB-19.24-M, or 1 component polysulphide type, CAN/CGSB-19.13-M. Colour as selected by Consultant.
 - d. Caulking Beads: Polyethylene, urethane, neoprene or vinyl closed cell, foam rope with Shore "A" hardness of 20 and tensile strength between 140 and 200 kPa.
 - e. Primer: As recommended by wall coating manufacturer.
 - f. Block Filler: As recommended by wall coating manufacturer and suitable for anticipated conditions. In areas of high humidity, use epoxy block filler only.

EPOXY COATINGS

3. PART EXECUTION

3.1. PREPARATION

3.1.1. Examination:

- a. Ensure surfaces to be coated are sound, clean, non-dusting, cured, free from oil and efflorescence and any other contaminants.
- b. Ensure surface temperature and moisture content of substrate meet minimum environmental requirements outlined herein.
- c. Carefully mask adjacent surfaces not scheduled to receive high performance coatings, wall openings for electrical outlets or switches and open ends of piping or conduit. Leave masking intact until application is complete. Masking shall be the type which can be readily removed without damage to the surface beneath

3.1.2. Surface Preparation:

- a. Surfaces shall be dry, clean, smooth, free from dust, dirt, grease, rust, loose crystals, or extraneous matter. Wire brush metal castings before first coat.
- b. Check non-metallic surfaces with moisture meter, do not proceed if reading is higher than 12-15% without written directions. If substrate is steel, do not apply coatings over moisture or when surface temperature is within 3 degrees Celcius of dew point.
- c. Wash unpainted or shop painted metal free of grease, dirt or oil; remove rust; then prime or spot prime where material is exposed, with rust inhibitive primer. Feather our edges to make touch up paint inconspicuous.
- d. Allow galvanized metal to weather minimum of 26 weeks and Xylene clean or abrade surface with bronze wool prior to coating.
- e. Test masonry surfaces to be painted for alkalinity. Ensure neutral pH before painting.
- f. If concrete to be painted is less than 26 weeks old, etch normal concrete surfaces with muriatic acid solution (1 part commercial 331.45% to 3 parts water). Rinse 2 or 3 times with clean water and bring pH of surface to neutral using Tri-Sodium-Phosphate (TSP) and flush and allow to dry to moisture content of 12-15% or less, read with electronic moisture meter. Confirm that no curing agents have been used on surfaces to be painted.
- g. Inspect millwork to assure surfaces are smooth, free from machine or surface marks and that nailheads have been countersunk. Seal all knots and sapwood where painted.
- h. Ensure shop sealer has been applied to glue-laminated beams.
- i. Inspect gypsum board to ensure joints are completely filled and sanded smooth. Fill small nicks or holes with patching compound and sand smooth. Remove dust prior to painting.

EPOXY COATINGS

- j. Nail holes, splits or scratches shall be puttied or speckled smooth after prime coat. Where same occurs on transparent finish, putty shall be coloured to match finish.
- k. If woodwork, metal or any other surface to be finished, cannot be put in proper condition for finishing by customary cleaning, sanding, puttying operations, notify Architect in writing, or assume responsibility for and rectify any unsatisfactory finish resulting.
- l. For exposed steel in high humidity areas, prepare steel in accordance with Steel Structures Painting Council Standard SSPC.SP 6 for a Commercial Blast.

3.2. APPLICATION

- 3.2.1. Apply special coatings before adjacent work is painted.
- 3.2.2. Apply coatings in accordance with manufacturer's instructions to produce monolithic wearing surface of minimum 0.33 mm (13 mils) DFT indicated to even, uniform in colour and appearance, free from marks, runs, craters or other defects detrimental to appearance or performance. Match approved samples.
- 3.2.3. Allow proper cure time between coats as recommended by manufacturer. Protect surface from damage during this time. Smoothness index of completed coatings shall be at least 50% using a 60 degrees Gardner gloss-meter.
- 3.2.4. Provide water-tight seal to pipes and projections coming through wall coating, using sealant.

3.3. CLEANING

- 3.3.1. Upon completion, remove masking and clean adjacent surfaces free of overspray.

END OF SECTION

OPERABLE GLASS PARTITION

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide operable glass partitionsw for the Work.

1.2.2. Related Work:

- a. Gypsum Board: Section 09 20 15
b. Structural steel: Section 05 50 00

1.3. REFERENCES

1.3.1. Conform to the following:

- a. ASTM C1048-92 - Glass
b. ASTM E90 – Sound transmission coefficient
c. CAN3-S157-M, Strength Design In Aluminum
d. CSA-W59.2-M, Welded Aluminum Construction
e. CAN3 S16.1-M: For steel reinforcement and support brackets

1.4. SUBMITTALS

1.4.1. Shop Drawings:

- a. Submit Shop Drawings bearing seal of Ontario Registered Professional Structural Engineer responsible for design and fabrication.
b. Indicate reinforcing and support steel sizes and associated design loads.
c. Submit data sheets for Hardware.

1.4.2. Test Report Submission:

- a. Supply a copy of an acoustic test report certifying that the partition was tested with a performance of 44 STC by an independent accredited laboratory. The partition tested must be fully functional, sized at 4267mm X 2743mm (14'0" X 9'0") and meet ASTM-E90 standard. The test results must be like or exceed the specified performance. The acoustical test report must show the weight and the panel construction as well as the acoustical seals tested

OPERABLE GLASS PARTITION

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

- 1.5.1. Proper storage of partitions before installation and continued protection during and after installation will be the responsibility of the General Contractor.

1.6. WARRANTY

- 1.6.1. Warrant work of this Section against defects and deficiencies for period of 1 year in accordance with General Conditions of the Contract. Warrant track and trolley system against defects and deficiencies for period of 5 years.

2. PART PRODUCTS

2.1. MATERIALS

- 2.1.1. Acceptable Products: Aluminum frames glass panels, manually operated

1. Series G-701 by Corflex.;

- a. Series G-701 by Corflex;
- b. approved equal.

- 2.1.2. Panels: Extruded aluminum frame 60mm (2 3/8") reinforced with concealed corner brackets.

- 2.1.3. Glass: Double sealed glazed tempered glass 51mm (2") thick.

- 2.1.4. Fabrication:

- a. The leading vertical edge of each panel shall incorporate a tongue with two vinyl gaskets to nest into the vertical recess in the edge of the adjoining panel creating a positive, interlocking joint that provides panel stability, ease of panel alignment and sound control.
- b. Horizontal seals must not exceed the panel width to prevent damage while handling.
- c. Top seals shall be continuous contact vinyl sweeps.
- d. Top and bottom horizontal seals shall be continuous contact, multi-layer, vinyl sweep seals.
- e. The top seals maintain contact with the track and the bottom seals maintain contact with the floor or other surface along the path of the movable wall.

- 2.1.5. Suspension System:

- a. Track shall be of clear anodized architectural grade extruded aluminum alloy 6063-T6. Track #36 design shall provide integral support for adjoining ceiling, soffit, or plenum sound barrier. Tracks shall be connected to the structural support by pairs of 10mm (3/8") diameter threaded steel hanger rods. L or T intersections shall be factory assembled and welded.

