



KITCHEN EXTERIOR REMEDIATION

SPECIFICATIONS & TENDER DOCUMENTS

Fire Station 66
3285 Dunrobin Road
Ottawa, Ontario

Prepared for:
City of Ottawa

Prepared by:
CLELAND JARDINE ENGINEERING LTD.

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1.0 GENERAL

- 1.1 The following is a general scope of work intended to assist the Contractor in assessing the kitchen exterior remediation work at 3285 Dunrobin Road, Fire Station 66.
- 1.2 The work generally includes the following: localized replacement of prefinished aluminum siding; localized replacement of exterior non-structural insulated sheathing; localized replacement of stud wall insulation; localized replacement of exterior windows; localized repair of wooden framing; repair of interior finishes; interior painting; localized asphalt shingle roof replacement; and cabinetry removal.
- 1.3 The area of work includes the northeast elevation at the front entrance including the northwest facing return to the garage bays and the northwest elevation for the length of the main building, excluding the rear addition. Accompany Consultant on a survey of the area of work to verify the precise location and scope of work.
- 1.4 It is the intention of the project drawings and specifications to achieve complete work. Any items that are understood to be necessary to complete the work, but are not directly identified, are considered to be part of the work.
- 1.5 The Contractor is to supply all labour, materials, equipment and services as necessary to achieve all work in accordance with the project Contract Documents.
- 1.6 The building will remain operational during construction. Coordinate access to the building to prevent disruption of building operations and activities.
- 1.7 Pay fees and obtain certificates and permits required to complete the work.
- 1.8 Provide work site safety in accordance with governing regulations and authorities. A site specific safety plan is required including emergency planning for those working at heights.
- 1.9 Prior to the start of work, submit shoring details for all work bearing the seal and signature of a Professional Engineer registered in Ontario. Supply, install and maintain shoring as required, for the duration of repair work.

2.0 MOBILIZATION

- 2.1 Provide protection, including barricades, as required to secure the work area and protect workers, building users and the general public.
- 2.2 Supply and install construction hoarding and signage (handwritten/spray-painted signage is not acceptable) for the duration of all portions of the Work to prevent public access to the areas of Work. This includes modular construction fencing with full-height protective mesh.
- 2.3 Mobilize access equipment to facilitate completion of the scope of work.
- 2.4 Provide protection for building finishes, exposed building elements and equipment in the work areas. This includes protection against water infiltration into the wall cavity or to the interior of the building during the Work. Be responsible for maintaining protection in place for the duration of the Work.

3.0 KITCHEN EXTERIOR REMEDIATION

3.1 Demolition:

- .1 Locally remove the prefinished aluminum siding, non-structural exterior sheathing, and stud wall batt insulation as detailed in the project documents and as specified on site by the Consultant.
- .2 Remove interior finishes around north corner windows at wall and ceiling to the limits specified on site by the Consultant. Allow for Consultant review of structural framing.
- .3 Remove three (3) windows from kitchen/office room at north corner of the building.
- .4 Shore wooden framing at northwest corner of building as detailed by a Professional Engineer registered in Ontario. Remove wooden framing damaged by moisture infiltration or remediation procedures, as specified on site by Consultant, not limited to window lintels, jambs, sills, and stud framing.
- .5 Remove kitchen cabinetry.
- .6 Remove the asphalt shingle roofing from the lower entrance canopy roof. Allow for Consultant inspection of the roof sheathing.

3.2 Exterior Wall Repairs:

- .1 Replace damaged structural wood framing in northwest corner of kitchen/office as directed on site by Consultant. Provide slab anchorage as specified in the project documents.
- .2 Install new framing to raise window sill height for three (3) windows to 36" from floor level, as per the project documents.
- .3 Install new asphalt shingle roofing as detailed including waterproof membrane at wall returns, and roofing membrane underlayment.
- .3 Install new stud cavity insulation, structural plywood sheathing, foil-faced polyisocyanurate exterior insulation with taped joints, and prefinished aluminum siding as per the project documents.
- .4 Provide new interior gypsum board finishes where removed and/or damaged. Repair gypsum board assemblies around the kitchen hookups and cabinetry anchor points.
- .5 Install new windows to the revised window sill height of 36" from floor level complete with trim.
- .6 Paint the kitchen/office room including walls, ceiling, and trim.

4.0 DE-MOBILIZATION

- 4.1 De-mobilize all equipment and materials from site.
- 4.2 Clean the area of work and all adjacent areas of all dust, debris and other deleterious materials.
- 4.3 Remove all temporary shoring.
- 4.4 Remove all hoarding and protective barriers. Remove temporary signage and reinstate regular traffic signage.

4.5 Provide Owner with all warranties and product manuals for work completed.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A653/A653M-17, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
 - .3 ASTM D1761-12, Standard Test Methods for Mechanical Fasteners in Wood.
- .2 American Wood Protection Association (AWPA):
 - .1 AWPA P5-15, Standard for Waterborne Preservatives.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
 - .2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction and amendment.
- .4 CSA International
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O80 Series-15, Wood Preservation.
 - .3 CAN/CSA-O86-14 Engineering Design in Wood.
 - .4 CSA O112 Series-M1977(R2006), CSA Standards for Wood Adhesives.
 - .5 CSA O141-05(R2014), Softwood Lumber.
 - .6 CSA O151-09(R2014), Canadian Softwood Plywood.
 - .7 CSA O325-16, Construction Sheathing.
 - .8 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.
- .5 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001- latest version, FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002-latest version, Structure and Content of Forest Stewardship Standards V2-1
 - .3 FSC Accredited Certified Bodies.
- .6 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2017.

