Document Responsibility (DR): A – Architectural M – Mechanical E – Electrical CO - Commisioning

DOCUMENT IDENTIFICATION		DR	
DIVISION 00	**PROCUREMENT AND CONTRACTING REQUIREMENTS**		
00 01 05	Project Directory	A	
00 01 10	Table of Contents	A	
00 30 00	Existing Conditions	A	
DIVISION 01	**GENERAL REQUIREMENTS**		
01 10 00	Summary of Work	A	
01 21 00	Allowances	A	
01 26 00	Contract Modification Procedures	A	
01 29 00	Payment Procedures	A	
01 30 00	Administrative Requirements	A	
01 32 33	Photographic Documentation	A	
01 40 00	Quality Requirements	A	
01 41 90	Regulatory Requirements	A	
01 42 00	References	A	
01 50 00	Temporary Facilities and Controls	A	
01 51 16	Temporary Fire Control	A	
01 57 19	Temporary Environmental Controls	A	
01 58 00	Project Identification	A	
01 61 00	Common Product Requirements	A	
01 70 00	Execution Requirements	A	
01 74 19	Construction and Demolition Waste Management and Disposal		
01 77 00	Closeout Procedures	A	
01 78 00	Closeout Submittals	A	
01 91 00	Commissioning Requirements	CO	
DIVISION 03	**CONCRETE**		
03 35 00	Concrete Floor Finishes	A	
03 35 43	Polished Concrete Floor Finish	A	
DIVISION 04	**MASONRY**		
04 21 13.23	Thin Veneer Clay Masonry	A	
04 22 00	Concrete Unit Masonry	A	
DIVISION 05	**METALS**		
05 41 00	Structural Metal Stud Framing	A	
05 50 00	Metal Fabrications	A	
05 51 00	Metal Stairs	A	
05 51 33	Metal Ladders And Guards	A	
DIVISION 06	**WOOD, PLASTICS AND COMPOSITES**		
06 10 00	Rough Carpentry	A	
06 12 00	Mass Timber Panels	A	
06 20 00	Finish Carpentry	A	
06 20 13	Exterior Finish Carpentry	A	
06 41 00	Architectural Wood Casework	A	

DIVISION 07 THERMAL AND MOISTURE PROTECTION

07 21 13 Board Insulation ..... A ....
07 21 16 Blanket Insulation ..... A ....
07 21 29 Sprayed Insulation ..... A ....
07 24 25 Thermal Isolation Clips for Exterior Wall Panel Assemblies A ....
07 26 00 Vapour Retarders ..... A ....
07 27 00 Air Barriers ..... A ....
07 42 13 Prefabricated Metal Wall Panels ..... A ....
07 46 19 Metal Siding ..... A ....
07 51 16 Modified Bitumen Membrane Roofing ..... A ....
07 62 00 Sheet Metal Flashing and Trim ..... A ....
07 81 23 Intumescent Thin-Film Fire Resistive Coating ..... A ....
07 84 00 Firestopping ..... A ....
07 92 00 Joint Sealants ..... A ....

DIVISION 08 DOORS AND OPENINGS

08 11 13 Hollow Metal Doors & Frames ..... A ....
08 11 16 Aluminum Doors and Frames ..... A ....
08 14 16 Wood Doors ..... A ....
08 31 13 Access Doors and Frames ..... A ....
08 36 13 Sectional Doors ..... A ....
08 36 13.29 Exterior Bi-Folding Sectional Doors ..... A ....
08 44 13 Glazed Aluminum Curtain Wall ..... A ....
08 51 13 Aluminum Windows ..... A ....
08 62 23 Tubular Skylights ..... A ....
08 71 00 Door Hardware ..... A ....
08 71 23 Power Door Operators ..... A ....
08 80 00 Glazing ..... A ....
08 90 00 Louvers & Vents ..... A ....

DIVISION 09 FINISHES

09 21 16 Gypsum Board Assemblies ..... A ....
09 30 13 Tiling ..... A ....
09 51 13 Acoustical Panel Ceilings ..... A ....
09 65 13 Resilient Base and Accessories ..... A ....
09 65 16 Resilient Sheet Flooring ..... A ....
09 65 22 Resilient Sheet Sports Flooring ..... A ....
09 65 36.13 Static Dissipative Tile Flooring ..... A ....
09 67 00 Epoxy Flooring ..... A ....
09 68 13 Tile Carpeting ..... A ....
09 91 13 Exterior Painting ..... A ....
09 91 16 Interior Painting ..... A ....
09 97 13.23 Exterior Steel Coatings ..... A ....

DIVISION 10 SPECIALTIES

~~10 11 23 Tackboards ..... A ....~~
10 14 19 Exterior Building Signage ..... A ....
10 14 53 Traffic Signage ..... A ....
10 22 00 Prefabricated Interior Partitions ..... A ....
10 26 00 Wall and Door Protection ..... A ....
10 28 13 Washroom Accessories ..... A ....
~~10 51 13 Metal Lockers ..... A ....~~
10 75 16 Flag Poles ..... A ....

DIVISION 11 EQUIPMENT

11 24 23.13 Fall Arrest Anchors ..... A ....

DIVISION 12 FURNISHINGS

12 24 13 Window Shades ..... A ....
12 35 53 Stainless Steel Countertops ..... A ....
12 36 61.16 Solid Surfacing Countertops ..... A ....
12 48 13 Floor Grilles ..... A ....

DIVISION 20 MECHANICAL

20 05 00 Common Work Results Mechanical ..... M ....

DIVISION 21 FIRE SUPPRESSION

21 13 13 Fire Protection ..... M ....

DIVISION 22 PLUMBING

22 05 01 Plumbing General Requirements ..... M ....
22 05 23 Valves And Specialties ..... M ....
22 05 29 Hangers and Supports ..... M ....
22 05 33 Identification ..... M ....
22 05 92 Testing ..... M ....
22 07 19 Piping Insulation ..... M ....
22 08 00 Plumbing System Commissioning ..... CO ....
22 10 00 Plumbing Piping and Fittings ..... M ....
22 10 10 Plumbing Pumps ..... M ....
22 11 23 Domestic Water Pumps ..... M ....
22 13 19 Plumbing Drains ..... M ....
22 36 23 Geothermal Domestic Water Heater ..... M ....
22 44 00 Plumbing Fixtures and Trim ..... M ....

DIVISION 23 HVAC

23 05 01 HVAC General Requirements ..... M ....
23 05 02 Documentation and Manuals ..... M ....
23 05 19 Gauges, Thermometers And Wells ..... M ....
23 05 23 Valves ..... M ....
23 05 29 Hangers And Supports ..... M ....
23 05 47 Vibration Isolation ..... M ....
23 05 48 Seismic ..... M ....
23 05 53 Mechanical Identification ..... M ....
23 05 93 Testing Adjusting And Balancing ..... M ....
23 07 13 Duct Insulation ..... M ....
23 07 19 Piping Insulation ..... M ....
23 08 00 HVAC System Commissioning ..... CO ....
23 08 01 Performance Verification of Mechanical Piping Systems ... M ....
23 08 02 Cleaning and Start-up of Mechanical Piping Systems ..... M ....
23 09 23 Controls ..... M ....
23 21 00 Pipe And Pipe Fittings ..... M ....
23 21 13 Ground Loop Heat Pump ..... M ....
23 21 14 Radiant In-Floor Heating ..... M ....
23 21 17 Glycol Tank ..... M ....
23 21 18 Expansion Tank ..... M ....
23 21 23 Hydronic Pumps ..... M ....
23 31 00 Ductwork ..... M ....

23 33 00 Duct Accessories ..... M ....
23 34 00 Fans ..... M ....
23 34 39 Destratification fan ..... M ....
23 37 13 Air Outlets And Louvers ..... M ....
23 72 13 Heat-Wheel Air-to-Air Energy Recovery Equipment ..... M ....
23 81 29 Variable Refrigerant Flow Ductless System ..... M ....
23 81 46 Water Source Zone Heat Pump ..... M ....
23 82 39 Unit Heaters ..... M ....
23 82 41 Water to Water Heat Pump ..... M ....
23 84 00 Variable Speed Drives ..... M ....
23 89 19 Fan Coil Units ..... M ....

DIVISION 25 INTEGRATED AUTOMATION

25 08 00 Integrated Automation Commissioning ..... CO ....

DIVISION 26 ELECTRICAL

26 05 01 General Electrical Requirements ..... E ....
26 05 02 Documentation and Manuals ..... E ....
26 05 20 Materials Devices And Equipment ..... E ....
26 05 36 Cable Management and Auxiliary Systems ..... E ....
26 05 73 Short Circuit Coordination Study
and Arc Flash Hazard Analysis ..... E ....
26 08 00 Electrical System Commissioning ..... CO ....
26 24 00 Distribution ..... E ....
26 32 13 Natural Gas Generator ..... E ....
26 36 00 Transfer Switch ..... E ....
26 51 00 Lighting ..... E ....
26 52 00 Emergency and Exit Lighting ..... E ....
26 57 00 Fire Alarm System ..... E ....

DIVISION 27 COMMUNICATIONS

27 00 00 Communications ..... E ....

