

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 This Section specifies insulation Work not specified in other Sections. Refer to other Sections for the respective insulation requirements.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to Site in their original wrappings with labels intact and store in areas directed by the City.
- .2 Store insulation on raised platforms and protect with waterproof covers. Prevent exposure of insulation to UV exposure.
- .3 Store materials inside buildings for 24 hours prior to installation.

Part 2 Products

2.1 MATERIALS

- .1 Batt Insulation, In stud cavities: Owens Corning: "Fibreglass Pink", sized to match cavity.

Part 3 Execution

3.1 PREPARATION

- .1 Ensure that surfaces to receive insulation are dry, firm, straight, and free from loose material, projections, ice, frost, slick, grease, oil or other matter detrimental to bond of the adhesive or uniform bedding of the insulation.

3.2 INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces as indicated on Drawings.
- .2 Fit insulation tight to electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other projections or openings.
- .3 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation panels free from ripped backs or chipped or broken edges.
- .4 Install materials in accordance with manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB).
 - .1 CGSB 71-GP-24M-[77(R1983)], Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .2 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
- .3 Environmental Choice Program (EPC).
 - .1 CCD-016-[97], Thermal Insulation.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with CW 1110 – Clause 1.5.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 INSULATION

- .1 Rigid cellular polystyrene: to CAN/ULC-S701.
 - .1 Type: 4.

- .2 Compressive strength: 170
- .3 Thickness: as indicated.
- .4 Size: 600 x 1200.
- .5 Edges: ship lapped.

2.2 ACCESSORIES

- .1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry.
- .2 Trim existing base insulation straight and even to ensure tight fit with new.
- .3 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .4 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .5 Offset both vertical and horizontal joints in multiple layer applications.
- .6 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.3 EXAMINATION

- .1 Examine substrates and immediately inform Contract Administrator in writing of defects.
- .2 Prior to commencement of work ensure:
 - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 PERIMETER FOUNDATION INSULATION

- .1 Exterior application: extend boards as indicated. Install on exterior face of perimeter foundation wall with thermal studs.
- .2 Employ thermal studs in accordance with manufacturer's recommendations

3.5 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 - General

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
- .2 Canadian Standards Association (CSA)
 - .1 CAN/CSA-ISO 9001 9002 9003, Requirements for Quality Assurance, Parts 1, 2 and 3.
 - .2 CAN/CSA-ISO 14001-96, Environmental Management Systems - Specifications with Guidance for Use.

1.2 SUBMITTALS

- .1 Submit proofs of manufacturer's CCMC Listing and listing number to the Contract Administrator.

1.3 PRODUCT DATA

- .1 Submit manufacturer's printed product literature, specifications and data sheets in accordance with CW 1110 – Clause 1.5.

Part 2 - Products

2.1 SHEET VAPOUR BARRIER

- .1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.
- .2 Staples: minimum 6 mm leg.
- .3 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

Part 3 - Execution

3.1 INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall and ceiling assemblies prior to installation of gypsum board to form continuous retarder.

- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

- .1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour barrier as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

- .1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
 - .1 Install moulded box vapour barrier.
 - .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

END OF SECTION

Part 1 – General

1.1. GENERAL REQUIREMENTS

- .1 Supply **Kingspan KS Series** factory-assembled insulated wall and roof panel system as specified and as shown on drawings.

1.2. QUALITY ASSURANCE

- .1 The **Kingspan KS Series** panels of Kingspan Insulated Panels Ltd., 8500 Keele St., Concord, Ontario, L4K 2A6 establish a standard of quality required for this project. Base materials will be those of Kingspan.
- .2 Alternate products will only be considered in accordance with B6.
- .3 Only polyurethane panels produced by the continuous in-line method for optimum uniformity and quality will be considered. Laminated or styrene core panels will not be accepted.
- .4 Work under this section shall be carried out by a contractor qualified by the panel manufacturer and having a minimum 5 years experience on projects of similar scope.