OPERABLE GLASS PARTITION

- b. Built-in ceiling trim shall be of anodized aluminum finish providing enclosure of plenum sound barrier on both sides of track for maximum sound control. A section of track will be removable to make it possible for a panel to be removed from the track for later maintenance.
- c. Each panel shall be supported by two dual horizontal wheel type trolley assemblies. Only the last or before last panel will have a visible locking device installed in the bottom rail.
- d. Each panel shall be supported by two-wheel counter-rotating horizontal carriers. Wheels to be of precision ground steel ball bearing with heat treated and hardened races encased with molded polymer tires.

2.1.6. Finishes:

- a. Aluminum components: Clear Anodized.
- b. Vinyl and PJC trim: Black, grey or beige as selected by Architect.

2.1.7. Operation:

- a. Top supported panels and manually operated.
- b. Hinged closure panel: Final partition closure to be by a full height hinged closure access panel at one end of the opening that hinges from a fixed two-piece telescopic aluminum jamb.
- c. The hinged panel shall be fitted with a lever type latches or lockset. Foot bolt to activate at the bottom of the panel next to the hinged closure panel.

2.1.8. Acoustical Performance:

- a. Panels to have an acoustic performance of STC 44.

3. PART EXECUTION

3.1. INSTALLATION

- 3.1.1. Provide anchors to be built into structure to the appropriate Sections for setting in.
- 3.1.2. Supply fastenings and anchors required to be built in to Work of other Sections to other Sections as required, and direct their proper installation.
- 3.1.3. Glazing:
 - a. Clean sealing surfaces at perimeter of glass, and sealing surfaces of rebates and stops, before applying any glazing material; use only solvents and cleaning agents recommended by glazing material manufacturer.
 - b. Centre glass in rebate to maintain specified clearances at perimeter on all four sides. Maintain centered position of glass in rebates on both sides of glass. Provide setting blocks as recommended by glass manufacturer as required, 70 to 90 points Shore "A" hardness, under each glass light; locate at quarter points.

OPERABLE GLASS PARTITION

3.1.4. Adjust and Cleaning:

- a. Remove strippable protective coatings before they have thermoset, and leave glass, framing members, and adjacent Work clean and unblemished upon completion of Work.
- b. Adjust all hardware for proper operation.

END OF SECTION

ROLLER SHADES

PART 1 GENERAL

1.1 GENERAL INSTRUCTIONS

- .1 Conform to Division 01, General Requirements.

1.2 SUMMARY

- .1 Provide manual operated roller shades for the Work.

1.3 RELATED SECTIONS

- .1 Gypsum Wallboard: Section 09 20 15

1.4 SUBMITTALS

- .1 Product Data: Provide data on compatibilities, and limitations of product.
- .2 Maintenance Data: Provide data on maintenance of installed system.

1.5 QUALITY ASSURANCE

- .1 Qualifications: Provide work of this Section executed by competent installers with minimum of 5 years experience in application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

1.6 WARRANTY

Warrant work of this Section for period of 2 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of the Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- .1 Products of following manufacturers are acceptable subject to conformance to requirements of Drawings and Specifications:
 - .1 Nysan Shading Systems Ltd. – basis of design,
 - .2 Hunter Douglas Contract,
 - .3 Approved equal.
- .2 Provide installation brackets that facilitate easy removal and replacement of blinds.

2.2 MATERIALS

ROLLER SHADES

- .1 Roller Shade: Face mounted chain operated with fascia, 3% fabric:
 - .1 Operation:
 - .1 Manual shade chain drive unit shall consist of a tension activated lifting mechanism with multi-layer concentric constant tension. Ensure lifting mechanism contains a memory tension lock which is pre-tensioned and when removed for shade cleaning, does not require re-tensioning. Ensure mechanism is internally free-floating along a grooved non-corrosive shaft and reversible for on site future alterations and maintenance.
 - .2 Internal tension idler (I.T.I) limiter automatically adjusts and controls amount of torque being generated for constant smooth operation of shade system. I.T.I automatically releases during down-travel and automatically engages during up-travel of shade system.
 - .3 Lifting mechanism must accommodate tension modules- (type D) for maximum shade performance when necessary. Ensure tension modules contain a memory lock for torque retention.
 - .4 Use noise reduction seals for sound isolation and absorption of mechanism.
 - .5 Ensure drive sprocket contains a planetary gear system for increased operational performance, speed ratio control, smoothness of lift and balance to chain and shade system.
 - .2 Assembly:
 - .1 Supply shade unit to site fully assembled in a 1 piece fully extruded aluminum cassette closed on all 4 sides, top, back, sides and bottom return.
 - .2 Mounting Detail:
 - .1 Wall mounted on drywall returns at windows.
 - .2 Shade Orientation: Regular-roll, shade cloth to roll at window side of roller.
 - .3 Shade Roller Tube: All aluminum extruded available in 32 mm (1-1/4"), or 50 mm (2") with reinforced internal ribs to provide maximum span without tube deflection. Tube sizes will depend on shade size.
 - .4 Tube End Plug: Internal tension idler (I.T.I) limiter automatically adjusts and controls amount of torque being generated for constant smooth operation of shade system. I.T.I must automatically release during down-travel and automatically engage during up-travel of shade system.
 - .5 Chain Drive: Heavy duty commercial grade sprocket. Drive sprocket must contain a planetary gear system for increased performance, speed ratio, smoothness and balance to chain and shade system.
 - .6 Operating Chain: No. 10 qualified heavy duty stainless steel bead chain 90 lb load test, with specially engineered chain joiner at 400 N breaking strength.

ROLLER SHADES

- .7 Exposed Hembar: Extruded aluminum with end caps Screw end plugs securely on ends showing no exposed aluminum.
- .8 Chain Hold Down: Fully secure operating chain to SP chain holder.
- .9 Mounting Brackets: Provide galvanized steel brackets for face and ceiling mounting.
- .10 Shade Holder: Design shade holder from 1 piece aluminum extruded unit, which will accept shade brackets and form a single unitized assembly when complete.
- .11 Cassette Box: Cassette design shall be a 1 piece aluminum extruded box closed on all 4 sides top, back, sides and bottom return. Cassette sections to be 79 mm in square profile. Cassette section with internal groove to accommodate a self cleaning brush to insure fabric maintenance as well as a gap brush on top back side of cassette to provide for a light seal. Wall thickness to be 1.52 mm (16 ga). Cassette end caps shall be 2 mm Delrin plastic with 4 countersunk flat headed screw holes.
- .12 Fascia: 75 mm aluminum fascia. Extruded aluminum alloy 6063-T5, pre-finished, 105 mm x 10 mm x 1.6 mm wall thickness (4.13" x 0.394" x 0.063"), custom designed closure to fit onto pre-moulded end mounting brackets without exposed fasteners. Colour: clear anodized. Fascia shall allow for continuous placement across multiple shades (to a maximum length of 6.1m (20ft.) without exposed fasteners. Fascia shall conceal the mounting hardware, power and control cables, drive mechanism, roller tube, and all fabric rolled on the tube.
- .13 Finishes: All exposed aluminum shall be clear anodised finish according to AA-M12C22A31 or coloured to match window framing. Unexposed aluminum unless otherwise specified: mill finish.
- .14 Shade Fabrics:
 - .1 Green Screen Eco 3% Series by Nysan: Fabric weight 8 oz/yd², Fabric Thickness 19 mil, Break Strength warp 240daN/5cm weft 200daN/5cm, Flame Res. 0.0 sec after flame, Fuel contributed value: 0, Average Openness: ±3% (ECO), Colorfastness to light: 7/8, Composition: Fabric made with 100% Polyester yarn, PVC free, and VOC free.
 - .2 Shade Fabric Colour: To be selected by Consultant from manufacturer's full colour range.
 - .3 Provide a weighted hem bar to maintain a straight bottom and a flat shade surface.
- .2 Roller Shade Blackout: Dual chain operator with 100mm fascia, 3% fabric and blackout:
 - .1 Operation:
 - .1 Manual shade chain drive unit shall consist of a tension activated lifting mechanism with multi-layer concentric constant tension. Ensure lifting mechanism contains a memory tension lock which is pre-tensioned and when