1.2 ACTION & INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
 - .1 Submit shoring drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

1.3 QUALITY ASSURANCE

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

1.4 DELIVERY, STORAGE & HANDLING

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

PART 2 - PRODUCTS

2.1 FRAMING STRUCTURAL & PANEL MATERIALS

- .1 Lumber: softwood, S4S, moisture content S-DRY graded and stamped in accordance with following standards:
 - .1 CSA O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Framing and board lumber: in accordance with NBC, except as follows:
 - .1 Studs: spruce, pine or fir (SPF), 121c. "STUD".
 - .2 Joists, lintels, beams, and plates : spruce, pine or fir (SPF), 124b. "No. 1" STRUCTURAL, STRUCTURAL LIGHT FRAMING AND STRUCTURAL JOISTS AND PLANKS.
 - .3 Trusses: spruce, pine or fir (SPF), 124b. "No. 1"- STRUCTURAL, STRUCTURAL LIGHT FRAMING AND STRUCTURAL JOISTS AND PLANKS.

- .3 Furring, blocking, nailing strips, strapping, grounds, rough bucks, bracing, bridging, curbs, fascia backing and sleepers: NLGA spruce, pine or fir (SPF), 121c. and pine, 113d.
 - .1 Painted trim: eastern white or red pine, 101c. "C AND BETTER" FINISH
- .4 Plywood, OSB and wood based composite panels: to CSA O325.
- .5 Eastern white spruce plywood: to CSA 0151, urea formaldehyde free, CSP, Class II.
 - .1 Roof sheathing: SHG Sheathing Grade, unsanded. Nominal thickness 12.5 mm, square edge.
 - .2 Wall sheathing: SHG Sheathing Grade, unsanded. Nominal thickness 12.5 mm, square edge.
- .6 Isocyanurate sheathing: to ASTM C1289, faced both sides.
 - .1 Air seal: closed cell polyurethane or polyethylene.
 - .2 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick.
 - .3 Insulation:
 - .1 Batt Insulation: Inorganic rock fibre thermal insulation, pre-formed unfaced blankets, minimum thermal resistance R20, to CAN/ULC-S702 Type 1. Acceptable product: Comfortbatt by Rockwool or accepted equal.
 - .2 Spray-applied Foam Insulation: One component, moisture-cure, self-expanding, low-expanding, non-shrinking, polyurethane foam. Acceptable product: Great Stuff by DOW or accepted equal.
 - .4 Sealants: in accordance with Section 07 92 00.
 - .5 General purpose adhesive: to CSA O112 Series.
 - .6 Nails, spikes and staples: to CSA B111.
 - .7 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.
 - .8 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.
 - .9 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, type approved by Departmental Representative.
 - .10 Fastener Finishes:
 - .1 Galvanizing: to ASTM A123/A123M, use galvanized fasteners for exterior work, treated lumber.
 - .11 Sill Plate Anchors:
 - .1 Threaded Anchor Rod: ½" diameter HAS-E-B by Hilti or approved equivalent

2.2 ACCESSORIES

- .2 Epoxy: HIT HY-200 by Hilti or approved equivalent
- .12 Wood Preservative:
 - .1 Preservative Coating: in accordance with manufacturer's recommendations for surface conditions:

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Structure: Aid consultant in review of existing structure to identify deteriorated structural elements requiring replacement, repair or reinforcement, and verify the sound condition of remaining structural elements.
- .2 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 PREPARATION

- .1 Treat surfaces of applicable materials with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material as follows:
 - .1 Wood furring for siding.

3.3 MATERIAL USAGE

- .1 Roof sheathing: in accordance with paragraph 2.1.5.
 - .1 Construction sheathing product: end use mark 2R24.
- .2 Exterior wall sheathing: in accordance with paragraph 2.1.5.
 - .1 Polyisocyanurate sheathing, 25 mm thick.
 - .2 Construction sheathing product: end use mark W16.

3.4 INSTALLATION

- .1 Apply dampproof flashing over concrete or masonry on which wood framing bears.
- .2 Treat surfaces of pressure treated wood which are cut or bored after pressure treatment with field applied wood preservative.
- .3 Wood frame construction to National Building Code of Canada 2010, Division B, Part 4.

- .4 Do interior and exterior millwork to AWI/AWMAC/ WI AWS Section 6.
- .5 Install members true to line, levels and elevations, square and plumb to a tolerance of 1:600 and rigidly secure in place.
- .6 Construct continuous members from pieces of longest practical length.
- .7 Install spanning members with "crown-edge" up.
- .8 Install roof sheathing perpendicular to framing; stagger end joints, locate ends over framing. Install in accordance with requirements of NBC.
- .9 Install furring and blocking as required to space-out and support casework, wall and ceiling finishes, facings, fascia, soffit, siding, and other work as required.
- .10 Install furring to support siding applied horizontally.
 - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .11 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .12 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.
- .13 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .14 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.
- .15 Secure exterior work with galvanized or non-ferrous fasteners.
- .16 Apply continuous bead of sealant at junction between sill plate and concrete at exterior walls.
- .17 Install new threaded anchor rods at 3'-0" o.c. where existing anchors are not suited for reuse. Embed anchor rods minimum 4.5" into concrete foundation using approved epoxy bonding agent as per the manufacturer's specifications.