DIVISION 31 EARTHWORK

31 22 13 Rough Grading ..... A ....
31 23 00 Excavation and Fill ..... A ....

DIVISION 32 EXTERIOR IMPROVEMENTS

32 12 16 Asphalt Paving ..... A ....
32 13 13 Concrete Paving ..... A ....
32 17 23 Pavement Markings ..... A ....
32 17 26 Tactile Warning Surfacing ..... A ....

DIVISION 33 UTILITIES

Not used

ATTACHMENTS

Geotechnical Investigation .....
Environmental Impact Study .....
Transportation Impact Study .....
Noise Impact Study .....
Archaeological Assessment .....

END OF SECTION

1 GENERAL

.1 Include the aggregate toital of all allowances listed below in the Bid Price.

.2 Expend Cash Allowances as directed by the Consultant. Each Cash Allowance will be adjusted to actual cost as defined hereunder and Contract Price will be amended accordingly by written order.

.3 Progress payments for work and material authorized under Cash Allowances will be made in accordance with GC 5.3 of the Contract. Cash allowances do not include H.S.T.

2 MATERIAL ALLOWANCES (SUPPLY ONLY)

.1 Material cash allowance shall include and provide payment for:
- .1 Net cost of material.
- .2 Applicable duties and taxes.
- .3 Delivery to site.

.2 Include in the Bid Price, in addition to the material cash allowance, costs for the following:
- .1 Handling at site, including unloading, uncrating, storage and hoisting.
- .2 Protection from damage by elements or otherwise.
- .3 Labour for installation and finishing.
- .4 Other expenses required to complete installation.
- .5 Overhead and profit.

3 ASSEMBLY ALLOWANCES (SUPPLY AND INSTALL)

.1 Assembly cash allowance shall include and provide payment for:
- .1 Net cost of material.
- .2 Applicable duties and taxes.
- .3 Delivery to site.
- .4 Assembly contractors'/suppliers' <u>only</u>, expenses relating to the following:
  - .1 Handling at site, including unloading, uncrating, storage and hoisting.
  - .2 Protection from damage by elements or otherwise.
  - .3 Labour installation and finishing.
  - .4 Other expenses required to complete installation.
  - .5 Overhead and profit.

.2 Include in the Bid Price any overhead and profit or related General Contractor costs.

4 TESTING & LABORATORY SERVICES

.1 Testing & Laboratory Services allowances shall include and provide payment for:
- .1 Transportation costs to and from the site,
- .2 Accommodation,
- .3 Equipment required to perform tests or inspections,
- .4 Costs of shipping samples to laboratory for testing,
- .5 Applicable duties and taxes,

5 ALLOWANCE AMOUNTS

.1 The Total Cash Allowance to be included in the Stipulated Price is ***Two Hundred Seventy-Five Thousand Dollars ($275,000)*** in Canadian funds. The cash allowance shall provide payment for the following in general:
- .1 Inspection & Testing Services..... ***$75,000***
- ***.2 Miscellaneous Contingency..... $200,000***
- ~~.3 Door Hardware ..... $65,000~~

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide bituminous dampproofing.

1.3 REFERENCES

.1 ASTM D6506; Specification for Asphalt Based Protection Board for Below-Grade Waterproofing.
.2 CAN/CGSB 37.5; Cement, Plastic, Cutback Asphalt.
.3 CAN/CGSB 37.16; Filled Cutback Asphalt, for Dampproofing and Waterproofing.
.4 CGSB 37-GP-9Ma; Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
.5 CGSB 37-GP-11M; Application of Cutback Asphalt Plastic Cement.
.6 CGSB 37-GP-36M; Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
.7 CGSB 37-GP-15M; Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application
.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation
.1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor(Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.5 STORAGE AND HANDLING
.1 Provide and maintain dry, off-ground weatherproof storage.

.2 Store materials on supports to prevent deformation. Store materials in accordance with manufacturers written instructions.

.3 Remove only in quantities required for same day use.

1.6 ENVIRONMENTAL CONDITIONS
.1 Do not proceed with work when wind chill effect would tend to set bitumen before proper curing takes place.

.2 Maintain air temperature and substrate temperature at dampproofing installation area above 5°C for 24 hours before, during and 24 hours after installation.

.3 Do not apply dampproofing in wet weather.

.4 Provide forced air circulation during installation and curing periods for enclosed applications.

.5 New concrete shall have cured for a minimum of 14 days prior to application of dampproofing.

2 PRODUCTS

2.1 MATERIALS
.1 Dampproofing: asphalt emulsion compound, to CAN/CGSB 37.2.

.2 Reinforcing Fabric: woven glass fabric; equivalent to Bakor Yellow Jacket, by Henry Company Inc.

.3 Sealing Compound: plastic cutback asphalt cement to CAN/CGSB-37.5.

.4 Protection Board: mineral-fortified asphaltic core, between outside layers of asphalt impregnated fiberglass, 6mm thick, to ASTM D6506, Class B; equivalent to Bakor 990-31 Protection Board by Henry Company Inc.

.5 Acceptable Products
- .1 Bakor 700-01 Dampproofing and Waterproofing Asphalt Emulsion, by Henry Company Inc.
- .2 SEALMASTIC EMULSION Dampproofing, by WR Meadows of Canada.
- .3 MULSEAL Dampproofing, by Tremco Canada Limited.

3 EXECUTION

3.1 PREPARATION

.1 Before applying dampproofing, seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound, in accordance with CGSB 37-GP-11M.

3.2 APPLICATION

.1 Apply dampproofing in accordance with CGSB 37-GP-12Ma, using brush/spray method, in two (2) coats at right angles to each other, in continuous unbroken film.

.2 Apply two additional coats of dampproofing with reinforcing fabric, to vertical corners and construction joints for a minimum width of 230mm on each side, and all around and for 230mm along pipes passing through walls.

.3 Apply protection board over dampproofing immediately following application. Butt boards together. Cut and fit around all penetrations.

.4 Allow 24 hours between coats and 48 hours before backfilling.

3.3 SCHEDULE

.1 Apply dampproofing to all perimeter foundation walls <u>not</u> covered by waterproofing membrane, as indicated on the drawings.

.2 Apply to entire exterior faces of foundation walls from 50mm below finished grade level, down to and including tops of footings.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide all spray-in-place foam insulation for applications as noted or as scheduled on the drawings.

1.3 REFERENCES

.1 ASTM E283; Rate of Air Leakage Through Exterior Windows Curtain Walls and Doors.
.2 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.3 CAN/ULC-S705.1; Thermal insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
.4 CAN/ULC-S705.2; Thermal insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities Specification.
.5 CAN/ULC-S770; Determination of Long Term Thermal Resistance of Closed Cell Thermal Insulating Foams.
.6 CDPH v1.1-2010; Standard Method For The Testing And Evaluation Of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers.

1.4 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents.

Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application
.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation
.1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor(Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.5 DELIVERY, STORAGE AND HANDLING
.1 Materials shall be delivered to jobsite in original and clearly marked containers with manufacturer's labels and seals intact.

.2 Store solvent base liquids away from excessive heat and open flame, at above freezing temperatures, and free from contact with cold or frozen surfaces.

.3 Do not double stack pallets of materials. Provide cover and adequate ventilation.

1.6 ENVIRONMENTAL REQUIREMENTS
.1 Provide protection and environmental controls in accordance with Section 01 50 00, and CAN/ULC-S705.2.

.2 Ventilate areas to receive insulation, in accordance with Section 01 50 00, by introducing fresh air and exhausting air continuously during, and for 24 hours after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect workers as recommended by insulation manufacturer. Applicator must wear appropriate breathing apparatus, safety goggles, and other protective clothing and equipment.

.5 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.6 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.7 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions.

2 PRODUCTS

2.1 MATERIALS

.1 Sprayed Insulation: spray-applied rigid polyurethane foam to CAN/ULC-S705.1, and conforming to CDPH v1.1-2010 (GREENGUARD Children & Schools);

.1 Compressive Strength: 222kPa,

.2 Density: 30.4 kg/m^3 minimum.

.3 Flame spread rating: less than 500 to CAN/ULC-S102,

.4 Air leakage of less than 0.001 L/s/m^2 at 75Pa to CAN/ULC-S705.1, per 25mm thickness,

.5 Water Vapour Permeance: 86.6 ng/Pa.s.m^2

.6 Long Term Thermal Resistance (LTTR) of minimum;

.1 1.05m^2 °C/W per 25mm thickness.

.7 Acceptable Products;

.1 Insulthane Extreme, by Elastochem Specialty Chemicals Inc.

.2 Heatlok ***Soya HFO***, by ***Huntsman Building Solutions***.

.3 WALLTITE ***CM01***, by BASF Canada.

.4 SealTite One, by Carlisle Coatings and Waterproofing.

.2 Primers: in accordance with manufacturers recommendations for surface conditions.

3 EXECUTION

3.1 EXAMINATION

.1 Verify that all surfaces to receive spray-in-place insulation are clean and free of all frost, oil, rust, or deleterious materials.

.2 Verify that all environmental conditions required for successful application of materials, can be met.