ROLLER SHADES

- removed for shade cleaning, does not require re-tensioning. Ensure mechanism is internally free-floating along a grooved non-corrosive shaft and reversible for on site future alterations and maintenance.
- .2 Internal tension idler (I.T.I) limiter automatically adjusts and controls amount of torque being generated for constant smooth operation of shade system. I.T.I automatically releases during down-travel and automatically engages during up-travel of shade system.
- .3 Lifting mechanism must accommodate tension modules- (type D) for maximum shade performance when necessary. Ensure tension modules contain a memory lock for torque retention.
- .4 Use noise reduction seals for sound isolation and absorption of mechanism.
- .5 Ensure drive sprocket contains a planetary gear system for increased operational performance, speed ratio control, smoothness of lift and balance to chain and shade system.
- .2 Assembly:
 - .1 Supply shade unit to site fully assembled in a 1 piece fully extruded aluminum cassette closed on all 4 sides, top, back, sides and bottom return with plastic injected-molded end caps.
 - .2 Mounting Detail:
 - .1 Ceiling mounted.
 - .2 Mounted on GWB head of window opening.
 - .3 Shade Orientation: Regular-roll, shade cloth and blackout to roll at window side of roller. Blackout shade mounted closest to window.
- .3 Shade Roller Tube: All aluminum extruded available in 32 mm (1-1/4"), or 50 mm (2") with reinforced internal ribs to provide maximum span without tube deflection. Tube sizes will depend on shade size.
- .4 Tube End Plug: Internal tension idler (I.T.I) limiter automatically adjusts and controls amount of torque being generated for constant smooth operation of shade system. I.T.I must automatically release during down-travel and automatically engage during up-travel of shade system.
- .5 Chain Drive: Heavy duty commercial grade sprocket. Drive sprocket must contain a planetary gear system for increased performance, speed ratio, smoothness and balance to chain and shade system.
- .6 Operating Chain: No. 10 qualified heavy duty stainless steel bead chain 90 lb load test, with specially engineered chain joiner at 400 N breaking strength.
- .7 Flat Fabric Wrapped Hembar (blackout) and Exposed Hembar (3% fabric): Extruded aluminum with end caps. Screw end plugs securely on ends showing no exposed aluminum.

ROLLER SHADES

- .8 Chain Hold Down: Fully secure operating chain to SP chain holder.
- .9 Mounting Brackets: Provide galvanized steel brackets for ceiling or wall mounting.
- .10 Shade Holder: Design shade holder from 1 piece aluminum extruded unit, which will accept shade brackets and form a single unitized assembly when complete.
- .11 Cassette Box: Cassette design shall be a 1 piece aluminum extruded box closed on all 4 sides top, back, sides and bottom return. Cassette sections to be 103 mm x 148mm. Cassette section with internal groove to accommodate a self cleaning brush to insure fabric maintenance as well as a gap brush on top back side of cassette to provide for a light seal. Wall thickness to be 1.52 mm (16 ga). Cassette end caps shall be 2 mm Delrin plastic with 4 countersunk flat headed screw holes.
- .12 Fascia: 100mm aluminum fascia. Extruded aluminum alloy 6063-T5, pre-finished, 105 mm x 10 mm x 1.6 mm wall thickness (4.13" x 0.394" x 0.063"), custom designed closure to fit onto pre-moulded end mounting brackets without exposed fasteners. Colour: clear anodized. Fascia shall allow for continuous placement across multiple shades (to a maximum length of 6.1m (20ft.) without exposed fasteners. Fascia shall conceal the mounting hardware, power and control cables, drive mechanism, roller tube, and all fabric rolled on the tube. Fascia shall not fit snug against side channels to prevent thermal shock to the glazing system.
- .13 Blackout Side Channels:
 - .1 Side channel shall be a slim line design 2 piece side channel inside mount 50 mm x 13 mm. Provide sealant for light tight seal. Colour: Clear Anodized aluminum.
- .14 Fabric Retainer System: Fabric shall be reinforced at edges with a frequency thermo-weld seal to prevent edges from fraying. Fabric retainers are positioned laterally on edge of fabric every 200 mm (8") to 300 mm (12") to prevent fabric escaping or being pulled out of the side channel.
- .15 Finishes: All exposed aluminum shall be clear anodised finish according to AA-M12C22A31 or coloured to match window framing. Unexposed aluminum unless otherwise specified: mill finish.
- .16 Shade Fabrics:
 - .1 Green Screen Eco 3% Series by Nysan: Fabric weight 8 oz/yd², Fabric Thickness 19 mil, Break Strength warp 240daN/5cm weft 200daN/5cm, Flame Res. 0.0 sec after flame, Fuel contributed value: 0, Average Openness: ±3% (ECO), Colorfastness to light: 7/8, Composition: Fabric made with 100% Polyester yarn, PVC free, and VOC free.
 - .2 Green Screen X-Lite Series by Nysan: Fabric weight 8 oz/yd², Fabric Thickness 19 mil, Break Strength warp 240daN/5cm weft 200daN/5cm, Flame Res.: 0.0 sec after flame, Fuel

ROLLER SHADES

contributed value: 0, Average Openness: Black out Material – 0% Open, Colorfastness to light: 7/8, Composition: Fabric made with 60% Polyester yarn 40% Acrylic, PVC free, and VOC free.

- .3 Shade Fabric Colour: To be selected by Architect from manufacturer's full colour range.
- .4 Provide a weighted hem bar to maintain a straight bottom and a flat shade surface.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Site Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation. Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

- .1 Coordinate location of support framing and blocking for installation of roller blinds.
- .2 Install blinds in accordance with manufacturer's printed installation instructions and with concealed anchorage.
- .3 Install roller blinds free of twist, warp or distortion.
- .4 Install roller blinds plumb, square, evenly spaced, in alignment and parallel with window plane.

END OF SECTION

FLEXIBLE LABORATORY FURNITURE SYSTEM

- 1. PART GENERAL
- 1.1. GENERAL REQUIREMENTS
 - 1.1.1. Conform to Division 01, General Requirements.
- 1.2. SECTION INCLUDES
 - 1.2.1. Modular Support Structure and Structural Table Base.
 - 1.2.2. Mobile Base / Wall Cabinets and Shelves.
 - 1.2.3. Fixtures and related Service Connections.
- 1.3. RELATED SECTIONS
 - 1.3.2. Solid Composite Worksurfaces: Section 12 36 53
 - 1.3.4. Plumbing Fixtures: Division 22
 - 1.3.5. Electrical: Division 26
- 1.4. REFERENCES
 - 1.4.1. SEFA 8: Laboratory Furniture – Casework, Shelving and Tables Guidelines
 - 1.4.2. ISO 9001:2015 – Quality Management International Standards Organization (ISO).
- 1.5. SUBMITTALS
 - 1.5.1. Product Data: Drawings to include data and details for construction of the laboratory furniture. Further, provide name, quantity, type and construction of materials (such as hardware, gauges, etc).
 - 1.5.2. Shop Drawings:
 - a. Provide shop drawings showing the layout and placement of all products by this section.
 - b. Show the type and location of all service fittings by this section.
 - c. Preparation instructions and recommendations.
 - d. Storage and handling requirements and recommendations.
 - 1.5.3. Selection Samples: Submit: one complete set of color chips showing the manufacturer's full range of colors. Minimum sample size: 2" x 2-1/2".
 - 1.5.4. Quality Assurance/Control: Design Data/Test Reports: Submit test data and design criteria in compliance with the project specifications.
- 1.6. QUALITY ASSURANCE
 - 1.6.1. Manufacturer Qualifications:
Provide to the Architect at least ten days prior to the bid opening:
 - a. List of manufacturing facilities.
 - b. Construction details depicting the materials, sizes, and methods of construction.
- 1.7. DELIVERY, STORAGE AND HANDLING
 - 1.7.1. Packaging, Shipping, Handling and Unloading:

FLEXIBLE LABORATORY FURNITURE SYSTEM

- a. Products to have packaging adequate to protect finished surfaces from soiling or damage during shipping, delivery, and installation.
- b. Delivery: Product delivery to take place after painting, utility rough-ins and related activities are completed that could otherwise damage, soil or deteriorate casework in installation areas.
- c. Handling: Always use proper moving equipment and personnel. Any wrapping or other method of protection to be left in place to avoid damage.
- 1.7.2. Acceptance at Site: Product is not to be delivered or installed until the conditions specified under Part 3, Installation, have been met.
- 1.7.3. Storage: Product to be stored in the area of installation. If it is necessary for product to be temporarily stored in an area other than the installation area, the environmental conditions to meet the environmental requirements specified under the Project Site Conditions article of this section.
- 1.7.4. Waste Management and Disposal: Remove any waste or refuse resulting from the installation of laboratory furniture products. Leave the project site broom clean and free of debris. Trash container(s) to be provided by others.
- 1.8. PROJECT SITE CONDITIONS
 - 1.8.1. Building must be enclosed. Windows and doors sealed and weather-tight.
 - 1.8.2. An operational HVAC system that maintains temperature and humidity at occupancy levels must be in place.
 - 1.8.3. Adjacent and related work to be complete.
 - 1.8.4. Ceiling, overhead ductwork and lighting must be installed.
 - 1.8.5. Site must be free of any further construction such as "wet work".
 - 1.8.6. Required backing and reinforcements must be installed accurately, and the project must be ready for furniture installation.
- 1.9. WARRANTY
 - 1.9.1. Furnish a written warranty that work performed under this section to remain free from defects as to materials and workmanship for a period of two years from date of shipment. Defects in materials and workmanship that develop within this time are to be replaced without cost or expense to the Owner.
 - 1.9.2. Defects include, but are not limited to:
 - a. Ruptured, cracked, or stained coating
 - b. Discoloration or lack of finish integrity
 - c. Cracking or peeling of finish
 - d. Slippage, shift, or failure of attachment to wall, floor, or ceiling
 - e. Weld or structural failure

FLEXIBLE LABORATORY FURNITURE SYSTEM

- f. Warping or unloaded deflection of components
 - g. Failure of hardware
 - 1.9.3. The warranty with respect to products of another manufacturer sold by Mott Manufacturing is limited to the warranty extended by that manufacturer to Mott Manufacturing.
- 2. PART PRODUCTS
 - 2.1. MANUFACTURER
 - 2.1.1. Acceptable Manufacturer:
 - a. Mott Manufacturing Ltd.; as represented by MottLAB or equal.
 - b. Other manufacturers that comply with the minimum thicknesses of material and similar construction appearance and quality as specified and shown in drawings.
 - 2.2. MATERIALS
 - 2.2.1. Sheet Steel: Mild steel, cold rolled furniture grade to requirements of ASTM A1008/A1008M, Grade C or higher
 - 2.2.2. Galvanized Sheet Steel: Commercial quality, to ASTM 653, Designation Z275.
 - 2.2.3. Stainless Steel: to ASTM A240, T304 and T316 alloy, #4 brushed finish.
 - 2.3. DESIGN REQUIREMENTS

Basis of design: Mott Manufacturing Altus Table system.

 - 2.3.1. Modular system to be made of tubular style framing combined with rectangular formed steel uprights.
 - 2.3.2. Allow for custom cabinet size fabrications as noted on Drawings.
 - 2.3.3. Tubular Frames / Table Supports to be adjustable height in 1" increments and complete with levelers.
 - 2.3.4. Rear frame to be used for carrying services and electrical conduit.
 - a. Rear upright supports to be equipped with slots for adjustable shelving and levelers.
 - b. All services supplied with hose and quick disconnect to reach ceiling panel supply.
 - 2.3.5. Assembled frame to be self-supporting without needing to be anchored to the building.
 - 2.3.6. The modular system must ship complete from the factory with minimal on-site assembly.
 - 2.3.7. Altus Tables (C2a through C4b on Laboratory Architect Drawings) without upright supports are not to have pre-plumbed or pre-wired services in them, however, they are otherwise constructed as described herein.
 - 2.4. ALTUS CONSTRUCTION
 - 2.4.1. Rear Support Structure:

FLEXIBLE LABORATORY FURNITURE SYSTEM

- a. Nominal rear frame dimensions: Width: 48", 60", 72", Depth: 3", Height: 84"
 - b. Rear Uprights:
 - i. 2" x 3" 14 ga. powder coated cold rolled steel
 - ii. 2" diameter nylon leveling glide 3/8" x 2-1/2" long threaded stem.
 - c. Upper Cross Rail: 16 ga. powder coated cold rolled steel
 - d. Load Capacity: Rear Upright to support up to 3 shelves loaded to a combined maximum of 400lbs. Shelf depths available as 12" or 15" deep.
 - e. Uprights to house services, electrical and data cables:.
 - f. Wire management tray to be under countertop.
 - g. Rear posts have slots punched on 1" increments starting at nominal 59" above the finished floor.
- 2.4.2. Tubular Table Assembly:
- a. Nominal table assembly dimensions: Width: 48", 60", 72", Depth: 23" or 29", Height: Adjustable from 29" – 36" (not including work surface).
 - b. Tubular Table Legs:
 - i. 2" outside square, 14ga. powder coated cold rolled steel.
 - ii. 1-3/4" outside square, 11ga. powder coated cold rolled steel inner telescoping leg.
 - iii. 2" diameter nylon leveling glide 3/8" x 2-1/2" long threaded stem
 - c. Capable of vertical height adjustment in 1" increments.
 - d. Table assembly to be fastened to the rear upright with two (2) hex 3/8" socket head bolts.
 - e. Hanging Rails: Front apron and rear support are to have rails allowing suspended cabinets to hang from.
 - f. Leveling Bolt: Frame to be fitted with a leveling bolt which will allow the legs to be adjusted for proper alignment of work surface height.
 - g. Load Capacity: Table frame to support 1000lbs maximum, width of bench may not exceed 72".
- 2.4.3. Shelves:
- a. Nominal shelf dimensions: Width: 48", 60", 72". Depth: 12" or 15" for shelves. 1" thick.
 - b. Shelf requirements:
 - i. Shelves constructed of powder coated cold rolled steel.
 - ii. Shelves to be flush with the face of the rear rectangular posts.
 - iii. Shelf brackets to be constructed powder coated cold rolled steel
 - iv. Bottom and middle shelves to have a rear 1" high retaining lip. Top shelf assemblies do not come with retaining lip.