3.5 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

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

END OF SECTION

PART 1 – GENERAL

- 1.1 RELATED SECTIONS**
- .1 06 10 00 Rough Carpentry
 - .2 07 62 00 Sheet Metal Flashing & Trim
- 1.2 REFERENCES**
- .1 Canadian Roofing Contractors' Association (CRCA)
 - .1 CRCA Roofing Specification Manual – (2014)
 - .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A123.1/A123.5-(05(R2010)), Asphalt Shingles Made From Organic Felt and Surfaced With Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced With Mineral Granules
 - .2 CAN/CSA-A123.3-(05(R2010)), Asphalt Saturated Organic Roofing Felt.
 - .3 CAN3-A123.51-(M85(R2011)), Asphalt Shingle Application on Roof Slopes 1:3 and Steeper.
 - .4 CAN3-A123.52-(M85(R2011)), Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3.
 - .5 CSA B111-(1974 (R2003)), Wire Nails, Spikes and Staples.
 - .6 CAN/CSA-B72-(M87(R2013)), Installation Code for Lightning Protection Systems.
 - .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS)
 - .4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)
 - .1 CCMC-(2014), Registry of Product Evaluations
- 1.3 SUBMITTALS**
- .1 Submit proof of manufacturer's CCMC Listing and listing number.
 - .2 Submit product data for products and accessories used.
 - .3 Product data sheets for asphalt shingles are to include:
 - .1 Product characteristics;
 - .2 Performance criteria;
 - .3 Limitations;
 - .4 Special handling criteria;
 - .5 Installation instructions;
 - .6 Cleaning procedures;
 - .7 Maintenance instructions.
 - .4 Submit MSDS for products and accessories used.

- .5 Submit samples of shingles, full size, in specified colour and finish.

1.4 QUALITY ASSURANCE

- .1 Installer qualifications:
 - .1 Installer is to be company specializing in application of asphalt shingle roofing systems, approved by manufacturer and with five (5) years of documented experience with similar projects.
 - .2 On-site supervisor is to have five (5) years of documented experience in on-site supervisory capacity with similar projects.
- .2 Provide 1000 x 1000 mm mock-up including components as follows: Prepared substrate, underlayment, shingles.
 - .1 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application.
 - .2 Locate where directed.
 - .3 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished Work.

1.5 DELIVERY, STORAGE & HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and as required to prevent damage or loss of performance.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Provide and maintain clean, dry, off-ground, well-ventilated weatherproof storage.
 - .2 Remove only in quantities required for same day use.
 - .3 Replace defective materials with new.

1.6 FIELD CONDITIONS

- .1 Install roofing on dry deck, free of snow and ice and use only dry materials.
- .2 Install roofing only during weather that will not introduce moisture into roofing system. Do not install roofing materials during rain or snowfall.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Asphalt shingles: to CSA A123.1/A123.5
 - .1 Type: 3-tab, self-seal, interlocking, 25-year minimum warranty.

- .2 Colour: as selected by Owner from Manufacturer's standard range to match existing.
- .3 Texture: as selected by Owner from Manufacturer's standard range to match existing.
- .2 Membrane underlayment: purpose-made, self-adhering, sheet membrane roof underlayment, polyethylene film, bottom surface rubberized asphalt adhesive with release sheet, top surface slip resistant, thickness 1.0 mm, complete with primer.
- .3 Roofing felt: to CSA A123.3 organic felt No.15
- .4 Asphaltic Cement
 - .1 Plastic cement to CAN/CGSB-37.5.
 - .2 Lap cement to CAN/CGSB-37.4.
- .5 Nails: to CSA B111, of galvanized steel, sufficient length to penetrate 20 mm into deck.
- .6 Staples: chisel point, to CSA B111, of galvanized steel, sufficient length to penetrate 20 mm into deck.

PART 3 – EXECUTION

3.1 REMOVAL OF EXISTING ROOFING

- .1 Remove existing roofing, flashings and underlay, and expose sheathing of roof.
- .2 Withdraw existing shingle and flashing nails, set those which break off. Leave surfaces free from dirt and loose material.
- .3 Allow for Consultant to inspect roof sheathing.
- .4 Remove deteriorated sheathing as directed on site by Consultant.
- .5 Replace cut out portions of sheathing with sheathing of equal sectional dimensions, and specified grade. Seat each end on rafter, with 25 mm bearing, and secure to rafter.

3.2 APPLICATION

- .1 Do asphalt shingle work in accordance with CRCA Specification except where specified otherwise.
- .2 Membrane underlayment:
 - .1 Install at eaves, sidewalls, and surfaces over interior space within 900 mm from the inside face of the exterior wall.
 - .2 Install at valleys.
 - .3 Install at roof/wall junctures, including chimneys.
 - .4 Install at penetrations, including vent pipes.
 - .5 Apply primer and install underlayment as recommended by manufacturer.
- .3 Install roofing felt over full extent of roof deck.
- .4 Install asphalt shingles on roof slopes 1:3 and steeper in accordance with CAN3-A123.51.