.3 Report in writing, any defects in surfaces or conditions which may adversely affect the installation or performance of the products provided under this section.

3.2 PREPARATION

.1 Mask all adjacent surfaces not to receive spray-in-place insulation which may be damaged or stained by insulation installation.

.2 Apply primers where recommended by insulation manufacturer.

3.3 APPLICATION

.1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions.

.2 Apply insulation in consecutive passes not less than 13mm and not more than 50mm thick, for a total thickness scheduled herein.

.3 Finished surface of foam insulation shall be free of voids and imbedded foreign objects.

.4 Avoid overspray of adjacent areas and surfaces.

.5 Finished installation shall be inspected and approved by Consultant prior to concealment.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide intumescent thin film fire-resistive coating application, including;

.1 Surface preparation,
.2 Base coat (where required),
.3 Intumescent Fire-Resistive Coating, and
.4 Coloured Top Coat.
.5 Intumescent Fire Barrier Paint for Cross Laminated Timber.

1.3 REFERENCE STANDARDS

.1 CAN/ULC-S101; Fire Endurance Tests of Building Construction and Materials.
.2 CAN/ULC-S102; Surface Burning Characteristics of Building Materials and Assemblies.
.3 CAN4-S114; Determination of Non-Combustibility in Building Materials.
.4 ASTM-E84; Test Method for Surface Burning Characteristics of Building Materials.
.5 ASTM-E119; Test Methods for Fire Tests of Building Construction and Materials.
.6 ASTM-E595; Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Out-gassing in a vacuum Environment.
.7 ASTM-E605; Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials (SFRM) Applied to Structural Members.
.8 ASTM-E736; Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.

.9 ASTM-E759; Test Method for Effect of Deflection on Sprayed Fire-Resistive Materials Applied to Structural Members.
.10 ASTM-E761; Test Method for Compressive Strength of Sprayed Fire-Resistive Materials Applied to Structural Members.
.11 ASTM-D2240; Test Method for Rubber Property - Durometer Hardness.
.12 ASTM-D2794; Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
.13 ASTM-D3960; Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
.14 ASTM-D4060; Test Method for Abrasion Resistance of Organic Coatings by the Taber Abrader.
.15 Underwriters Laboratories Inc. (ULI); Fire Resistance Directory, Volume 1, current edition.
.16 Intertek Testing Services / Warnock Hersey International, Inc. (ITS/WH); Directory of Listed Products, current edition.
.17 Underwriters' Laboratories of Canada (ULC); List of Equipment and Materials, Fire Resistance, current edition.
.18 Factory Mutual Research (FM); Approved Products Guide, current edition.

1.4 QUALITY ASSURANCE
.1 Applicator Qualifications
.1 Work of this section shall be performed by applicators having a minimum of 2 years documented experience in the installation of intumescent thin film fire-resistive coating. Submit proof of experience to Consultant.

.2 Installation
.1 Work shall be performed in strict accordance with manufacturer's printed instructions, and in accordance with all warranty requirements.

.3 Pre-installation Meeting
.1 Convene a pre-installation meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor (Site Superintendent & Project Manager),
.2 Installation Subcontractor (Site Foreman & Project Manager),
.3 Product Manufacturer and/or Distributor (Technical Representatives),
.4 Related Subcontractors (ie. Mechanical and/or Electrical), and
.5 Consultant.

1.5 SYSTEM DESCRIPTION
.1 Thin-film intumescent fire-resistive coating system shall provide a fire resistance rating:
.1 Columns: 2 hour for columns, in accordance with the following:
.1 UL Design No: X650.

1.6 SUBMITTALS

.1 Submit manufacturer's product specifications including certification of compliance with the Contract Documents, as may be required by the Consultant.

.2 Submit test results in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

.3 For assemblies not tested and rated, submit proposals based on related designs using accepted intumescent thin film fire-resistive coating design criteria.

1.7 SAMPLES

.1 Submit duplicate 300mm x 300mm samples of final exposed finish of intumescent thin film fire-resistive coating in accordance with Section 01 30 00.

1.8 MOCK-UP

.1 Site prepare mock-up of one column in intumescent thin-film fire-resistive coating in accordance with Section 01 30 00. Mock-up shall include all materials and layers representing complete coating system.

.2 Notify Consultant upon completion of mock-up and request review.

.3 Approved mock-up shall serve as the minimum standard of work for the balance of Intumescent Coating work. Approved mock-up may remain in place as part of the final work.

.4 Rejected mock-up shall be removed and replaced with new material. Request re-inspection until approved by Consultant.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

.2 Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Do not store in direct sunlight. Protect from freezing.

.3 Store materials at a temperature not less than 10°C in a dry, protected area, off ground in original, undamaged, sealed containers with manufacturer' s labels and seals intact.

1.10 SITE CONDITIONS

.1 Substrate and ambient air temperature shall be in accordance with manufacturer's requirements.

.2 Protect work area from windblown dust and rain. Protect adjacent areas from over spray.

.3 Provide ventilation in areas to receive work of this section, during application and 24 hours (minimum) after application.

.4 Temperature and Humidity Requirements: Maintain air temperature and relative humidity in spaces where products will be installed for a time period before, during and after installation as recommended by manufacturer.

.5 Do not apply thin-film intumescent fire-resistive coating when temperature of substrate and/or surrounding air is below 10°C. Use electric heat if supplemental heat is required.

.6 Maintain relative humidity of 40% to 60% in work area. Relative humidity must not exceed 75% throughout total period of application and drying for intumescent coating, and must not exceed 65% throughout application and drying for protective decorative finish coat.

.7 Manufacturer's recommended temperature and humidity conditions must be maintained throughout the entire application and drying period until intumescent coating and basecoat are fully dried and top coated, including any interim period prior to application of top coat.

1.11 SEQUENCING AND SCHEDULING

.1 Sequence work in conjunction with ceiling hanger tabs,, sprinkler pipes, HVAC systems and other mechanical systems.

.2 Do not apply thin-film intumescent fire-resistive coating until concrete toppings and/or roofing applications have been installed.

.3 Steel surfaces with less than 1 meter clear working access may necessitate the application of materials to inaccessible surfaces prior to erection of the finished steel members, either at the point of fabrication or on-site.

2 PRODUCTS

2.1 MATERIALS

.1 Basecoat: non-intumescent base coat material for use in conjunction with UL Designs X640 and X644, ITS/WH Designs AD/CA 120-02 and AD/CA 180-02, ULC Designs Z609 and Z616, and Factory Mutual Column Protection Methods 3 and 4);

.1 A/D BASECOAT by A/D Fire Protection Systems.

.2 Bond-Seal by Cafco Industries Inc., Mississauga ON.

.3 Fire Finish 120+ CFP-SP-WB by Hilti Firestop.

.4 Carboline equivalent by by StonCor Group Whitby ON.

.2 Intumescent Fire-Resistive Coating: water-based, two-component, intumescent thin-film fire-resistive coating, labelled and listed;
- .1 Hardness (Shore "D"): Durometer D81.8, 230ºC.
- .2 Surface Burning Characteristics (ASTM E84):
  - .1 Flame Spread: 0 -20,
  - .2 Smoke Development: 0-50, Class "A".
- .3 Dry Weight: 2.2 kg/m^2 at 1.6mm dry.
- .4 Cohesion / Adhesion (Bond or Tensile) (ASTM 736): 3.24 kgm^2 at 3mm dry.
- .5 Compressive strength (ASTM E761): 7.6MPa at 10 % deformation.
- .6 Impact Resistance (ASTM D2794): 1.4 kg-m (direct) at 1.6mm.
- .7 Abrasion Resistance (ASTM D4060): 508 cycles at 1.6mm dry.
- .8 Acceptable Products;
  - .1 CAFCO® Sprayfilm™ WB 3; by Cafco Industries Inc., Mississauga ON
  - .2 A/D FIREFILM®II; by A/D Fire Protection Systems Inc., Scarborough ON.
  - .3 Fire Finish 120+ CFP-SP-WB by Hilti Firestop.
  - .4 Carboline Nullifire®607; by StonCor Group Whitby ON.

.3 Top Coat: one component, siliconized alkyd colour coating; colour as selected by the Consultant;
- .1 Acceptable Products;
  - .1 CAFCO® Topseal; by Cafco Industries Inc., Mississauga ON,
  - .2 Equivalent by A/D, Carboline or Hilti.

.4 Primers: Solvent-based (xylene), short oil alkyd/zinc phosphate, one coat primer.

.5 Intumescent Fire Barrier Paint: water-based intumescent coating, complying with CAN/ULC S102-10; FlameOff Fire Barrier Paint, by FlameOff Coatings Inc., Raleigh North Carolina.

3 EXECUTION

3.1 EXAMINATION

.1 Examine surfaces to receive work of this Section and report any defects which may affect the application. Identification marking of steel components must be by wax crayon to facilitate ease of removal prior to application of intumescent coating.

.2 Verify that substrate surfaces are ready to receive work. Commercial Blast Cleaning (SSPC-SP6/NACE No.3) is required for minimum surface preparation. Weld flashes shall be ground smooth prior to commencement of application.