FLEXIBLE LABORATORY FURNITURE SYSTEM

- v. Vertical shelf adjustment in 1" increments.
- 2.4.4. Mobile Base Cabinets:
 - a. Design and construction to be as in section 12 35 53.13 Metal Laboratory Casework.
 - b. Minimum each and to be locking type. Cabinet height must ensure 2-½" of clearance under the table frame.
- 2.4.5. Plumbing/Fixtures:
 - a. Provide fixtures as shown on drawings.
 - b. Rear upright structure to support a maximum of three plumbing fixtures on one side.
 - c. Compressed air fixture: dual-90 degree celcon needle valves, ColourTech (white).
 - d. Nitrogen air fixture: dual-90 degree celcon needle valves, ColourTech (white).
 - e. Vacuum air fixture: dual-90 degree celcon needle valves, ColourTech (white).
 - f. Plumbing lines to be polyurethane routed out the top of the upright.
 - g. All plumbing to have service hose at the top of the upright with additional 4' of hose length to reach the ceiling supply panel.
 - h. Plumbing to be arranged that they services cannot be intermixed.
 - i. All service valves and quick disconnects to be keyed and color coded. Only plug and body connects of the same key will couple and allow flow.
- 2.4.6. Electrical: Each Altus table to have 6 120V Receptacles, 2-20A circuits, factory prewired and complete with a 4' cord and twist lock plug.
- 2.4.7. Data: Each Altus table to have a factory pre-wired data receptacle (Cat 6A) capable of providing 4 ethernet connections.
- 2.5. CEILING SERVICE PANELS
 - 2.5.1. General Construction:
 - a. Panels shall be compatible with most T-grid acoustical suspended ceiling structures.
 - b. Panel shall provide a means to mount and disconnect quick connect service fixtures, electrical and data outlets.
 - c. Panel shall accommodate single sided and back-to-back bench configurations.
 - d. Panels ship with junction boxes and cover plates.
 - e. Provide quick connect fitting, electrical receptacles, and data receptacles as shown on drawings.
 - f. Panels shall be 23-¾" x 23-¾" x 1", 14 gauge cold rolled steel with a powder coated finish. Colour by Architect.
- 2.6. STEEL FURNITURE FINISH
 - 2.6.1. Metal finishes to meet or exceed current SEFA standards.
 - 2.6.2. Provide a third-party certificate to showing compliance.

FLEXIBLE LABORATORY FURNITURE SYSTEM

2.6.3. Colour selection per Drawings.

3. PART EXECUTION

3.1. INSTALLATION

- 3.1.1. Install casework within system, align and set level with levelling devices, in accordance with shop drawings.
- 3.1.2. At wall locations secure wall cabinets to face of finished walls and partitions, applying self-tapping screws through wall finish material into each concealed stud flange.
- 3.1.3. Install components to provide a secure, neat, and complete installation.

END OF SECTION

SOLID COMPOSITE WORK SURFACES

PART 1. GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Conform to Division 01, General Requirements.

1.2 SECTION INCLUDES

- .2 Solid composite work surfaces.

1.3 RELATED SECTIONS:

- .1 Flexible Laboratory Furniture System: Section 12 35 53
.2 Plumbing Fixtures: Div 24

1.4. REFERENCES

- .1 SEFA 3-2010 Recommended practices for laboratory work surfaces
.2 International Standards:
.1 ASTM D3023 & C1378 – Stain Resistance
.2 ASTM D696 – Thermal Co-efficient of Expansion
.3 ASTM E1428 / JIS Z 2801:2012 (mod) – Bacteria Resistance
.4 EN 438-2:12 – Boiling water absorption
.5 EN 438-2:16 – Standard Test Method for Resistance to Dry Heat
.6 EN 12721 – Standard test method for resistance to wet heat
.7 EN 438-2:17 Dimensional stability in elevated temperature (ASTM D648 – Heat distortion)
.8 EN 438 – 2:21 – Impact resistance
.9 EN 438 -2:25 – Standard Test Method for Resistance to Scratch
.10 EN 438 – 2:27 – Light fastness
.11 EN ISO 178/ASTM 790-08 – Elasticity and flexural strength
.12 EN ISO 1183 – Density
.13 ASTM e-84 – Surface burning / flame spread.
.14 ASTM D785 – Rockwell hardness
.15 ISO 9001 – quality management systems
.16 ISO 14001: 2015 – Environmental management system
.17 ISO 50001:2018 – Energy Management System
.18 ISO 45001:2018 -Occupational health and safety management system

1.5. SUBMITTALS

- .1 Submittals for Review in accordance with Section.
.1 Product data: Manufacturer's data sheets on each product used,

SOLID COMPOSITE WORK SURFACES

including preparation instructions/installation instructions and recommendations; storage & handling requirements.

.2 Samples:

- .1 Selection Samples: for each product specified, submit a complete set of color samples representing manufacturer's full range of standard colors
- .2 Verification samples: Submit four samples 100mm x 150mm representing each color and thickness of material used

.2 Quality Control Submittals: Test Reports – independent/certified test reports showing compliance with specified performance characteristics and physical properties.

1.6. QUALITY ASSURANCE

.1 Manufacturer qualifications:

- .1 Primary product furnished by a single manufacturer with a minimum of 10- years (documented) experience in work of this section.
- .2 Products manufactured in an ISO 9001 certified facility.

1.7. WARRANTY

Provide warranty for an extended period of 10 years. The warranty to include the specified physical and chemical properties. The manufacturers authorized fabricator, product installer and panel manufacturer must sign the warranty documents and submit a copy to the contractor.

PART 2. PRODUCTS

2.1. MANUFACTURER

- .1 Fundermax
- .2 Durcon SPC Chemical Resistance

2.2. MATERIALS

- .1 Basis of Design: Fundermax Max Resistance² with post-consumer recycled content (min 65%), a double sided and double-cured polyurethane acrylic surface finish (Optional: with Color Through Core)
- .2 Basis of Design Product: Subject to compliance with requirements, provide phenolic Max Resistance² with post-consumer recycled content (min 65%), double hardened acrylic coating top and bottom as manufactured by Fundermax GmbH, or a comparable product by one of the following:
 - .1 Fundermax GmbH / Fundermax North America LLC
 - .2 Durcon

SOLID COMPOSITE WORK SURFACES

| | |
|--|---|
| Typical Counter | Fundermax Max Resistance ² (Option: Colour Through Core) |
| ESD Counter | Fundermax MAX Compact Interior (in clean room only) |
| Typical Base | Mott Altus Table System (Option: No services/shelves) |
| ESD Base be black | Mott Altus Table System (Option: Grounding Lug) |
| Fundermax's Colour Core for the ESD Black and Volcano Grey 2181 tops | |

- .2 Grommets: Provide 50mm dia grommets by Hafele or approved equal. Location to be determined on site

2.3. MATERIAL PROPERTIES

- .1 Work surfaces – shall be constructed of chemical resistant panels that are double sided and color matched top and bottom.
- .2 Thickness – As specified on drawings or by Architect.
- .3 Cabinets – shall be constructed as per the cabinet manufacturer's specification with chemical resistant panels that are double sided with a double cured polyurethane integrated acrylic surface.
- .4 Color: Colored Core to be Selected by Architect: 0085 white with 0085 white core; 0074 pastel grey with 0074 pastel grey core; 0077 charcoal with 0077 charcoal core; 2181 volcano with 2181 volcano core.
- .5 Finish – matte non-glare.
- .6 Chemical resistance
 - .1 Evaluation of chemical resistance based on SEFA 3-2010 Laboratory Work Surfaces standard list of 49 chemicals / concentrations, their required methods of testing (24-hour surface test) and exceed the acceptable results as a means of establishing an acceptable level of performance for all exposed and semi- exposed surfaces.
 - .2 The chemical resistance performance as follows:
 - .1 Rating Scale:

Level 0 - No detectable change.