- .5 Install asphalt shingles on roof slopes 1:6 to less than 1:3 in accordance with CAN3-A123.52.
- .6 Install for high-wind resistance as recommended by manufacturer and as follows:
 - .1 Provide six (6) nails per 3-tab shingle.
 - .2 Provide three (3) spots of plastic cement, 25 mm dia., per 3-tab shingle.

3.3 CLEANING

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris. Clean up daily, or more often as required.
- .2 At end of each day, remove waste material and debris, including nails and staples, from site and leave Work area clean.
- .3 Remove nails and staples using magnetic broom.
- .4 Upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International (ASTM).
 - .1 ASTM D523-14, Standard Test Method for Specular Gloss.
 - .2 ASTM D822-01, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-93.2-M91, Prefinished Aluminum Siding, Soffits and Fascia, for Residential Use.
 - .2 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
 - .3 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
 - .4 CAN/CGSB-37.29-M89, Rubber- Asphalt Sealing Compound.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

1.2 SAMPLES

- .1 Submit product data for products and accessories used.
- .2 Submit manufacturer's colour chart for prefinished siding.
- .3 Submit duplicate 300 x 300 mm samples of siding material including colour and profile specified.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings to Consultant.
- .2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, fascia, and related work.

PART 2 - PRODUCTS

2.1 ALUMINUM CLADDING COMPONENTS

- .1 Strip siding: to CAN/CGSB-93.2, Type: A-siding, Class:
1-non-thermally rated horizontal:
 - .1 Colour: as selected by Owner from Manufacturer's standard range to match existing.
 - .2 Gloss: to match existing.
 - .3 Profile: to match existing, preformed interlocking joints, fastener holes prepunched.
 - .4 Pattern: plain surface.
 - .5 Thickness: to match existing.
- .2 Fascia and exposed trim: to CAN/CGSB-93.2, Type C, Class
1-non-thermally rated:
 - .1 Colour: as selected by Consultant from Manufacturer's standard range to match existing.
 - .2 Gloss: to match existing.

- .3 Profile: manufacturer's standard to match existing.
- .4 Pattern: plain surface.

2.2 ACCESSORIES

- .1 Exposed trim: inside corners, outside corners, cap strip, drip cap, under sill trim, starter strip and window/door trim of same material, colour and gloss as cladding, with fastener holes pre-punched.
- .2 Isolation coating: alkali resistant bituminous paint.
- .3 Plastic cement: to CAN/CGSB-37.5.
- .4 Fasteners: Nails: to CSA B111. Screws to ANSI B18.6.4. Purpose made aluminum alloy.
- .5 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .6 Sealants: as per Section 07 92 00 – Sealants.
- .7 Touch-up paint: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 QUALITY OF WORK

- .1 Install cladding in accordance with CGSB-93.5 and manufacturer's written instructions.
- .2 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .3 Organize work to minimize waste.

3.2 EXAMINATION

- .1 Prior to beginning of work, visually inspect and verify that conditions of substrates are acceptable for product installation.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.3 PROTECTION

- .1 Protect installed products and components as well as adjacent work from damage during construction.
- .2 Repair damage to adjacent materials caused by work of this Section.

3.4 REMOVALS

- .1 Remove and dispose of metal siding complete with all metal flashings as indicated.

3.5 INSTALLATION

- .1 Walls:
 - .1 Install 25 x 75 wood strapping, spaced as per siding manufacturer's recommendation.
 - .2 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.
 - .3 Install outside corners, fillers and closure strips with carefully

formed and profiled work.

- .4 Install soffit and fascia cladding as indicated.
- .5 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
- .6 Attach components in manner not restricting thermal movement.
- .7 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00 – Sealants.
- .8 Use concealed fasteners except where approved by Consultant.

3.6 CLEANING

- .1 Maintain work in tidy condition, free from accumulation of waste products and debris. Clean up daily, or more often as required.
- .2 Remove waste fasteners from surfaces immediately.
- .3 At end of each day, remove waste material and debris from site and leave work area clean.
- .4 Upon completion remove surplus materials, rubbish, tools, and equipment.

END OF SECTION

PART 1 – GENERAL

1.1 REFERENCES

- .1 The Aluminum Association Inc. (AAI)
 - .1 AAI-Aluminum Sheet Metal Work in Building Construction- [2002].
 - .2 AAI DAF45-[03], Designation System for Aluminum Finishes.
- .2 Canadian Roofing Contractors Association (CRCA)
 - .1 Roofing Specifications Manual – Latest edition

1.2 SUBMITTALS

- .1 Submit product data for products and accessories used.
- .2 Submit manufacturer's colour chart for prefinished sheet metal.
- .3 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes, and colours.
- .4 Submit Sheet Metal Mechanics' qualifications.
- .5 Provide mock-up of each type of construction and flashing condition.

1.3 QUALITY ASSURANCE

- .1 Sheet Metal Mechanics:
 - .1 Ensure Sheet Metal Mechanics have acceptable trade certificate of qualification with experience in sheet metal work.
 - .2 Ensure Sheet Metal Mechanics have minimum five (5) years' acceptable experience for all sheet metal work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions and as required to prevent damage or loss of performance.
- .2 Storage and Handling Requirements:
 - .1 Provide and maintain clean, dry, off-ground, well-ventilated weatherproof storage.
 - .2 Remove only in quantities required for same day use.
 - .3 Replace defective materials with new.