.3 Verify that all clips, hangers, sleeves and similar devices have been attached. Confirm compatibility of surfaces to receive intumescent coating. Steel surfaces must be primed with a compatible primer.

.4 Beginning of installation means acceptance of substrate.

.5 Verify substrate and workspace temperature and humidity conditions are in accordance with manufacturer's recommendations.

3.2 PREPARATION

.1 Substrate shall be free of material which would impair bond.

.2 Verify that painted substrate are compatible and have suitable bonding characteristics to receive intumescent coating. Remove incompatible materials.

.3 Ensure that surface mounted conduits and fixtures, and any other items required to penetrate intumescent coating, are placed before installation.

.4 Ensure that ductwork, piping, mechanical equipment, or other items which would interfere with application of intumescent coating are not positioned until work of this section is completed.

.5 Remove all existing paint from steel surfaces to receive intumescent coating.

.6 Provide drop sheets or other protection to adjacent areas or surfaces not to receive intumescent coating .

.7 Mask all adjacent surfaces to prevent over spray or contamination.

3.3 APPLICATION

.1 General

.1 Apply products in accordance with manufacturer's instructions in sufficient thickness to achieve required fire resistance rating. Spray application is recommended. Base Coat (where required) is to be applied by spray only. Apply decorative colour finish according to manufacturer's recommendations.

.2 Priming

.1 Apply Intumescent Coating and Base Coat only to primed surfaces. Use only primer as approved by the manufacturer. Follow primer manufacturer's instructions.

.3 Application Rates and Thickness Measurements

.1 Comply with fire test designs or manufacturer's thickness selection tables for determination of dry film thickness of Intumescent Coating and Base Coat (where required) for size of steel element to be protected, and for required fire resistance rating (s). Apply Top Coat.

.2 Apply Intumescent Coating at a maximum rate of 0.76mm wet or approximately 0.58mm dry per coat. Apply Base Coat (where required) at a maximum rate off 1.52mm wet per coat.

.3 Final dry film thickness must be measured with a dry-film thickness gauge. Do not apply Top Coat until it has been determined that the required dry film thickness of Intumescent Coating and Base Coat (where required) have been provided.

.4 Application

.1 Spray Equipment: Use spray application for best coverage, finish and appearance.

.1 For Intumescent Coating, use an airless sprayer capable of 20685kPa pressure, minimum, without surging.

.2 For Base Coat, use sprayer capable of 27580kPa pressure, minimum, without surging. Remove all filters except pump filter.

.3 For Intumescent Coating use a 3/17 to 4/23 size, heavy-duty type, self-cleaning (reversible) tip.

.4 For Base Coat, use a 0.58mm tip.

.5 Use a 0.38mm tip for Top Coat.

.6 Adjust pressure and distance between tip and surface to minimize orange peel. Adjust fan width to minimize over spray.

.2 Hand Application: Use a brush recommended for use with latex paint and a low pile roller to apply Intumescent Coating. Use a China bristle brush or roller to apply Top Coat. Apply Base Coat by spray only.

.3 Handling: When applying by brush or roller, work from a small container, mixing frequently. Keep original pail tightly closed with the surface of the material covered by the plastic sheet provided.

.4 Drying and Recoat Time: Drying time will vary with temperature and humidity conditions. Apply next coat of Base Coat only after previous coat is dry.

.5 Top Coat Application

.1 A minimum of 24 hours is recommended between application of the final coat of Intumescent Coating and application of Top Coat. Recommended site conditions must be maintained for any interim period after final coat of Intumescent Coating and until Top Coat has been applied and dried. Intumescent Coating must be dry before application of Top Coat. Do not apply Top Coat until it has been determined that the required dry film thickness of Intumescent Coating has been provided.

.2 Apply Top Coat to a minimum dry film thickness of 0.05-0.10mm.

.6 Patching

.1 Patch and repair any fire resistive coating that has been damaged in accordance with patching recommendations of material manufacturer. If coating becomes damaged, rebuild thickness by spray or brush. Fill small areas with trowel. When dry, smooth and finish with Top Coat to match.

3.4 INTUMESCENT FIRE BARRIER PAINT

.1 Apply materials in accordance with coating manufacturer's application instructions, to a minimum of 15 wet Mils per 107 ft^2 per US gallon (381µm per 2.63m^2/L). FSI 0; SDI 15.

.2 Apply to all CLT surfaces in plenum spaces.

3.5 INSPECTION AND TESTING

.1 The intumescent coating basecoat application shall be tested for dry film thickness (DFT) in accordance with ASTM E605 tested assembly requirements, and manufacturer's specifications.

.2 The cost of inspection and testing shall be paid by the Owner.

3.6 PATCHING

.1 All patching of and repair to intumescent coating due to damage by other trades, shall be performed by this section and paid for by the trade responsible for the damage.

3.7 CLEANING

.1 Remove intumescent coating material from all adjacent materials not designated to receive intumescent coating application.

.2 Upon completion of the intumescent coating work, promptly remove all equipment, protection sheets, and excess materials from the site.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 Subcontractors involved in the work of this section shall examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide all aluminum windows including the following:
- .1 Window hardware,
- .2 Operable vents (with insect screens),
- .3 Aluminum closure panels,
- .4 aluminum sills, and
- .5 Internal sealants and caulking.

1.3 REFERENCES

.1 Aluminum Association (AA); DAF-45, Designation System for Aluminum Finishes.

.2 ASTM B209-01; Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.3 ASTM B221M-00; Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

.4 ASTM E283, Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.

.5 ASTM E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors.

.6 ASTM E331-00; Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

.7 ASTM E1105-00; Test Method for Field Determination of Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.

.8 CAN/CSA-A440.2-M1991, Energy Performance Evaluation of Windows and Sliding Glass Doors.

.9 CAN3-S157, Strength Design in Aluminum.

1.4 PERFORMANCE REQUIREMENTS

.1 Structural performance shall be based on CAN3-S157, Strength Design in Aluminum, and a maximum deflection of 1/175 of the span.

.2 Air infiltration shall not exceed 0.0003 $m^3/s\ m^2$ when tested in accordance with ASTM E283 at a pressure differential of 300Pa.

.3 Design and size components to withstand dead and live loads caused by pressure and suction of wind acting normal to plane of system, as calculated in accordance with the Ontario Building Code.

.4 Window frames shall meet the following minimum performance criteria in accordance with CAN/CSA A440:

.1 Perimeter Frames

.1 Air Tightness: A3/fixed

.2 Water Tightness: B7

.3 Wind Load Resistance: C4

.2 Vent Frames

.1 Air Tightness: A3

.2 Water Tightness: B7

.3 Wind Load Resistance: C4

.5 System to provide for expansion and contraction within system components caused by a cycling temperature range of 95°C over a 12 hour period without causing detrimental affect to system components.

.6 Drain water entering joints, condensation occurring in glazing channels or migrating moisture occurring within system, to the exterior by a weep drainage network. All proprietary internal drainage systems must be vented and drained to the exterior of the building envelope. All horizontal members shall be sealed to vertical members to provide individual compartments within the system in accordance with the rain screen principle

.7 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass.

1.5 SUBMITTALS

.1 Prior to preparation of shop drawings submit a letter from the system manufacturer, certifying that the subcontractor has issued a purchase order, letter of intent or otherwise entered into a contract with the manufacturer. The letter must be dated and include:

.1 Name of project.
.2 Name of subcontractor.
.3 Complete list of product series or style.
.4 Manufacturer's contact with telephone and telefax numbers.

.2 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate materials and large scale details for profiles of components, elevations of unit, anchorage details, required reinforcing, location of isolation coating, description of related components, finishes and fasteners.

.3 Samples

.1 Submit 300 x 300mm sample representative of window frame system including prefinished framing, glass, metal panels, operable vents, and corner detail. Submit samples of all available sill profiles for selection by the Construction Manager.

.4 Product Data

.1 Submit product data for the following, in accordance with Section 01 30 00:

.1 Material composition
.2 Finishes
.3 Hardware requirements

.5 Test Reports

.1 Submit test report from approved independent testing laboratory, certifying windows comply to performance requirements of CAN/CSA-A440.2, and this specification.

1.6 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified

herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation
.1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

.5 Mock-up
.1 Supply and install one full window in place, for review by the Construction Manager in accordance with Section 01 40 00.

.2 Construct mock-up to include all components including vision glass, aluminum sill, and all sealants.

1.7 DELIVERY, STORAGE, AND HANDLING
.1 Do not deliver aluminum windows to the site until installation can commence, or until adequate secure storage is provided.

.2 Deliver all window frames shrink-wrapped in polyethylene. Do not remove wrapping until time of installation.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
.1 Products and systems provided under this section must be from one manufacturer for window frames, operable vents, sills, and infill panels.

2.2 MATERIALS
.1 Aluminum Members: Alcan 6063-T54 alloy and temper.

.2 Screws, bolts and fasteners: for use with aluminum; 300 series stainless steel or 400 series stainless steel cadmium plated.

.3 Glazing gaskets: extruded black EPDM, of sufficient durometer hardness.

.4 Glazing Tape: exterior glazing; Tremco POLYSHIM II.

.5 Vision Glass: refer to Section 08 80 00.