Level 1 - Slight change in color or gloss.

Level 2 - Slight surface etching or severe staining.

Level 3 - Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

SOLID COMPOSITE WORK SURFACES

| CHEMICAL/REAGENT | TEST METHOD | RATING |
|-------------------------|-------------|--------|
| ACETATE, AMYL | A | 0 |
| ACETATE, ETHYL | A | 0 |
| ACETIC ACID - 98% | B | 0 |
| ACETONE | A | 0 |
| ALCOHOL, ETHYL | A | 0 |
| ALCOHOL, METHYL | A | 0 |
| ALCOHOL, BUTYL | A | 0 |
| AMMONIUM HYDROXIDE, 28% | B | 0 |
| BENZENE | A | 0 |
| CARBON TETRACHLORIDE | A | 0 |
| CHLOROFORM | A | 1 |
| CHROMIC ACID - 60% | B | 0 |
| CRESOL | A | 1 |
| DICHLORACETIC ACID | A | 2 |
| DICHROMATE ACID 5% | B | 1 |
| DIMETHYLFORMAMIDE | A | 0 |
| DIOXANE | A | 0 |
| ETHYL ETHER | A | 0 |
| FORMALDEHYDE, 37% | A | 0 |
| FORMIC ACID - 90% | B | 1 |
| FURFURAL | A | 1 |
| GASOLINE | A | 0 |
| HYDROCHLORIC ACID 37% | B | 0 |
| HYDROFLUORIC ACID, 48% | B | 1 |
| HYDROGEN PEROXIDE, 30% | B | 2 |
| IODINE, TINCTURE OF | B | 1 |
| METHYL ETHYL KETONE | A | 0 |
| METHYLENE CHLORIDE | A | 0 |
| MONOCHLOROBENZENE | A | 0 |
| NAPHTHALENE | A | 0 |
| NITRIC ACID 20% | B | 0 |

SOLID COMPOSITE WORK SURFACES

| | | |
|---|---|---|
| NITRIC ACID 30% | B | 0 |
| NITRIC ACID 70% | B | 0 |
| PHENOL, 90% (WT) | A | 1 |
| PHOSPHORIC ACID 85% | B | 0 |
| SILVER NITRATE, SATURATED | B | 0 |
| SODIUM HYDROXIDE FLAKE | B | 0 |
| SODIUM HYDROXIDE, 10% (WT) | B | 0 |
| SODIUM HYDROXIDE, 20% (WT) | B | 0 |
| SODIUM HYDROXIDE, 40% (WT) | B | 0 |
| SODIUM SULFIDE SATURATED | B | 0 |
| SULFURIC ACID, 33% | B | 0 |
| SULFURIC ACID, 77% | B | 0 |
| SULFURIC ACID, 77% & NITRIC ACID, 70% EQUAL PARTS | B | 2 |
| SULFURIC ACID, 96% | B | 1 |
| TOLUENE | A | 0 |
| TRICHOLOROETHYLENE | A | 0 |
| XYLENE | A | 0 |
| ZINC CHLORIDE, SATURATED | B | 0 |

.7 Physical Properties:

- .1 Density DIN 52350 / ISO 1183: $\geq 1,35\text{g/cm}^3$ / $\geq 84\text{lbs/ft}^3$.
- .2 Modulus of elasticity EN ISO 178: $\geq 9000\text{MPa}$ / $\geq 1,305,340$ psi.
- .3 Flexural Strength EN ISO 178: ≥ 80 MPa / $\geq 11,603$ psi.
- .4 Tensile Strength EN ISO 527-2: ≥ 60 MPa / $\geq 8,702$ psi.
- .5 Resistance to Scratching EN 438-2 point 25: 4-6 N (6N = 1.35lbf).
- .6 Resistance to Impact EN 438-2 point 21: $\geq 8\text{mm}$ / $\geq 1/3"$.
- .7 Resistance to stress Abrasion EN 438-2 point 10: ≥ 450 U (rotations).
- .8 Dimensional stability measured at elevated temperatures with moisture change EN 438-2, point 17: $\leq 0.10\%$ length : $\leq 0.21\%$ width (CGS).
- .9 Resistance to boiling water EN 438-2, point 12: 0.5% (CGS/CGF) 1.5 (BCS).
- .10 Co-efficiency of thermal expansion DIN 52328: 20×10^{-6} .
- .11 Resistance to dry heat EN 438-2, point 16: 4.

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- .12 Resistance to staining EN 438-2, point 26 (group 1-2): 5 no visible changes, no blisters or cracks.
- .13 Light fastness EN 438-2 point 27: 4 or 5.
- .14 Non porous and non-microporous surface and edges.
- .15 Surface will not support bacteria growth.
- .16 Will not support oxidation of material surface.
- .17 Both sides decorative and chemical resistant.
- .18 Double hardened acrylic surface finish.
- .19 Min thickness of the acrylic finish: $\geq 0,1\text{mm} / 0.004''$
- .20 Environmental standards: FSC / PEFC certification ; Environmental Product Declaration (EPD) ; Manufacturer recycles waste and cutoffs to produce green electricity.
- .21 Fire Rating:
 - 1. Flame Spread Index: 25
 - 2. Smoke Developed Index: 130

2.4. FABRICATION

- .1 Fabricate panels as per shop drawings: Drip grooves 3mm set back 6mm from face on the underside at all exposed edges unless otherwise noted on Laboratory Furnishings drawings.
- .2 Marine Edge treatment:
 - .1 All exposed edges to be sanded to a smooth finish.
 - .2 All edges to be marine edge type.
- .3 Curb/Back splash
 - .1 Supplied loose for field installation.
 - .2 Same material as the work surface/countertop.
 - .3 4" high unless otherwise indicated on the drawing.
 - .4 Bonded to the top of the work surface to form a square joint.
- .4 Joints:
 - .1 Tight fitting butt joints (recommended) – adhered with reactive adhesive/resin adhesive or mechanical fasteners positioned to be concealed after installation.
 - .2 Standard butt joints – a 1.5mm seam using a two-part epoxy adhesive/grout.
 - .3 Fix work surface panels with blind fastenings into the back or underside

SOLID COMPOSITE WORK SURFACES

of the panel. Use #10, type A sheet metal screws sized to stop at least 3mm short of the finished face. Pre-drill panel with clearance hole in the supporting structure. Or Max Compact panels can be bonded to wood materials using a high-quality PVA glue.

.5 Sink cutouts:

- .1 Drop in – shall be routed to form openings with 10mm minimum depth supporting flanges and such that the rim of the sink, when installed is at the same level as the work surface top. Epoxy sinks shall be set in a bed of two-part epoxy adhesive/grout. Stainless steel and polypropylene sinks shall be set in a bed of silicone sealant.
- .2 Under Mount – routed to form smooth edged openings with the top edge radius. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radius not less than 3mm. All undermount sinks shall be supported by brackets blind fixed to the underside of the work surface and/or cabinet.