PART 2 – PRODUCTS

2.1 SHEET METAL MATERIALS

- .1 Aluminum sheet: plain pattern, 22 ga. (0.64 mm) minimum thickness.

2.2 PREFINISHED ALUMINUM SHEET

- .1 Finish: factory applied coating to CAN/CGSB-93.1 supplemented and amended as follows:
 - .1 Class F1S.
 - .2 Colour selected by Consultant from manufacturer's standard range to match existing.

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- .2 Thickness specified for prefinished aluminum sheet applies to base metal.
- 2.3 ACCESSORIES**
- .1 Trim & closures: Prefinished sheet metal to match cladding. All pre-manufactured accessories to include concealed fasteners.
- .2 Fasteners: as recommended by manufacturer.
- .3 Plastic cement: to CAN/CGSB-37.5.
- .4 Underlay/Membrane: No. 15 perforated asphalt felt to CSA 123.3.1
- .5 Sealants: Refer to Section 07 92 00 - Sealants.
- .6 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .7 General purpose adhesive: to CSA O112 Series.
- .8 Cleats and Hook Strips: of same material, and temper as sheet metal, minimum 50 mm wide, thickness same as sheet metal being secured.
- .9 Touch-up paint: as recommended by prefinished material manufacturer.
- 2.4 FABRICATION**
- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details or as indicated.
- .2 Form pieces in 2400 mm maximum lengths, unless otherwise indicated.
- .3 Form joints using S-lock, unless otherwise indicated. Make allowance for expansion at joints.
- .4 Hem exposed edges on underside 12 mm.
- .5 Mitre and seal corners with sealant.
- .6 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- PART 3 – EXECUTION**
- 3.1 QUALITY OF WORK**
- .1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Organize work to minimize waste.
- 3.2 EXAMINATION**
- .1 Prior to beginning of work, visually inspect and verify that conditions of substrates are acceptable for product installation.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied.

3.3 PROTECTION

- .1 Protect installed products and components as well as adjacent work from damage during construction.
- .2 Repair damage to adjacent materials caused by work of this Section.

3.4 INSTALLATION

- .1 Use concealed fastenings except where accepted by Consultant before installation
- .2 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.
- .3 Where sheet metal would be in contact with pressure treated lumber provide separation layer.
- .4 Form joints with tight fit over hook strips.
- .5 Mitre corners and seal with sealant.
- .6 Lock end joints and seal with sealant.

3.5 CLEANING

- .1 Maintain work in tidy condition, free from accumulation of waste products and debris. Clean up daily, or more often as required.
- .2 Remove waste fasteners from surfaces immediately.
- .3 At end of each day, remove waste material and debris from site and leave work area clean.
- .4 Upon completion remove surplus materials, rubbish, tools, and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C920-05, Standard Specification for Elastomeric Joint Sealants.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .2 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.2 SUBMITTALS

- .1 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .2 Submit duplicate samples of each type of material and colour.
- .3 Cured samples of exposed sealants for each color where required to match adjacent material.
- .4 Submit manufacturer's instructions. Instructions to include installation instructions for each product used.

**1.3 QUALITY ASSURANCE/
MOCK-UP**

- .1 Construct mock-up as directed by Departmental Representative.
- .2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.
- .3 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Locate where directed.
- .5 Allow 24 hours for inspection of mock-up by Consultant before proceeding with sealant work.

- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.
- 1.4 DELIVERY, STORAGE, AND HANDLING**
 - .1 Deliver, handle, store and protect materials in accordance with manufacturer's recommendations
 - .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.
- 1.5 WASTE MANAGEMENT AND DISPOSAL**
 - .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .2 Place materials defined as hazardous or toxic in designated containers.
 - .3 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
 - .4 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
 - .5 Divert unused joint sealing material from landfill to official hazardous material collections site.
- 1.6 PROJECT CONDITIONS**
 - .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 5°C.
 - .2 When joint substrates are wet.
 - .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
 - .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 - PRODUCTS

- 2.1 SEALANT**
 - .1 Urethanes One Part.
 - .1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25, colour to be selected by Consultant from manufacturer's standard range.
 - .2 Acceptable material: Dymonic 100 by Tremco.

- .2 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded open or closed cell foam backer rod.
 - .2 Size: oversize 30 to 50%.
 - .2 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.
 - .3 Bond Breaker Sealant.
 - .1 Sealant of dissimilar material that will not bond to primary sealant.
- 2.2 SEALANT SELECTION**
- .1 Perimeters of exterior openings where frames meet exterior facade of building: Sealant type: Urethanes One Part.
 - .2 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: Urethanes One Part.
 - .3 Perimeter of sill flashings as detailed on drawings: Sealant type: Urethanes One Part.
 - .4 Perimeters of interior frames, as detailed and itemized: Sealant type: Urethanes One Part.
 - .5 Exterior cladding material transitions: Urethanes One Part.
- 2.3 JOINT CLEANER**
- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
 - .2 Primer: as recommended by manufacturer for all joints.