1.3. WORK INCLUDES

- .1 All steel faced, factory foamed polyurethane insulated panels for walls and roofs as detailed on drawings.
- .2 Accessories as necessary to install the panels as specified.
- .3 Sealants as required between metal panel components and between panels and adjoining construction.
- .4 All metal flashing and trim required for installation of pre-formed composite panels where noted on drawings.

1.4. RELATED WORK BY OTHERS

- .1 Supply and installation of roof capping, trim or flashing at parapet and wall-roof junctions.
- .2 Wood blocking.

In structural steel frame construction, supply and installation of supplementary structural steel support members for the composite panel system.

1.5. SUBMITTALS

- .1 Shop Drawings
 - a) Submit shop drawings in accordance with CW 1110 – Clause 1.5.
 - b) Furnish drawings showing panel layout, finishes, corners, custom geometry's, locations of openings etc. Provide detailed drawings of joints, anchorage system, sealants, edge conditions, closures and other details as may be required for a weather tight installation.

Distinguish between factory and field assembled work. No panels shall be fabricated until shop drawings have been approved by the Contract Administrator.

.2 Panel Sample

- a) Submit full width panel sections of 8" long showing joints, insulation, profiles and finishes for Contract Administrator's approval.

1.6. PANEL PERFORMANCE TESTS

The following performance tests are considered the minimum acceptable requirements:

.1 Structural Test

- a) **ASTM E72** - The design load / deflection criteria and fastening pattern shall be verified from witnessed / audited tests using the "Chamber Method" in accordance with ASTM E72. The deflection criteria shall be L/180 for walls and L/240 for roof assemblies.

.2 Thermal Resistance Tests

- a) **ASTM C518** Panels shall provide nominal thermal resistance of $R=7.2$ / inch thickness when tested in accordance with this standard.

.3 Fatigue Test

- a) Positive wind pressure and negative wind pressure (suction) are continually bending interior and exterior composite panels. The panel shall withstand at least 2 million alternate cycles of L/180 deflection without any evidence of delamination, foam core cracking or permanent deformation.

.4 Freeze / Heat Cycling Test

- a) Panels shall exhibit no delamination, surface blisters, permanent bowing or deformation when subjected to cyclic temperature extremes of -20°F (-29°C) to +180°F (+82°C) temperatures for twenty one (21), eight-hour cycles.

.5 Adhesion Test

- a) **ASTM D1623** - Panels are tested adhesion in accordance with this standard.

.6 Humidity Test

- a) Panels shall exhibit no delamination or metal interface corrosion when subjected to +140°F (+60°C) temperature and 100% relative humidity for a total of 1200 hours (50 days).

.7 Autoclave Test

- a) Panels shall exhibit no delamination or shrinkage/melting of the foam core from the metal skins after being subjected in an autoclave to a pressure of 2psig (13.8kPa) at a temperature of +218°F (+103°C) for a period of 2 1/2 hours.

.8 Acoustics Test

- a) **ASTM E90** Panels meet sound transmission STC-25 when tested in accordance with this standard.

.9 Toxicity Test

- a) Panels shall meet the minimum standards of acceptance as required for fire gas toxicity established in article 15, part 1120 of the New York State Uniform Fire Prevention Code.

1.7. PANEL FIRE TESTS

- .1 Kingspan panels meet specific building envelope performance criteria and requirements stipulated by US and Canadian building codes. Panels were tested in conformance to UL, ULC, FM, and ASTM approval standards, testing methods and procedures. Kingspan panels are listed and labeled by:

- a) Factory Mutual (FM)
- b) Warnock Hersey (WH)