.6 Allowable tolerances:

- .1 Square: +/- 1.0mm per running foot
- .2 Location of cutouts / drilled openings: +/- 1.0mm of design dimension
- .3 Size of cutouts / drilled openings: +/- 1.0mm.

PART 3. EXECUTION

3.1. EXAMINATION

- .1 Do not begin installation of work surfaces/countertops until cabinets have been installed.
- .2 Confirm that surfaces to receive tops are plumb, level with a maximum deflection of 6mm in 6.0m.

3.2. PREPARATION

- .1 Prepare surface as per methods recommended by manufacturer.

3.3. INSTALLATION

- .1 Install in accordance with approved shop drawings and manufacturer's instructions.
- .2 Adhere to adjacent surfaces in accordance with manufacturer's recommendations.
- .3 Fasten tops to supporting construction with adhesive appropriate for use with adjoining construction and as recommended by the manufacturer.
- .4 Form field joints using manufacturer's recommended adhesive. Joints to be

SOLID COMPOSITE WORK SURFACES

inconspicuous and nonporous.

- .5 Install laboratory shelving, pegboards, and reagent racks using fasteners and adhesive appropriate for use with adjoining construction and as recommended by the manufacturer.

- .1 Adhesive options: For installation of materials in permanent location bond joints with a high chemical resistant sealant with color similar to base material.

3.4. PROTECTION

- .1 Following installation, the General Contractor shall ensure the work surfaces/countertops are protected from damage. The tops shall be kept free from paint, plaster, cement scratches or any other destructive forces.

END OF SECTION

MODULAR CLEANROOM

1. PART GENERAL

1.1. GENERAL REQUIREMENTS

- 1.1.1. Conform to Division 01, General Requirements.

1.2. DESCRIPTION

1.2.1. Work Included:

- a. Provide Modular Cleanroom for the Work.

1.2.2. Related Work Specified Elsewhere:

- a. Rubber Sheet Flooring: Section 09 65 15
b. Mechanical: Division 20-25
b. Electrical: Division 26

1.3. REFERENCE STANDARDS

- 1.3.1. ISO 14644-4 Design, Construction and Start Up – Cleanrooms and associated controlled environments
- 1.3.2. NAPRA – Model Standards for Pharmacy Compounding of Non-Hazardous Sterile Preparations - 2016
- 1.3.3. NAPRA – Model Standards for Pharmacy Compounding of Hazardous Sterile Preparations – 2016.
- 1.3.4. 2017 – USP Compounding Compendium General Chapter 797, General Chapter 800.
- 1.3.5. CSA Z317.2-15 – Special requirements for heating, ventilation, and air-conditioning systems in health care facilities.
- 1.3.6. CSA Z317.13-17 – Infection Control during Construction Renovation and Maintenance of Health Care Facilities.

1.4 SYSTEM DESCRIPTION

1.4.1. Cleanroom Modular Wall/Ceiling System Requirements:

- a. Construct cleanroom of modular aluminum honeycomb panels c/w galvanized steel skins, uPVC finish and demountable panels with fine line seams and cold welded finish.
- a. Non-walkable cleanroom ceiling system with Precision T Grid Clear Anodize Aluminum Finish and D-Lite Solid Core Ceiling.

MODULAR CLEANROOM

1.4.2. Performance:

- a. Meet NAPRA model standards, Section 5.3 requirements for construction and performance.
- b. Primary compounding rooms designed as 'Clean-Not-Classified' with a minimum of 10 ACH. Room conditions of 20C, 30%RH – 50%RH.
- c. Design conditions outside of clean room: 23° C dry bulb max. and 18 °C max. wet bulb.
- d. Provide an overall safety factor on loads and equipment selection of 5%.
- e. Lighting levels in the room in accordance with CSA Z317.5.
- f. Power receptacles as noted on drawings imbedded in wall system. No exposed conduits or raceways.
- g. Trim kit to fit room into adjacent architectural finishes

1.4.3. Mechanical Systems:

- a. Base building contractor to provide:
 - 1. Conditioned ventilation/cooling air, and exhaust ductwork to the perimeter of the cleanroom as indicated on the mechanical drawings/specifications.
 - 2. Sprinkler system for cleanroom area. Openings in cleanroom panels by this Section.
- b. This Section responsible for the design and installation of all ductwork, dampers, air valves, exhaust ducting, and pressure control for cleanroom.
- c. Provide terminal HEPA units for supply air to cleanroom.
- d. Provide pressure control monitoring to provide audible and visual indication of alarm conditions.

1.4.4. Electrical Systems:

- a. Provide distribution panel and wiring, receptacles, data, lighting, and controls within cleanroom.

1.5 SUBMITTALS

1.5.1. Provide submittals in accordance with Section 01 33 00.

1.5.2. Shop Drawings:

- a. Include in drawing plan view of room and equipment, elevation view with equipment, electrical power and control drawings and equipment list. Construction/layout, equipment sizes, equipment capacities, air delivery systems relative to system load including safety factor and lighting design calculations.

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- b. HVAC Shop Drawings:
 - 1. *Indicate unit, complete specifications, dimensions, sizes, required clearances, and connection details to base building systems.*
 - 2. *Product data to indicate dimensions, weights, and ratings, characteristics and finish materials.*
 - 3. *Indicate product data on all filtration media and filter performance.*
 - 4. *Indicate electric requirements for power supply wiring including wiring diagrams for interlock and control wiring.*
 - 5. *Indicate all control system components, devices, and assembly complete with schematic wiring diagrams and control sequence descriptions.*
 - 6. Sizing and details of dedicated HVAC and Terminal Fan powered HEPA systems.
 - 7. HVAC and pressure control details.
 - c. Indicate features of units including but not limited to the following: switches, locks, doors, light fixtures, shelving, services, recorders, utility connection points, signage, and closure trim. Dimension items for both size and location. Shop drawings shall note work provided by others. Coordinate services with mechanical, electrical, and other trade subcontractors.
 - d. Provide lighting calculations to support the number of fixtures required. Provide output from the IES approved software system indicating luminance calculations to meet the required CSA 317.5 illumination requirements. Provide a reflected ceiling plan that supports the desired luminance level. Provide cut sheet of selected high efficiency LED lighting fixtures.
- 1.5.3. Samples: Submit one sample of panel finish when requested by Consultant.
- 1.5.4. Provide operation and maintenance data for incorporation into manual specified in Division 01.
- 1.5.4. Provide testing plan, from third party testing company, for certification of the cleanroom.
- 1.6 QUALITY ASSURANCE
- 1.6.1. Supply, installation and commissioning of the Cleanroom must conform to ISO 14644. All design drawings must be reviewed and approved by on-staff Professional Engineer and must demonstrate local warranty and service support.
- 1.7 DELIVERY, HANDLING and STORAGE
- 1.7.1. Deliver, store and handle materials in manner to prevent damage and deterioration. Protect all factory finished panel surfaces subject to damage while in transit and after installation.

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- 1.7.2. Do not deliver materials or assemblies to site until installation spaces are ready to receive rooms. Cover and protect panels as required to prevent site damage.

1.8 WARRANTY

- 1.8.1. Provide written warranty stating the product is free from defects in material or workmanship under normal use and service. The warranty to cover the following:
- a. One-year parts and labour warranty on all components.
 - b. Five-year panel warranty.
- 1.8.2. Warranty to indicate, that one year after acceptance, the cleanroom will, under normal operation.
- a. Maintain within specified tolerance the selected temperature settings.
 - b. Be free from defects due to faulty materials or workmanship.