PART 3 - EXECUTION

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

- 3.3 PRIMING**
 - .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
 - .2 Prime sides of all joints in accordance with sealant manufacturer's instructions immediately prior to caulking.
- 3.4 BACKUP MATERIAL**
 - .1 Apply bond breaker tape where required to manufacturer's instructions.
 - .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.
- 3.5 MIXING**
 - .1 Mix materials in strict accordance with sealant manufacturer's instructions.
- 3.6 APPLICATION**
 - .1 Sealant.
 - .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
 - .2 Curing.
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
 - .3 Cleanup.
 - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 00 – Rough Carpentry.
- .2 Section 07 62 00 – Sheet Metal Flashing & Trim.
- .2 Section 07 92 00 – Joint Sealants.
- .3 Section 08 80 50 – Glazing.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A123 / A123M – 17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 CSA International
 - .1 CSA A440 (AAMA/WDMA/CSA-101/I.S.2/A440-08, NAFS) - North American Fenestration Standard/ Specification for Windows, Doors and Skylights, including appendices.
 - .2 CSA A440S1 (AAMA/WDMA/CSA-101/I.S.2/A440S1-09), Canadian Supplement to AAMA/WDMA/CSA-101/I.S.2/A440-08, NAFS - North American Fenestration Standard/Specification for Windows, Doors and Skylights, including appendices.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC S705.2-04 – Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Installer's Responsibility – Specification.

1.3 SUBMITTALS

- .1 Shop Drawings:
 - .1 Submit shop drawings.
 - .1 Indicate materials and details in full-size scale for head, jamb and sill, profiles of components, interior and exterior trim junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes fasteners, and sealant. Indicate location of manufacturer's nameplates.
 - .2 Indicate installation details, including air barrier, drainage, flashings including sill flashing, sill expansion joint cover plates and drip deflectors, perimeter insulation and sealants.
- .2 Test and Evaluation Reports: Submit test reports from approved independent testing laboratories, certifying compliance with specifications for:
 - .1 Air tightness.
 - .2 Water tightness.
 - .3 Condensation resistance.

1.4 STORAGE AND HANDLING

- .4 Wind load resistance.
- .5 Forced entry resistance.
- .6 Mullion deflection – combination and composite units.
- .7 Insect screens.
- .3 Close-out Submittals: Submit operation and maintenance data for windows for incorporation into Project Manual.
- .1 Store and handle materials to not cause damage.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Materials: to CSA A440 and CSA A440S1.
- .2 Windows, all windows by same manufacturer:
 - .1 Aluminium frame and sash.
 - .2 Thermally broken.
 - .3 Rain-screen design.
- .3 Window Types: as required, including fixed, awning and combination units.
- .4 Screens:
 - .1 Mesh material: non-corrosive, fibreglass or synthetic.
 - .2 Mesh count: 18 x 16 nominal.
 - .3 Frames: material and colour to match window frames.
 - .4 Mounting: for interior replacement.

2.2 PERFORMANCE

- .1 Performance: to CSA A440 and CSA A440S1, as follows:
 - .1 U-value: 1.60 W/m²•K maximum.
 - .2 Air tightness: A 3 – Fixed minimum.
 - .3 Water tightness: B 3 minimum.
 - .4 Wind load resistance: C 2 minimum.
 - .5 Condensation resistance, Temperature Index: I 73 minimum.
 - .6 Forced Entry: F 20 ground floor units, F 10 otherwise.
 - .7 Insect Screen Strength: S 2.

- .8 Mullion Deflection: L/175 maximum.
- .9 Reference NAFS: Class R – PG 40 (PG 1,920 Metric) Water Test Pressure 290 Pa, reinforced to meet deflection.

2.3 FABRICATION

- .1 Fabricate to CSA A440 and CSA A440S1, and as follows:
 - .1 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
 - .2 Face dimensions detailed are maximum permissible sizes.
 - .3 Brace frames to maintain squareness and rigidity during shipment and installation.
- .2 Provide steel clips, reinforcement and fasteners as required.

2.4 COATINGS

- .1 Enamel coating for aluminium: to CSA A440 and CSA A440S1, U-V resistant, colour to Consultant's selection from Manufacturer's standard range.
- .2 Isolation coating for aluminium: alkali resistant bituminous paint.
- .3 Zinc coating for steel clips, reinforcements and fasteners: Coating Grade 55 minimum 380 g/m² zinc coating to ASTM A123/A123M.

2.5 HARDWARE

- .1 Hardware: stainless steel or white bronze sash locks and aluminum handles to provide security and permit easy operation of units.
- .2 Locks: provide operating sash with spring loading locking device, to provide automatic locking in closed position.
- .3 Limiters: Except for windows at ground floor and at balconies, provide limiters to prevent openings in excess of 100 mm width, complete with child-proof over-ride.

2.6 GLAZING

- .1 Refer to the Related Section.

2.7 ACCESSORIES

- .1 Equip window frames with site-installed air-barrier membrane for sealing to building. Provide material identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
- .2 Spray-applied foam insulation: to CAN/ULC S705.2, one-part polyurethane, low-expansion, fast-setting, compatible with window frame materials.

PART 3 – EXECUTION

3.1 EXAMINATION

- .1 Verification of Supply: verify procurement of all materials prior to commencing other work, including materials that are available only on special order in the required models, sizes or finishes.
- .2 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 REMOVALS

- .1 Remove existing windows, complete with associated components, including, sealants, flashings, fasteners, shims and insulation within shim spaces.

3.3 PREPARATION

- .1 Position window assembly for proper alignment of sheet metal flashings and related sealants.
- .2 Ensure sealant contact surfaces have been prepared.