.6 Reinforcing, Supports and Anchors: aluminum or hot-dip galvanized steel.

.7 Sealants: refer to section 07 92 00.

.8 Isolation coating: alkali resistant, epoxy resin solution.

.9 Aluminum Trim: minimum 1.52mm aluminum, finish to match windows.

.10 Perimeter Foam Sealant: single component polymeric low-expansion insulating sealant;
- .1 Great Stuff PRO™, by Dow Chemical Company.
- .2 CF812, by Hilti Corporation.

2.3 EXTERIOR WINDOWS

.1 Frames: extruded aluminum, thermally broken, fixed perimeter frames, minimum 133mm frame depth for double glazing;
- .1 Acceptable Products
  - .1 RainBlade ***1990*** by Alumicor Limited.
  - .2 518 IsoPort™ Series by Kawneer Company Canada Ltd.
  - .3 Series 435 by C.R. Laurence (United States Aluminum of Canada).
  - .4 525 Series by Commdoor Aluminum.

.2 Operable Vents: extruded aluminum, thermally broken for double glazing; open-in 'hopper style' ventilators, with two-point cam handle locks, aluminum insect screens, and complete perimeter weatherstripping;
- .1 Acceptable Products
  - .1 Univent 1350 Series by Alumicor Limited.
  - .2 526 IsoPort™ Series by Kawneer Company Canada Ltd.
  - .3 Series 8250 by C.R. Laurence (United States Aluminum of Canada).
  - .4 225 Series by Commdoor Aluminum.

2.4 ACCESSORIES

.1 Infill Panels: Prefinished aluminum sheets 3mm thick formed as detailed, supplied and installed on concealed aluminum support angles, with concealed fasteners. Colour and finish to match window frames.

.2 Sills: Prefinished extruded aluminum, as shown on drawings; colour and finish to match exterior finish of window frames. **Site-fabricated bent aluminum plate/sheet sills are not acceptable**.
- .1 Drip deflectors (end dams) at all ends.
- .2 Joint covers where sills are not continuous lengths, and at mitres.

.3 Align intermediate joints with mullions.
.4 Round off all protruding edges and corners.

.3 Spandrel Panels: Prefinished aluminum sheets 3mm thick, bonded to both sides of 25mm thick expanded polystyrene (EPS) insulation, glazed into frame with removable stops and seals. Spandrel panels must be removable from the exterior.

2.5 ALUMINUM FINISH
.1 Anodized: Class 1 anodic colour coating to AA-M12C22A42/44; #29 Black.

2.6 FABRICATION
.1 Fabricate window frames from extrusions of size and configurations shown on drawings.

.2 Fabricate in accordance with CAN/CSA-A440 supplemented as follows:
.1 Fabricate units square and true with maximum tolerance of plus or minus 1.5mm for units with a diagonal measurement of 1828mm or less and plus or minus 3mm for units with a diagonal measurement over 1828mm.
.2 Face dimensions detailed are maximum permissible sizes.
.3 Brace frames to maintain squareness and rigidity during shipment and installation.
.4 Provide all internal reinforcing as required for the proper structural design and support of the framing system.
.5 All joints shall be accurately machined, assembled and sealed to provide neat weathertight joints
.6 Shielded drainage and pressure equalization vents shall be provide where required to provide external drainage as specified. All horizontal members shall be sealed to vertical members to provide individual compartments within the system in accordance with the rain screen principle.
.7 Window framing shall consist of thermally broken sections with fixed glazing stop on exterior side, and snap-in glass stop on interior side. Provide mullion sections (closed) for all perimeter head, jamb and sill applications; with outer glazing leg cleanly cut off. No open sections are permitted.

3 EXECUTION

3.1 INSTALLATION
.1 Install in accordance with CAN/CSA-A440.

.2 Erect and anchor all frames square and level using concealed fastenings where possible.

.3 Anchors to be built into the structure shall be provided to the General Contractor for setting in accordance with the approved shop drawings.

.4 Frames shall be joined by coupling the split interlocking mullions after bedding compound has been applied to the female section.

.5 After erection, all operating windows shall be checked and adjusted to ensure smooth and proper operation.

.6 Maunfacturer' name plates or labels shall not be installed on exterior of windows.

3.2 ISOLATION COATING

.1 Isolate aluminum from following components, by means of isolation coating:

.1 All dissimilar metals except stainless steel, zinc, or white bronze.

.2 Concrete, masonry, and mortar.

.3 Wood.

3.3 CAULKING & SEALS

.1 Fill all voids between window frames and building components with foam sealant. Allow for caulking and backer rod application.

.2 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.

.3 Apply sealants to full perimeter of interior and exterior of frames in accordance with Section 07 92 00.

3.4 CLEANING

.1 During installation, remove all corrosive or foreign materials or droppings resulting from work of this or other trades.

.2 Perform initial cleaning operation of all window frames upon completion of installation. Remove all remaining labels, protective films, or other surface imperfections.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide glass and glazing for:
- .1 Interior doors and screens,
- .2 Exterior doors, and screens,
- .3 Exterior windows,
- .4 Exterior curtain wall systems,
- .5 Unframed mirror glazing.

.2 Section includes but is not limited to the provision of:
- .1 Glass
- .2 Specialty glazing products
- .3 Glazing sealants, gaskets, tapes, and backing materials
- .4 Miscellaneous glazing materials necessary to complete the work of this section

1.3 REFERENCE STANDARDS

.1 ANSI/ASTM E330; Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
.2 ASTM C509; Standard Specification for Elastomeric Cellular Gasket and Sealing Material.
.3 ASTM C542; Specification for Lock-Strip Gaskets.
.4 ASTM C864; Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
.5 ASTM C920; Specification for Elastomeric Joint Sealants.
.6 ASTM C1115; Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.

.7 ASTM D790; Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
.8 ASTM D2240; Test Method for Rubber Property - Durometer Hardness.
.9 ASTM E84; Test Method for Surface Burning Characteristics of Building Materials.
.10 ASTM F1233; Test Method for Security Glazing Materials and Systems.
.11 CAN/CGSB-12.1; Tempered or Laminated Safety Glass.
.12 CAN/CGSB-12.3; Flat, Clear Float Glass.
.13 CAN/CGSB-12.5; Mirrors, Silvered.
.14 CAN/CGSB-12.8; Insulating Glass Units.
.15 CAN/CGSB-12.9; Spandrel Glass.
.16 CAN/CGSB-12.20; Structural Design of Glass for Buildings.
.17 Flat Glass Manufacturers Association (FGMA) Glazing Manual.
.18 Laminators Safety Glass Association Standards Manual.

1.4 PERFORMANCE REQUIREMENT
.1 Provide continuity of building enclosure vapour and air barrier using glass and glazing material as follows:
.1 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 acting normal to plane of glass to a design pressure measured in accordance with the Ontario Building Code and CAN/CGSB-12.20.

.3 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.

.4 Provide thermal stress analysis for all single glazed lites and all sealed glass units. Make recommendations for additional heat treatment, thickness change, or other required modifications prior to ordering of materials or manufacture of sealed glass units.

1.5 SAMPLES
.1 Submit 300mm x 300mm samples of all tinted, coated, and surface treated glass in accordance with Section 01 30 00.

1.6 QUALITY ASSURANCE
.1 Manufacturer/Fabricator
.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application
.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified

herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation
.1 If requested, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.7 ENVIRONMENTAL 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.

1.8 MAINTENANCE DATA
.1 Provide maintenance data including cleaning instructions for incorporation into Operations and Maintenance manual.

1.9 EXTENDED WARRANTY
.1 Provide sealed glass unit manufacturer's warranty certificate stating that the factory-sealed insulating glass units specified under this section are guaranteed against failure of seal of enclosed air space and deposits on inner faces of glass detrimental to vision, for a period of ten (10) years from the Date of Substantial Performance.

2 PRODUCTS

2.1 FLAT GLASS
.1 Safety Glass
.1 Tempered (TG): to CAN/CGSB-12.1, tong-free, roller marks free, with visible after installation factory-applied permanent impression in one corner identifying each pane as tempered. Glass must have smooth ground edges where used in Draft Stop applications. Thickness as indicated in schedules and on drawings.
.2 Laminated (LG): to UL 972, constructed of 2 layers of heat-strengthened glass, with 1.5mm Saflex® PVB interlayer, CPSC Category II.

.2 Low Emissivity (Low-E) Glass, minimum 6mm thick, PPG ***"SunGuard SN 68" clear by Guardian Glass;***
- .1 Coating: soft-sputtered.
- .2 Visible Light Transmittance: ***61%***.
- .3 ***Solar Heat Gain*** Co-efficient: ***0.34.***
- .4 Visible Light Reflectance: ***15%.***
- .5 ***U-Value: 0.184 Winter Night (btu/hr-ft^2-F)***
- .6 Tempered Low-E Glass; to CAN/CGSB-12.1, 6mm thick, tong free, roller marks free, with visible after installation factory-applied permanent impression in one corner identifying each pane as tempered. Low-E coating one face.