2. PART PRODUCTS

2.1. ACCEPTABLE CLEAN ROOM MANUFACTURERS

- 2.1.1. Basis of Design: Labworks International, Woodbridge, ON – 416.977.5477.
- 2.1.2. Equal: Environmental Systems Corp., Barrie ON. 705.797.8877.
- 2.1.3. Equal: Mecart, St. Augustin-de-Desmaures, QC, 418.880.7000.

2.2. MATERIALS and COMPONENTS

2.2.1. Cleanroom Wall System:

- a. Description: Non-load bearing, flush wall system with aluminum honeycomb core, galvanized steel skins and un-plasticized PVC finish on both sides. Wall panels shall snap into aluminum furring clips and be demountable with fine line seams, cold welded except for removable panels. Caulk removable panels.
- b. Materials: Panel size: Maximum 1219mm x 4876mm. Panel thickness – 50mm for studless panel system, 12mm for liner panel. Galvanized steel skin 30ga.
- c. Liner Panels: Matching UPVC finish and sealed seams and attached to standard stud wall where noted on drawings.
- d. Panel Fabrication: Continuously bonded galvanized steel skins to aluminum honeycomb creating a homogeneous construction panel.
- e. *Screed system to allow for leveling of wall system. Screed to be recessed to allow for flooring to be coved in place.*
- f. *Panels to incorporate chase-ways as required for services in the clean room.*

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- g. *Finish: Snow white uPVC on both sides.*
- h. *Low Level Return Air Chases: Construct low-level return air chases with either raised wall opening or stainless-steel grille. Locate as required for required performance of the room.*

2.2.2. Cleanroom Ceiling System:

- a. *Description: Non-walkable ceiling with T-Bar suspension system with 50mm x 38mm gasketed grid in powder-coated white finish. Demountable panels with fine line seams.*
- b. *Materials: Panel size – maximum 1470mm x 3048mm. Panel thickness 50mm. Galvanized steep skin 30 ga.:*
 - 1. *Mounting Components – Zinc plated steel plates, turnbuckles and fasteners to be zinc plated steel.*
 - 2. *Light / Filter Frames – welded T-bar frame with a powder coat hybrid polyester-epoxy white paint finish, sized to match fixture requirements*
- c. *Panel Fabrication: Continuously bonded galvanized steel skins to aluminum honeycomb creating a homogeneous construction panel.*
- d. *Finish: Snow white uPVC on cleanroom side.*

2.2.3. Coves:

- a. *Description: Snap-in PVC coving with preformed PVC internal and external corners to receive coving allowing for a continuous smooth system.*
- b. *Materials: Cove – white, 50mm radius extruded PVC. Attachment track: Mill finish, extruded aluminum. Preformed corners – injection molded smooth PVC.*
- c. *Cold-weld sealed on all sides.*

2.2.4. Flooring:

- a. *As specified in Section 09 65 16.*

2.2.5. Cleanroom Windows:

- a. *Description: Double glazed, trim-less, flush window system for installation in wall system.*
- b. *Unit thickness 50mm.*
- c. *Glazing – 2 – 5mm clear tempered panes.*
- d. *Edge Construction: Black powder coated extruded aluminum glazing frame with groove to facilitate the joining and support to the adjacent panel utilizing a plastic spline connector.*
- e. *Glass to be bonded to aluminum glazing frame.*

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- f. *Vent glazing frame to interior of window and filled with desiccant*

2.2.6. Aluminum Cleanroom Doors:

- a. *Description: Welded Miter or standard crimp miter, powder coated hybrid polyester-epoxy painted door units with full glaze and specified hardware. (reference door hardware schedule.*
- b. *Overall Frame and Unit thickness 50mm.*
- c. *Glazing – 2 – 5mm clear tempered pane.*
- d. *Fabrication: Construct door leaf and jamb of an epoxy powder coated aluminum extrusion frame. Supply doors with full glazing c/w standard double gasket.*

2.2.7. Cleanroom HVAC System:

- a. *General: Provide HVAC system from supply, return, and exhaust connection points provided by base building mechanical. Include ducting above the cleanroom including Professional Engineered design, installation, site supervision, commissioning and independent certification by a NEBB accredited testing agency.*
- b. *Mechanical ducting, air-valves, dampers, and controls must be suitable for a cleanroom environment and in accordance with the mechanical specification requirements.*
- c. *Equipped each pressure zone with an electronic pressure monitoring indicator c/w LCD display and BACNET interface to base building BAS for alarming.*

2.2.8. Cleanroom Lighting:

- a. *Basis of Design: Certolux CRIF series cleanroom grade LED luminaire or equivalent.*
- b. *Provide sufficient fixtures to meet required light levels as required by the CSA Z317-5 Illumination in Healthcare Facilities.*
- c. *Provide CSA approved fixtures.*

2.2.9. Stainless Steel Sink:

- a. *Hospital grade 316 stainless steel wall mounted sink, no overflow.*
- b. *Provide handsfree faucet with no aerator.*
- c. *Shroud complete unit to conceal plumbing connections for view.*

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3. PART EXECUTION

3.1. EXAMINATION

- 3.1.1. *Examine and verify areas and work of other trades for conditions that affect the work of this Section.*
- 3.1.2. *Ensure floor is level to accommodate the floor panels.*
- 3.1.3. *Report unsatisfactory conditions to Consultant in writing.*
- 3.1.3. *Do not begin installation until unsatisfactory conditions are corrected.*

3.2. INSTALLATION

- 3.2.1. *Perform installation by Specialty Room Supplier personnel or manufacturer's representative. Supplier shall supply factory trained, on-site supervision at all times when work of this Section is performed.*
- 3.2.2. *Provide appropriate protection apparatus.*
- 3.2.3. *Install in accordance with ISO 14644-4 – Cleanroom design & construction.*
- 3.2.4. *Erect work true-to-line, plumb, square and level with all joints aligned. Fit joints and intersecting members accurately and in true planes adequately fastened.*
- 3.2.5. *Cut or drill holes in panels, as required, to accommodate electrical and mechanical services, runs or connections. Cleanroom panel system to have integral raceways for services into the room.*
- 3.2.6. *Final connections of building utilities to room to be made by HVAC, plumbing, and electrical contractors.*

3.3. CLEANING AND ADJUSTING

- 3.3.1. *Upon completion of work, clean equipment and apparatus, remove protective coverings and test and adjust operating equipment. Provide a complete cleaning of the room and all associated equipment in preparation for certification testing.*

3.4. TESTING, BALANCING, AND TRAINING

- 3.4.1. *Provide complete air balancing of all systems by an independent AABC certified balancing contractor. Once balancing is complete and in compliance with design intent, certification testing may commence.*
- 3.4.2. *Employ an independent certification company to complete all required ISO certification tests to ensure this room meets all requirements for the ISO ratings as noted.*

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- 3.4.3. *Manufacturer to instruct Owner in the complete operation of room, including controls, after completion of room start-up.*
- a. *Provide up to 8 hours of demonstration and instruction in the complete operation and maintenance of the cleanroom.*
 - a. *Provide Operation and Maintenance data indicating sequential operation, start-up and shut-down, and preventative maintenance, with all pertinent control data, schematics, test results, quality control documents and as built drawings.*

END OF SECTION