3.4 INSTALLATION

- .1 Air-barrier membrane installation:
 - .1 Apply to full extent of sub-frame in rough opening.
 - .2 Pre-apply mastic to irregularities and corners.
 - .3 Provide smooth application, free of wrinkles and fish-mouths.
 - .4 Provide proper overlaps.
 - .5 Apply corner patches at all junctures to verticals, including at end jambs and intermediate mullions.
- .2 Window installation:
 - .1 Install in accordance with CSA A440 and CSA A440S1.
 - .2 Install plumb, level and square.
 - .3 Install centred in opening, with 13 mm shim space all sides.
 - .4 Provide shim support and full fastening at all points as recommended by manufacturer. Trim shims neatly.
 - .5 At operable units, ensure proper alignment, clearances and operation.

- .3 Spray-applied foam insulation installation:
 - .1 Fully fill shim spaces, applying foam in at least two passes, permitting foam of the first pass to expand into the depth of the cavity before applying second pass to fill the cavity to the surface.
 - .2 Permit foam to expand and achieve initial set, as recommended by manufacturer.
 - .3 Neatly trim excess.
- .4 Sheet metal flashing installation:
 - .1 Refer to the Related Section.
 - .2 Install flashings as required.
 - .3 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one-piece lengths at each location, to fit window opening. Secure with anchoring devices located at ends and evenly spaced 600 mm on centre in between.
- .5 Sealant Installation:
 - .1 Refer to Section 07 92 00 – Sealants.
 - .2 Seal juncture of air-barrier membrane to adjacent stone.
 - .3 Seal joints between windows and window sills with sealant.
 - .4 Bed sill expansion joint cover plates and drip deflectors in bedding compound.
 - .5 Seal between sill cap and masonry sill.
 - .6 Seal butt joints in continuous sills.
 - .7 Conceal sealant within window units except where exposed use is permitted by Consultant.
- .6 Glazing installation:
 - .1 Refer to the Related Section.

3.5 CLEANING

- .1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .2 Clean windows inside and out, including frames, sash and glass. Remove glazing labels.

3.6 PROTECTION

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

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 08 50 00 – Windows.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM D2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness.
 - .2 ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
 - .2 CAN/CGSB-12.8-97, Insulating Glass Units, including amendment.
- .3 Glass Association of North American (GANA)
 - .1 GANA Glazing Manual - 2008.
 - .2 GANA Laminated Glazing Reference Manual - 2009.
- .4 South Coast Air Quality Management District (SCAQMD)
 - .1 Rule 1168 Adhesive and Sealant Applications (Amended October 6, 2017).

1.3 SUBMITTALS

- .1 Product Data: Submit manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Certificates: Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect glazing and frames from nicks, scratches, and blemishes.

- .3 Protect prefinished aluminum surfaces with wrapping or strippable coating.
- .4 Replace defective or damaged materials with new.

1.5 AMBIENT CONDITIONS.1 Ambient Requirements:

- .1 Install glazing when ambient temperature is 10°C minimum. Maintain ventilated environment for 24 hours after application.
- .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Design Criteria:
 - .1 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials. Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
 - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads to ASTM E330.
 - .3 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.
- .2 Insulating Glass Units:
 - .1 Insulating glass units: to CAN/CGSB-12.8 and GANA Laminated Glazing Reference Manual, double unit, 25 mm overall thickness.
 - .1 Glass: clear float glass, to CAN/CGSB-12.3.
 - .2 Glass thickness: 6 mm each light.
 - .3 Inter-cavity space thickness: 13 mm with low conductivity spacers.
 - .4 Glass coating: surface number 2, "Low E".
 - .5 Inert gas fill: argon.

2.2 PERFORMANCE

- .1 Low Emissivity "Low E" glass:
 - .1 Solar heat gain Coefficient: 0.39
 - .2 Visible light transmittance: 70%.
 - .3 Shading co-efficient: 0.45
 - .4 U-Value: winter night 0.29 maximum, summer day 0.27 maximum
 - .5 Acceptable product: Solarban 60 by PPG, or accepted equal.

2.3 ACCESSORIES

- .1 Setting blocks: EPDM, 80-90 Shore A durometer hardness to ASTM D2240, length of 25 mm for each square meter of glazing
- .2 Spacer shims: neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self-adhesive on one face.
- .3 Glazing tape: Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; black colour.
- .4 Glazing gaskets and splines: resilient silicone, extruded shape to suit glazing channel retaining slot, black colour.
- .5 Glazing clips: manufacturer's standard type.
- .6 Sealant: VOC limit 250 g/L maximum to SCAQMD Rule 1168.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of existing substrates are acceptable for glazing reinstallation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

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.

3.3 INSTALLATION: FACTORY FULLY- GASKETED

- .1 Perform work in accordance with GANA Glazing Manual for glazing installation methods.
- .2 Form glazing gaskets for tight fit and proper seal to glass units.
- .3 Provide welded corners.

3.4 INSTALLATION: FIELD TAPE & GASKET

- .1 Perform work in accordance with GANA Glazing Manual for glazing installation methods.
- .2 Cut glazing tape to length and install against permanent stops, projecting 1.6 mm above sight line.
- .3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of light or unit.