.3 Spandrel Glass: to CAN/CGSB-12.9, PPG Starfire Glass with Opacicoat coating on Surface #4, Charcoal colour as selected by Consultant, minimum 6mm thick.
- .1 Type: 1 – Tempered safety glass.
- .2 Class: A - Float
- .3 Style: 3 - Organic coated.
- .4 Form: M - Monolithic.

.4 Mirror Glass: Silvered mirror glass to CAN/CGSB-12.5.
- .1 Large Sized and Full Width Mirrors: 6mm thick, tempered safety glass, back finished with one coat silver, one coat copper, and two coats backing paint. Mirrors to be adhesive mounted to wall. Refer to drawings for sizes.

.5 Fire Resistive Glass (FG): ***non-laminated*** fire-resistive glass with surface-applied film; FireLite®NT, as manufactured by Nippon Electric Glass Company, Ltd., distributed by Technical Glass Products, Kirkland WA, or KERALITE as manufactured by Vetrotech Saint-Gobain Auburn WA (distributed by F1 Glass Solutions, Toronto);
- .1 Properties:
  - .1 Thickness: ***5mm*** overall.
  - .2 Weight: 2.4 lbs./sq. ft.
  - .3 Approximate Visible Transmission: 88 percent.
  - .4 Approximate Visible Reflection: 9 percent.
  - .5 Fire-rating: 20 minutes to 3 hours for doors; 20 minutes to 90 minutes for other applications.
  - .6 Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I and II).
  - .7 STC Rating: Approximately 35 dB.
  - .8 Surface Finish: Premium (polished).
  - .9 Positive Pressure Test: UL 10C, UBC 7-2 and 7-4; passes.
  - .10 Labelling: Permanently label each piece of FireLite®NT with the FireLite® logo, UL logo and fire rating in sizes up to 3,325 sq. in., and with the FireLite label only for sizes that exceed the listing (as approved by the local authority having jurisdiction).
  - .11 Fire Rating: Fire rating listed and labelled by ULC for fire rating scheduled at opening locations on drawings, when

tested in accordance with ULC Standards CAN4 S-104 and CAN4 S-106.

.6 Sealed Insulating Glass Units: to CAN2-12.8 and composed of ***three*** lites of minimum 6 mm thick glass separated by ~~(a)~~13mm wide "warm edge" ***spacers***, double sealed and atmospheric pressure equalized to prevent bowing of the glass lites in the vertical position. All units shall be Argon Gas filled. Edges of glass shall be straight cut, free of nicks and other imperfections conducive to breakage. 25mm overall thickness for double glazed units. U-Value of 0.24, and SHGC of 0.27 for sealed glass units.

.1 Vision Units (***VG-1***): ***Triple-***glazed, double sealed insulating glass units, clear tempered glass ~~outer lite, and tempered inner~~ ***lites***, with specified low emissivity coating on **No. 2** surface.

.2 Vision Units (***VG-2***): **Triple-**glazed, double sealed insulating glass units, clear laminated glass inner lite, and tempered clear safety glass **centre and** outer lite, with specified low emissivity coating on No. 2 surface.

.7 Patterned Glass:

.1 Surface Treatment: Satin acid-etched surface treatment on Surface #1. AviProtek by Walker Glass, or equivalent.

.2 Glass Surface Pattern

.1 Colour: White.

.2 Pattern: 4"x4" 5mm dots, bird-friendly pattern as detailed on the drawings, applied to Surface #1 of exterior glazing units.

2.2 GLAZING FILMS

.1 Film Coatings for glass, 75 micron thick semi-transparent film, self-adhesive; 3M Fasara SH2FGCL Cloud.

2.3 GLAZING MATERIALS

.1 Setting Blocks: EPDM or Neoprene, 80 – 90 (Shore A) durometer hardness to ASTM D2240, to suit glazing method, glass weight, and area.

.2 Spacer Shims: EPDM or Neoprene, 50 – 60 (Shore A) durometer hardness to ASTM D2240, 75mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.3 Glazing Tapes

.1 Compression: 100% solids, preformed macro-polyisobutylene/butyl rubber with integral synthetic rubber spacing rod; coiled on release paper; size as required for frame stop heights; POLYSHIM II, by Tremco.

.2 Non-compression: 100% solids, preformed butyl rubber to ASTM C1281, 66 (Shore 00) durometer hardness to ASTM D2240; coiled on release paper; size as required for frame stop heights; Tremco 440 tape.

.3 Fire Rated Glass Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent.

.4 Glazing Gaskets
- .1 Dense Gaskets for Compression Glazing
  - .1 Extruded from ozone-resistant compound, resistant to sunlight, weathering, oxidation and permanent deformation under load. Gasket Configuration shall provide for mechanical engagement with the metal. Gaskets shall meet either ASTM C-864 Option II, or ASTM C-1115 Type C (for silicone compounds).
    - .1 Dense Neoprene extrusions: Tremco Incorporated, 50, 60 and 70 durometer hardness.
    - .2 Dense EPDM extrusions: Tremco Incorporated, 40, 50, 60 and 70 durometer hardness.
    - .3 Dense SCR-900 extrusions: Tremco Incorporated, 60 and 70 durometer hardness.
    - .4 Dense Silicone extrusions: Tremco Incorporated, 40, 60 and 70 durometer hardness.
- .2 Cellular Gaskets for Compression Glazing:
  - .1 Extruded from ozone-resistant compound, resistant to sunlight, weathering, oxidation and permanent deformation under load. Gasket configuration shall provide for mechanical engagement with the metal. Gaskets shall meet ASTM C-509 Option II.
    - .1 Cellular extrusions: Tremco Incorporated, Closed Cell Neoprene extrusions.
    - .2 Cellular extrusions: Tremco Incorporated, Closed Cell EPDM extrusions.

.5 Glazing Sealants
- .1 Cap Beads
  - .1 Commercial Glazing: single or multi-component, non-acid curing silicone sealant to ASTM C920;
    - .1 One part neutral cure silicone; equivalent to Spectrem 2, by Tremco.
- .2 Heel and Toe Beads
  - .1 Commercial Glazing: single or multi-component, non-acid curing silicone sealant to ASTM C920;
    - .1 One part medium modulus silicone sealant; equivalent to Tremsil 600, by Tremco.
- .3 Perimeter Seals
  - .1 Single or multi-component, elastomeric sealant to ASTM C920;
    - .1 One part neutral cure silicone; equivalent to Spectrem 2, by Tremco.

.2 One part low modulus neutral cure silicone; equivalent to Spectrem 3, by Tremco.

.4 Metal Expansion Seals
.1 Single or multi-component, non-acid curing silicone sealant to ASTM C920;
.1 One part, neutral curing, silicone sealant; equivalent to Spectrem 2, by Tremco.

.5 Metal to Metal Joinery Seals
.1 Single or multi-component, non-acid curing silicone sealant to ASTM C920;
.1 One part medium modulus silicone sealant; equivalent to Tremsil 600, by Tremco.

.6 Concealed Splice Sleeve Conditions
.1 Single component, non-drying, non-skinning synthetic rubber sealant;
.1 One part synthetic rubber; equivalent to Tremco Curtain Wall Sealant, by Tremco.

.7 Fire Rated Glass Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Acceptable Products:
.1 Dow Corning 795 - Dow Corning Corp.
.2 Silglaze-II 2800 - General Electric Co.
.3 Spectrem 2 - Tremco Inc.

2.4 GLAZING ACCESSORIES
.1 Glazing Clips: manufacturer's standard type.

.2 Mirror Attachment: Stainless steel continuous J-molds.

2.5 SEALED GLASS UNIT FABRICATION
.1 Fabricate sealed glass units through the Insulating Glass Manufacturers Association of Canada Certification Program to CAN/CGSB 12.8. Sealed units shall bear IGMAC Certified Products List number and be properly identified.

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, and ready to receive glazing.

3.2 PREPARATION

.1 Clean contact surfaces with solvent recommended for use by the sealant manufacturer, and wipe dry thoroughly.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR GLAZING

.1 Aluminum Frames - Tape / Gaskets

.1 Cut glazing tape to length and set against permanent stops, level with sight line. Seal corners by butting tape and dabbing with sealant.

.2 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.

.3 Place setting blocks at 1/4 points, with edge block maximum 150mm from corners.

.4 Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.5 Install removable stops with gaskets inserted between glazing and applied stops.

3.4 INTERIOR GLAZING

.1 Wet Method - Sealant / Sealant

.1 Install glazing resting on setting blocks. Install applied stop and centre light by use of spacer shims at 600mm centres, 6mm below sight line.

.2 Locate and secure glazing light using spring wire clips or glazers' clips.

.3 Fill gaps between glazing and stops with glazing sealant until flush with sight line. Tool surface to straight line.

.2 Steel Frames - Tape / Sealant

.1 Cut glazing tape to length and set against permanent stops, 3mm below sight line. Seal corners by butting tape and dabbing with sealant.

.2 Place setting blocks at 1/4 points, with edge block maximum 150mm from corners.

.3 Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.4 Install removable stops with spacer strips inserted between glazing and applied stops below sight line. Place glazing tape on glazing light or unit with tape 6mm below sight line.

.5 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 6mm below sight line.