.2 Fire Endurance Tests

CAN/ULC-S101	Stay in Place Fire Test 10 minutes Panels remain in place for 10 minutes and no joint fastener required holding panel together
CAN/ULC-S101	Stay in Place Fire Test 15 minutes Panels remain in place for 15 minutes with stitching screws
CAN/ULC-S126	Fire Spread under Roof Deck Assemblies Test
CAN/ULC-S127	Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials
CAN/ULC-S134	Standard Method of Fire Test for Exterior Wall Assemblies
Uniform Building Code (UBC) UBC 26-3 [UL 1715]	Enclosed Room Fire Test
Uniform Building Code (UBC) UBC 26-4	Full Scale Multi-Story Fire Test
ULC/ORD 376	Fire Growth Full Scale Room

.3 Flame Spread Tests

CAN/ULC-S102	Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies Flame spread index less than 20. Smoke developed classification less than 350
ASTM E84	Standard Method of Test for Surface Burning Characteristics of Building Materials Flame spread index less than 20. Smoke developed classification less than 350

.4 Factory Mutual Approvals (FM)

FM Standard 4880 Approval for Class 1 fire classification [UL 1040]	Meet the FM Standard 4880 Approval requirements for Class 1 fire classification to a maximum height of 30 feet without sprinkler protection
FM Standard 4880 (50') Approval for Class 1 fire classification [UL 1040]	Meet the FM Standard 4880 Approval requirements for Class 1 fire classification to unlimited height
FM Standard 4881 Approval for Class 1 Exterior Wall Systems	High Velocity Hurricane Zone with Large Missile Impact
FM Standard 4471 Approval for Class 1 Panel Roofs	Panel roof meets the criteria for fire, wind, foot traffic, hail damage resistance, and water leakage resistance

1.8. WARRANTY

- .1 Panel manufacturer shall offer **one (1) year** limited warranty, commencing from date of shipment providing panels manufactured to be free from defects in materials and workmanship under normal use and service, excluding panel skin coating (paint finish) which is covered under a separate warranty.

Part 2 – Products

2.1 PANEL DESIGN

- .1 Factory fabricated panel shall be as thick as detailed on design drawings. Panels shall consist of roll formed steel face and liner sheets chemically fused to a foamed in place rigid polyurethane expanded foam core. Panels shall be single piece construction full height or may be stacked in multiple courses for most temperature applications (vertical and horizontal).
- .2 The steel facing sheets at the longitudinal edges of the panel shall have roll formed male and female interlocking geometry fully supported by the foamed in place insulation core. The insulation core shall be molded in a tongue and groove profiles shape to allow positive insulation to insulation contact in panels.
- .3 Select panel type required:
 - a. **Kingspan KS39 RW HIGH RIB wall & roof panel** style with high rib profile and standing nested lap seam at the joint with anti-siphon groove, designed for roof & wall applications.
 - Standard panel modular coverage 38 7/8” wide
 - Panel thickness available in 1 9/16”, 2 3/4” & 4”
 - **HIGH RIB** profile 26Ga. Exterior – Stucco Embossed (Non-embossed optional)
 - **SHADOWLINE** profile 26Ga. Interior – Stucco Embossed (Non-embossed optional)

KS39 RW HIGH RIB panels shall use #14 Hex-head type “B” self-tapping with steel & neoprene washer and saddle clips supplied by panel manufacturer. Fasteners and saddle clips shall be applied from the exterior at the panel joint connecting both metal faces to the supporting steel structure.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

2.2 MATERIALS

- .1 Facing and liner sheets shall be steel with Stucco Embossed pattern. Steel shall be:
 - Tension leveled and conforming to ASTM A653 grade 33 (A) structural quality hot dipped galvanized coating to ASTM A924 Standard Specification for Steel Sheet, Zinc-Coating Galvanized with G-90 designation, or
 - Tension leveled conforming to ASTM A792/A792M-06a Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process AZ50 / AZM150 GALVALUME® (55% aluminum, 45% zinc), or
 - Stainless steel Grade Type 304 conforming to ASTM A480 Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip with finish #4 or 2B.