- .5 Install removable stops, with spacer shims inserted between glazing and applied stops at 600 mm intervals, 6 mm below sight line.
- .6 Fill gaps between light and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.
- .7 Trim protruding tape edge.

3.5 CLEANING

- .1 Leave Work area clean at end of each day.
 - .1 Remove traces of primer, caulking.
 - .2 Remove glazing materials from finish surfaces.
 - .3 Remove labels.
 - .4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 After installation, mark each light with an "X" by using cleanly removable plastic tape or paste.
- .3 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM C 475-02(2007), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C 514-04(2009e1), Standard Specification for Nails for the Application of Gypsum Board.
 - .3 ASTM C 557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .4 ASTM C 840-08, Standard Specification for Application and Finishing of Gypsum Board.
 - .5 ASTM C 954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .6 ASTM C 1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .7 ASTM C 1047-09, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .8 ASTM C 1396/C 1396M-09a, Standard Specification for Gypsum Wallboard.
- .2 Association of the Wall and Ceilings Industries International (AWCI)
 - .1 AWCI Levels of Gypsum Board Finish-97.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-07, Standard Method of Test Surface Burning Characteristics of Building Materials and Assemblies.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name

and address.

.3 Storage and Handling Requirements:

- .1 Store gypsum board assemblies materials level off ground and in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
- .3 Protect from weather, elements and damage from construction operations.
- .4 Handle gypsum boards to prevent damage to edges, ends or surfaces.
- .5 Replace defective or damaged materials with new.

1.4 AMBIENT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Standard Board: to ASTM C1396/C1396M, Type X, 12.7 mm thick, 1200 mm wide x maximum practical length, ends square cut, tapered edges.
 - .1 Acceptable Products: ToughRock Fireguard 45 by Georgia-Pacific Gypsum or accepted equal.

2.2 ACCESSORIES

- .1 Accessories shall be selected in accordance with manufactures recommendations and to meet the following requirements:
 - .1 Screws: ASTM C1002, corrosion resistant treated.
 - .2 Nails: to ASTM C 514.
 - .3 Laminating compound: asbestos-free.
 - .4 Stud adhesive: to CAN/CGSB-71.25, ASTM C 557.
 - .5 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, PVC , 0.5 mm base thickness, perforated flanges, one piece length per location.
 - .6 Sealants: as per Section 07 92 00 – Sealants.
 - .7 Polyethylene: to CAN/CGSB-51.34, Type 2.
 - .8 Joint compound: to ASTM C 475, asbestos-free

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 ERECTION

- .1 Do application and finishing of gypsum board to ASTM C 840 and in accordance with manufactures recommendations; except where specified otherwise.
- .2 Install work level to tolerance of 1:1200.

3.3 APPLICATION

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
- .2 Apply single layer gypsum board to existing framing using screw fasteners. Maximum spacing of screws 300 mm on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
 - .3 Install gypsum board with face side out.
 - .4 Do not install damaged or damp boards.
 - .5 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.4 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre using contact adhesive for full length.
- .2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .3 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .4 Splice corners and intersections together and secure to each member with 3 screws.
- .5 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered

out onto panel faces.

- .6 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
 - .1 Level 5: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
 - .6 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
 - .7 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
 - .8 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
 - .9 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
 - .10 Mix joint compound slightly thinner than for joint taping.
 - .11 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
 - .12 Allow skim coat to dry completely.
 - .13 Remove ridges by light sanding or wiping with damp cloth.

3.5 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.6 PROTECTION

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

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2004.
- .5 National Fire Code of Canada - 1995

1.2 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractor: minimum of five (5) years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
 - .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.

1.3 SCHEDULING

- .1 Schedule painting operations to prevent disruption of occupants.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS). Indicate VOCs during application and curing.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Remove damaged, opened and rejected materials from site.
- .2 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with

temperature range 7 degrees C to 30 degrees C.

- .3 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .4 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .5 Remove paint materials from storage only in quantities required for same day use.

1.6 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .2 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless pre-approved written approval by product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
 - .5 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
 - .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 15% for wood.
 - .2 12% for plaster and gypsum board.
 - .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
- .3 Surface and Environmental Conditions:

- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
- .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:
 - .1 Apply paint finishes when temperature at location of installation can be maintained to satisfy manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.
- .5 Use MPI listed materials having minimum E2 E3 rating where indoor air quality (odour) requirements exist.
- .6 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.

2.2 INTERIOR PAINTING SYSTEMS

- .1 All interior painting (window sills, window trim & gypsum board finishes):
 - .1 Latex primer - MPI #50.
 - .2 INT 9.2A Latex semi-gloss finish, colour as per Owner selection from manufacturer's full range to match existing.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

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

written application instructions.

3.3 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Stucco, plaster and gypsum board: 12%.
 - .2 Wood: 15%.

3.4 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Consultant.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
 - .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .2 Surface Preparation:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place "WET PAINT" signs in occupied areas as painting operations progress.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter

is flushed from surface.

- .4 Allow surfaces to drain completely and allow to dry thoroughly.
- .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
- .6 Use trigger operated spray nozzles for water hoses.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

3.5 APPLICATION

- .1 Apply paint by brush or roller. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

3.6 SITE TOLERANCES

- .1 Walls & window sills: no defects visible from a distance of 1000 mm at 90 degrees to surface, ready for finishes by others.

3.7 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

END OF SECTION