.6 Apply cap bead of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

.3 Glazing Film Installation
- .1 Clean glass to receive film, thoroughly and let dry.
- .2 Install plastic film in accordance with film manufacturer's instructions.
- .3 Remove all air bubbles, creases or visible distortion.
- .4 Fit tight to glass perimeter. Do not leave clear gaps.
- .5 Provide glazing film to interior mirrors, screens and windows where indicated on the drawings. Final extent and design by the Consultant.

3.5 MIRROR INSTALLATION

.1 Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions. Install stainless steel mirror clips (6 per sheet) at perimeter edges of mirror installation (butt joints between mirror panels).

.2 Place plumb and level, in locations indicated on the drawings.

3.6 CLEANING & PROTECTION

.1 During installation, remove all corrosive or foreign materials or droppings resulting from work of this trade.

.2 Perform initial cleaning operation of all glass and mirrors upon completion of installation. Do not remove labels or protective films until time of final cleaning.

.3 After initial cleaning, mark large lites with an "X" by using removable plastic tape. Do not use masking tape. Do not mark heat absorbing or reflective glass units.

.4 Provide instructions for the proper method and materials to be used in the cleaning and maintenance of finished surfaces. Remove all remaining labels and protective films at time of final cleaning.

3.7 GLAZING TYPES

.1 Refer to the Drawings for the locations and extent of all glazing types.

.1 ***VG-1****:* Insulating Glass Units; tempered clear glass outer, ***centre and*** inner ***lites, with specified low emissivity coating on No. 2 surface***. Glass Surface Pattern where indicated.

.2 ***VG-2:*** Insulating Glass Units; clear laminated glass inner lite and tempered safety glass ***centre and*** outer ***lites***, with specified low emissivity coating on No. 2 surface. Glass Surface Pattern where indicated.

.3 FG: Fire Resistive Glass for glazing in Fire Resistance Rated (FRR) glazing assemblies.

.1 FG.1: ***5mm*** Fire-rated, ceramic safety glass (FireLiteNT)

.4 TG: Clear tempered safety glass.

.1 Interior Screens: tempered safety glass, thickness as shown on the drawings.

.5 LG: Laminated Glass; 2 layers - 6mm heat strengthened glass with 1.52mm Vanceva PVB interlayer.

.1 Interlayer Colour: Vanceva Clear.

.6 MG: Mirror glass; thickness as indicated on the drawings.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide resilient sheet flooring including;

.1 floor preparation
.2 primers and sealers
.3 sheet flooring Products
.4 adhesives
.5 Flash cove base and accessories

1.3 REFERENCE STANDARDS

.1 ASTM D2047; Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
.2 ASTM E648; Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
.3 ASTM E662; Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
.4 ASTM F970; Test Method for Static Load Limit.
.5 ASTM F1859; Specification for Rubber Sheet Floor Covering without Backing

1.2 QUALITY ASSURANCE

.1 Manufacturer/Fabricator

.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to

provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application
.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation
.1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.4 SUBMITTALS
.1 Shop Drawings
.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate on shop drawings a complete seaming layout for all resilient sheet products, colour and pattern layouts, types of adhesives and/or heat welding materials.

.2 Samples
.1 Submit duplicate (8" x 10") 200mm x 250mm samples of all resilient sheet flooring materials, in specified colours and patterns, in accordance with Section 01 30 00.

.3 Integral Base
.1 Submit duplicate (4" x 4") 102mm x 102mm samples of prefabricated flashcove bases in accordance with Section 01 30 00.

.2 Samples shall be representative of riser height and toe lengths specified, and shall represent one completed inside corner and one completed outside corner, with seams sealed and finished.

.3 Produce samples in specified flooring materials and selected colours.

1.5 CLOSEOUT SUBMITTALS

.1 Maintenance Materials

.1 Deliver 2% of total area in one single piece, of each colour, pattern, and type flooring material required for project for maintenance use, in accordance with Section 01 78 00. Minimum maintenance materials shall be (100ft^2)9.3m^2 of any one colour and/or floor type.

.2 Deliver 6.1m (20ft.) in 3.05m (10ft.) lengths, of prefabricated flashcove bases for each colour and type of flooring material used in the Work, for maintenance use in accordance with Section 01 78 00.

.2 Maintenance Data

.1 Provide care and maintenance data for resilient flooring for incorporation into Operations and Maintenance manual.

.2 Provide care and maintenance data for prefabricated flashcove bases for incorporation into Operations and Maintenance manual.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver sheet flooring products in rolls, wrapped in polyethylene. Store according to the manufacturer's recommendations.

.2 Store materials flat on clean, dry floor area, away from construction activities so as to prevent damage.

.3 Remove packaging prior to installation and allow materials to acclimatize according to the manufacturer's recommendations.

1.7 SEQUENCING AND SCHEDULING

.1 Installation of resilient sheet flooring shall not commence until all overhead mechanical, electrical, and dust generating work is completed.

.2 Schedule resilient sheet flooring installation for completion prior to installation of millwork.

1.8 SITE CONDITIONS

.1 Maintain air temperature and structural base temperature at flooring installation area above (68°F)20°C for 72 hours before, during and 72 hours after installation. Temporary heat is not acceptable.

1.9 GUARANTEE

.1 Guarantee in writing, the installation of the Products specified herein to be free from defects in workmanship for a period of two (2) years from Date of Substantial Performance.

.2 This Guarantee shall cover instances of rippling, bubbling, seam failure, adhesive failure, and other installation defects which become apparent during the guarantee period, and are found to be due to faulty installation. The guarantee shall provide for repair of idenitfied defects, including removal and replacement of any affected Products.

1.10 EXTENDED WARRANTY

.1 Provide a warranty certificate in the name of the Owner, warranting that the Products specified herein shall be free from defects in material and manufacture for a period of five (5) years from Date of Substantial Performance.

.2 This warranty shall provide for replacement of any defective Products at no cost to the Owner, including the cost of removal and disposal of defective materials, and installation of new Products to match the original installation.

2 PRODUCTS

2.1 MATERIALS

.1 Resilient Sheet Flooring: sheet rubber, homogeneous to ASTM F1859 Type 1, three layer construction (rubber wear layer/60 Shore A rubber core/polyester backing), (0.079")2.0mm thickness, colour as selected by Consultant;

.1 Acceptable Products

.1 MONDO™ Harmoni™, by MONDO America Inc., Laval, QC.

.2 Welding Rods: colour and pattern matched welding rods, compatible with sheet flooring material, as supplied by individual flooring manufacturers.

.2 Pre-Fabricated Cove Bases

.1 Fabricated from same materials and dye lots as resilient flooring, in maximum practical lengths, with (1½" x 1½")38mm x 38mm formed aluminum reinforcing bonded to back of base material; as manufactured by FlashCove™ Prefabricated Bases Inc., Markham ON (800.334.5147), and as follows:

.1 Riser: (4")102mm.

.2 Toe: (3")76mm.

.2 Metal Base Cap: for adhesive installation; stainless steel "chiklet" cap by FlashCove ™ Prefabricated Bases Inc.

.3 Seam Seal Adhesive: compatible with sheet flooring material, as supplied by individual flooring manufacturers.

2.2 ADHESIVES AND ACCESSORIES

.1 Substrate filler and leveler: Portland cement based latex filler requiring water only to produce cementitious paste, as recommended by flooring manufacturer for use with their product; equivalent to S-194/195 by Armstrong.

.2 Primer: latex floor primer for concrete and wood substrates; equivalent to S-185 by Armstrong.

.3 Moisture Retardant: for concrete and wood substrates; equivalent to S-135 VapArrest by Armstrong.

.4 Adhesives

.1 Rubber Flooring: two-part, solvent-free, polyurethane adhesive, equivalent to Johnsonite #975 Two-Part Urethane Adhesive.

.2 Integral Base: Low-VOC premium cove base adhesive, as recommended by the prefabricated flashcove base manufacturer.

.5 Surface Cleaner: neutral detergent solution.

.6 Surface Polish: matte finish commercial floor polish; Carefree Matte by Johnson Wax.

3 EXECUTION

3.1 INSPECTION

.1 Ensure concrete floors are dry by using test methods recommended by flooring manufacturer, and exhibit negative alkalinity, carbonization or dusting.

.2 Moisture test results should meet the flooring manufacturer's recommendations but shall not exceed (5 lbs/1000ft^2/24 hours) 0.5kg/100m^2/24 hours. Alkali readings shall be 5 to 9.

.3 If moisture content does not meet manufacturer's recommendations, apply moisture retardant to substrate, and re-test.

3.2 SUBFLOOR TREATMENT

.1 Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.

.2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.3 Prime entire substrate to receive tile flooring with specified primer, to primer manufacturer's recommendations.

3.3 FLOORING APPLICATION

.1 Refer to Room Finish Schedule, Colour Schedule, and/or Floor Finishes Plans for locations of resilient sheet flooring types, and floor pattern requirements.

.2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.3 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.

.4 Double cut sheet joints and continuously seam seal heat weld according to manufacturer's printed instructions. Seams shall be in accordance with reviewed seaming layout. In the absence of a seaming layout, seam locations shall be as approved by Consultant on site prior to commencement of installation.