Exterior and interior profiles

- i. “**HIGH RIB**” profile shall have five (5) 1 ½” high standing ribs approximately 10” on center running the longitudinal direction of the panel. The panel faces shall be Stucco Embossed. Panel faces can be optionally non-embossed.
- .2 Fasteners: Refer to individual panel specifications above. Supplementary fastening, when required, shall be made with Tek fasteners into the interior panel face with reinforcing bars or with Fab-Lok fasteners spaced to meet code requirements and anticipated loads.
- .3 Sealant used in warm side of panel joints shall be non-curing synthetic butyl sealant.
- .4 Core material used in the panel shall be foamed in place multi-component polyurethane or isocyanurate polymeric resin insulation having the following typical physical properties.
- .5 Foam Core Property Table:

	Property	Results	Test Method
a.	Closed cell	95%	ASTM D2856
b.	Density	2.2 – 2.8pcf (35.3 – 44.9kg/m ³)	ASTM D1622
c.	Compressive Stress (Parallel to Rise)	42psi (289.5kPa)	ASTM D1621
	Compressive Stress (Perpendicular to Rise)	24psi (165.4kPa)	
d.	Shear Stress	17.5psi (120.6kPa)	ASTM C273
e.	Tensile Stress	40psi (275.7kPa)	ASTM D1623
f.	Oven Aging at 200°F (93°C) for 1 day	+1% vol. Change	ASTM D2126
	Oven Aging at 200°F (93°C) for 7 days	+3% vol. Change	
g.	Low Temperature Aging at -20°F (-29°C) for 1 day	0% vol. Change	ASTM D2126
	Low Temperature Aging at -20°F (-29°C) for 7 days	0% vol. Change	

2.3 FINISHES

- .1 The exterior and interior faces of **Kingspan KS Series** foam panels and flashings shall receive factory applied coatings.
- .2 The exterior/interior facing to be one of the following:
 - a) **Fluoropolymer**
 - A 1.0mil total coating made up of 0.2mil primer and 0.8mil 70% Kynar 500 color top coat. USDA approved in “Regal White” color

Part 3 – Execution

3.1 INSPECTION

- .1 Examine alignment of structural steel to ensure conformance to the tolerance requirements of CSA Standard S16.1 and/or AISC Code section 7.13 prior to panel installation and do not proceed until all observed defects are corrected by the contractor.

3.2 INSTALLATION

- .1 Install composite panels, clips, fasteners, joint fillers, trims, flashings and related sealants in accordance with approved shop drawings. Comply with panel manufacturers’ general instructions and recommendations for installation and as applicable for project conditions to ensure low temperature and/or weatherproof performance of composite panel system.
- .2 Consult panel manufacturer for location, type, and frequency of fasteners.
- .3 Adjacent panels shall be mechanically interlocked at their vertical edges with the roll-formed tongue and groove profile.
- .4 Flashing and trim shall be installed true and in proper alignment. Sealant, foam and membrane shall be installed where indicated without skips and voids to ensure weather tightness and integrity of the vapor barrier.

3.3 HANDLING AND STORAGE

- .1 The panels shall be handled and stored in accordance with good construction practice to prevent permanent distortion and mechanical damage.

3.4 DAMAGED MATERIALS

- .1 Repair or replace damaged materials to the satisfaction of the Contract Administrator. The cost of repairing or replacing damaged material will be charged to the responsible party.

3.5 CLEANING AND CARE

- .1 After completing panel installation, strip interior protective film if so instructed by Contract Administrator. Panel surface shall be free of deleterious material including dirt.
- .2 Wipe finished surfaces of filings caused by drilling or cutting to prevent any discoloration or rust stains resulting from the installation process.

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

1. Skirting around Pre-Engineered Building.

1.2 REFERENCE STANDARDS

1. CRCA – “Canadian Roofing Contractors Association”.
2. ASTM A525 Sheet Steel, Zinc Coated, Galvanized by the Hot-Dip Process.
3. CGSB 37-GP-5M – “Sealing Compound, Rubber Asphalt”.

Part 2 Products

2.1 SHEET METALS

1. Base drip flashing: Prefinished steel, 24 Ga
2. Roof flashing: Prefinished steel, 24 Ga
3. Drip and side flashings for wall penetrations: Prefinished steel, 24 Ga

2.2 ACCESSORY MATERIALS AND COMPONENTS

1. Fasteners for: stainless steel
2. Rubber-asphalt sealing compound: conforming to requirements of CGSB 37-GP-5M.
3. Bituminous paint: acid and alkali resistant type; black colour.

2.3 FABRICATION

1. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
2. Backpaint flashing with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals.

Part 3 Execution

3.1 PREPARATION

1. Field measure Site conditions prior to fabricating Work.

3.2 INSTALLATION

1. Installation shall be in accordance with CRCA recommendations and as indicated on Drawings.
2. Lock seams and end joints. Fit flashing tight in place. Make corners square, surfaces true and straight in all planes and all lines accurate to profiles.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 This Section specifies sealing Work not specified in other Sections. Refer to other Sections for the respective sealant Work.

1.2 SUBMITTALS

- .1 Samples for Initial Selection: provide 150 mm (6") long cured, colour samples of manufacturer's standard range of colours in each type of sealant for selection by the City. Submit samples of primer, bond breaker tape and joint backing material, if requested.
- .2 Product Data: submit product information from sealant manufacturers prior to commencement of Work of this Section verifying:
 - .1 Selected sealant materials are from those specified;
 - .2 Composition and physical characteristics;
 - .3 Surface preparation requirements;
 - .4 Priming and application procedures;
 - .5 Suitability of sealants for purposes intended and joint design;
 - .6 Test report on adhesion, compatibility and staining effect on samples of materials used on Project;
 - .7 Sealants compatibility with other materials and products with which they come in contact including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, brick, stone, concrete, masonry, metals and metal finishes, ceramic tile, plastic laminates, paints;
 - .8 Suitability of sealants for temperature and humidity conditions at time of application.

1.3 QUALITY ASSURANCE

- .1 Installer: Trained and approved by the manufacturer and having a minimum three years experience in the installation of the work described in this Section and can show evidence of satisfactory completion of projects of similar size, scope and type. If requested, provide letter of certification from manufacturer stating that installer is certified applicator of its products, and is familiar with proper procedures and installation requirements required by the manufacturer.
- .2 Maintenance Seminars: Provide, to the City of Winnipeg, training seminars and recommendations on Product maintenance procedures.
- .3 Manufacturer's Site Inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the work of this Section, to

ensure the Work is correctly installed. When requested, submit manufacturer's inspection reports and verification that the work of this Section is correctly installed.

- .4 Pre-Installation Meeting: Two weeks prior to commencing work of this Section, arrange for manufacturer's technical representative to visit the site and review preparatory and installation procedures to be followed, conditions under which the work will be done, and inspect the surfaces to receive the work of this Section. Advise the Contract Administrator of the date and time of the meeting.
 - .1 Weather conditions under which work will be done;
 - .2 Anticipated frequency and extent of joint movement;
 - .3 Joint design;
 - .4 Suitability of durometer hardness and other properties of material to be used;
 - .5 Recommendations of manufacturer for mixing of multi-component sealants;
 - .6 Number of beads to be used in sealing operation and priming operation if required.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original, unopened containers with manufacturer's labels identifying manufacturer's name, brand name of product, grade and type, application directions and shelf life or expiry date of product.
- .2 Handle and store materials in accordance with manufacturer's printed directions. Store flammable materials in safe, approved containers to eliminate fire hazards.
- .3 Do not use sealing materials that has been stored beyond the maximum recommended shelf life.