.5 Run patterned sheets parallel to corridor traffic, and parallel to long dimension of rooms. Border widths minimum 1/3 width of full material width.

.6 As installation progresses and after installation, roll flooring with (100 lb) 45kg roller to ensure full adhesion.

.7 Cut flooring neatly around fixed objects. flooring shall run continuously under all millwork without interrupting floor pattern.

.8 Install flooring in pan type floor access covers. Maintain floor pattern and direction.

.9 Continue flooring through areas to receive demountable partitions without interrupting floor pattern.

.10 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

3.2 INTEGRAL BASE APPLICATION

.1 Provide pre-fabricated cove base for all integral base as indicated in finish schedules.

.2 Dry-fit base; cut and fit material to required lengths. Mitre-cut inside and outside corners.

.3 Dry-fit, and cut metal cove cap prior to base installation.

.4 Scribe glue line on walls and floor at edge of base material.

.5 Apply adhesive in full spread (100% coverage on two surfaces) for full length of base material. Apply base to wall surface straight and level.

.6 Slide cove cap behind base material.

.7 Hand roll base material onto wall and floor surface, and remove all bumps, ripples, and fishmouths. Remove all excess adhesive.

.8 Seam seal all seams (vertical and horizontal) in base material.

3.3 CLEANING AND POLISHING

.1 Once cleaning and polishing operations commence, prohibit all traffic on floor surface during, and for a minimum 8 hours after cleaning and application of sealer and polish.

.2 Cleaning

.1 Remove excess adhesive from floor, base and wall surfaces without damage to such surfaces. Remove all dust, dirt, and debris.

.2 Clean floors with neutral detergent solution specified (3 to 4 oz/gal) 85 to 113g/4.5L, to flooring manufacturer's instructions.

.3 Final Surface Protection

.1 Apply final surface protection immediately prior to final inspection by the Consultant.

.2 Clean floors with neutral detergent solution specified (4 to 6 oz/gal) 113 to 170g/4.5L, to flooring manufacturer's instructions.

.3 Apply three coats of commercial floor polish specified.

3.4 PROTECTION OF FINISHED WORK

.1 Protect new floors from scratches, gouges, scuff marks and other damage from time initial surface protection application, until final inspection.

.2 Prohibit all traffic on tile floor surfaces after application of final surface protection.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

.1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.

.2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.

.3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.

.4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

.1 Provision of all labour, materials, equipment and incidental services necessary to provide static dissipative tile flooring, including adhesives, primers, floor preparation and installation.

1.3 REFERENCES

.1 ASTM E648; Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
.2 ASTM E662; Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
.3 ASTM F150; Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
.4 ASTM F710; Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
.5 ASTM F1859; Specification for Rubber Sheet Floor Covering without Backing
.6 ASTM F1869; Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
.7 ASTM F2170; Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
.8 NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.
.9 NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials.
.10 ANSI/ESD S7.1 :Floor Materials-Resistive Characterization of Materials
.11 ANSI/ESD STM 97.1: Floor Materials and Footwear-Resistance in Combination with a Person

.12 ANSI/ESD STM 97.2: Floor Materials and Footwear Voltage Measurement in Combination with a Person
.13 CAN/ULC-S102.2; Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.4 QUALITY ASSURANCE
.1 Manufacturer/Fabricator
.1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application
.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation
.1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting
.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
.1 Contractor (Site Superintendent & Project Manager)
.2 Application Subcontractor (Site Foreman & Project Manager)
.3 Product Manufacturer and/or Distributor (Technical Representatives)
.4 Related Subcontractors whose work is affected by that of this Section.

1.5 SAMPLES
.1 Submit duplicate full sized tile samples of each type and colour of resilient tile specified in accordance with Section 01 30 00.

1.6 DELIVERY, HANDLING AND STORAGE
.1 Deliver products to the site in original, unopened containers with manufacturer's labels intact. Labels shall indicate product designation, lot numbers and colour.

.2 Store products in cool, dry, well-ventilated area at (50 to 81°F) 10 to 27°C, and away from any open flame, spark or other heat source.

1.7 ENVIRONMENTAL REQUIREMENTS
.1 Ambient air and surface temperature shall be (40 to 120°F) 4 to 50°C at installation area for 24 hours prior to and 24 hours after application.

.2 Substrate temperature must be minimum (5°F) 3°C above dew point to prevent condensation.

1.8 SEQUENCING AND SCHEDULING

.1 Installation of resilient tile shall not commence until all overhead mechanical, electrical, and dust-generating work is completed.

.2 Schedule resilient tile installation for completion prior to installation of millwork.

1.9 CLOSEOUT SUBMITTALS

.1 Maintenance Data

.1 Provide data for maintenance of resilient flooring for incorporation into Operations and Maintenance Manual.

.2 Maintenance Materials

.1 Deliver 2% of total area of each colour, pattern and type tile flooring material required for this project for maintenance use, in accordance with Section 01 78 00. Minimum maintenance materials shall be (100ft^2) 9.3m^2 of any one colour and/or floor type.

2 PRODUCTS

2.1 TILE MATERIALS

.1 Static Dissipative Tile: homogeneous rubber to ASTM F1859 Type 1, three layer construction (rubber wear layer/60 Shore A rubber core/polyester backing), 3.5mm thickness, (39" x 39") 1000mm x 1000mm;

.1 Critical Radiant Flux: 0.45 watts/cm^2 – Class 1, to ASTM E648.
.2 Smoke: 450 or less to ASTM E662.
.3 Static Load Limit: (250 psi) 5.27 kg/cm^2 to ASTM F970.
.4 ANSI/ESD S7.1: 7.5 x 108, 12% RH, tested surface to ground.
.5 Meets OSHA/NFPA (> 2.5 x 104 ohms): 6.2 x 107 ohms .
.6 Meets ASTM F150, 106 to 109 ohms (50% RH, 100v): 6.2 x 107 ohms.
.7 ESD-approval (IEC 61340 / 100v): 107
.8 Colour: as selected by the Consultant.
.9 Acceptable Products are:

.1 Architectural SD Rubber Static Dissipative Tile, by StaticWorx ESD Flooring.
.2 ESD Rubber Static Dissipative Tile, by Roppe Corporation.
.3 Colorex SD by Forbo Inc.

2.2 ADHESIVES AND ACCESSORIES

.1 Substrate filler and leveler: Portland cement-based latex filler requiring water only to produce cementitious paste, as recommended by flooring manufacturer for use with their product.

.2 Primer: latex floor primer for concrete and wood substrates.

.3 Adhesive: equivalent to ASD-800 Static Dissipative Tile Adhesive by Roppe, or equivalent by StaticWorx.

.4 Grounding Strips: (2") 50mm wide x (24") 610mm long copper ground-connection strips for under the tile.

.5 Surface Cleaner: neutral detergent solution.

3 EXECUTION

3.1 INSPECTION

.1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer, and exhibit negative alkalinity, carbonization or dusting.

.2 Moisture test results should meet the flooring manufacturer's recommendations but shall not exceed (5 lbs/1000ft^2) 0.5kg/100m^2 per 24 hours. Alkali readings shall be 5 to 9.

.3 If moisture content does not meet manufacturer's recommendations, apply moisture retardant to substrate, and re-test.

3.2 SUBSTRATE TREATMENT

.1 Remove substrate ridges and bumps. Fill low spots, cracks, joints, holes and other defects with filler.

.2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured.

.3 Prime entire substrate to receive tile flooring with specified primer, to manufacturer's recommendations.

3.3 TILE APPLICATION

.1 Apply adhesive uniformly using recommended notched trowel in strict accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.2 Install grounding strips to the requirements of the flooring manufacturer.

.3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles shall be minimum half tile width.

.4 As installation progresses, roll flooring with (100 lb.) 45kg roller to ensure full adhesion. Roll floor again in its entirety after installation.

.5 Cut tile and fit neatly around fixed objects, and floor protrusions. Flooring shall run continuously under all millwork without interrupting floor pattern.

.6 Install flooring in pan type floor access covers. Maintain floor pattern and direction.

.7 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.

.8 Install reducers at unprotected or exposed edges where flooring terminates, in accordance with Section 09 65 13.

3.4 CLEANING

.1 Initial Surface Protection

.1 Apply initial surface protection within 48 hours after completion of installation and final set of adhesive. Prohibit all traffic on floor surface prior to application of initial surface protection.

.2 Remove excess adhesive from floor, base and wall surfaces without damage to such surfaces. Remove all dust, dirt, and debris.

.3 Clean floors with neutral detergent solution specified (3 to 4 oz/gal) 85 to 113g/4.5L, to flooring manufacturer's instructions.

.2 Final Surface Protection

.1 Apply final surface protection immediately prior to final inspection by the Consultant.

.2 Clean floors with neutral detergent solution specified (4 to 6 oz/gal) 113 to 170g/4.5L, to flooring manufacturer's instructions.

3.5 PROTECTION OF FINISHED WORK

.1 Protect new floors from scratches, gouges, scuff marks and other damage from time initial surface protection application, until final inspection.

.2 Prohibit all traffic on floor surfaces after application of final surface protection.

END OF SECTION