1.5 PROJECT CONDITIONS

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

1.6 WARRANTY

- .1 Warrant work of this Section against defects and deficiencies including cracking, crumbling, melting, shrinkage, sag, failure in adhesion, cohesion or reversion, air and moisture leakage, marbling or streaking due to improper mixing, discolouration due to dirt pick-up during curing and staining of adjacent materials.

Part 2 Products

2.1 MATERIALS

- .1 General: Non-bleeding, non-migrating, capable of supporting their own weight.
 - .1 Horizontal Joints: Self levelling.
 - .2 Vertical and Overhead Joints: Non-sag.
- .2 Sealant Type B: CAN/CGSB-19.24-M, Type 2, Class B, multi-component, chemical curing, modified polyurethane, Sikaflex 2cNS EZ Mix by Sika, or Dymeric 240 by Tremco.
- .3 Joint Backing: Preformed, compressible, resilient, non-waxing, non-extruding, non-staining closed cell polyethylene or urethane foam, shape to suit intended use, oversize 25% and compatible with sealant, primer and substrate.
- .4 Bond Breaker Tape: As recommended by sealant manufacturer.
- .5 Joint Primer: Non-staining, suitable for substrate surfaces, compatible with joint sealants and as recommended by sealant manufacturer.
- .6 Cleaning Material: Non-corrosive, non-staining, xylol, methyl-ethyl-ketone, toluol, isopropyl alcohol or as recommended by sealant manufacturer and acceptable to material or finish manufacturers for surfaces adjacent to sealed areas.
- .7 Sealants, Cleaning Materials and Primers: Compatible with each other.

Part 3 Execution

3.1 EXAMINATION

- .1 Ensure joints are suitable to accept and receive sealants. Commencement of work implies acceptance of surfaces and conditions.
- .2 Do not apply sealant to masonry until mortar has cured.
- .3 Before any sealing work is commenced, test materials for indications of staining or poor adhesion.

3.2 PREPARATION

- .1 Clean joints and spaces which are to be sealed and ensure they are dry and free of dust, loose mortar, oil, grease, oxidation, coatings, form release agents, sealers and other foreign material.
- .2 Clean porous surfaces such as concrete, masonry or stone by wire brushing, grinding or sandblasting as required to obtain clean and sound surfaces.
 - .1 Remove laitance by grinding or mechanical abrading.

- .2 Remove oils by abrasive blast cleaning.
- .3 Remove loose particles present or resulting from grinding, abrading or sandblast cleaning by thorough brushing.
- .3 Clean ferrous metals of rust, mill scale and foreign materials by wire brushing, grinding or sanding.
- .4 Wipe non-porous surfaces such as metal and glass to be sealed, except pre-coated metals, with cellulose sponges or clean rags soaked with ethyl alcohol, ketone solvent, xylol or toluol and wipe dry with clean cloth.
 - .1 Where joints are to be sealed with silicone based sealants clean joint with methyl-ethyl-ketone or xylol. Do not allow solvent to air-dry without wiping.
 - .2 Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with joint primer and sealant.
- .5 Install joint backing material to achieve correct and uniform joint profile.
- .6 Where joint design or depth of joint prevents use of joint backing material, apply bond breaker tape to prevent three-sided adhesion.
- .7 Do not stretch, twist, puncture or tear joint backing. Butt joint backing at intersections. Install bond breaker tape at back of joint where joint backing is not required or cannot be installed.
- .8 On horizontal traffic surfaces, support joint filler against vertical movement which might result from traffic loads, including foot traffic.
- .9 Where surfaces adjacent to joints are likely to become coated with sealant during application, mask them prior to priming and sealing.
- .10 Do not exceed shelf life and pot life of materials, and installation times, as stated by manufacturers.
- .11 Be familiar with work life of sealant to be used. Do not mix multiple component materials until required for use.
- .12 Use materials as received from manufacturer, without additions, deletions and adulterations of materials.
- .13 Mix multiple component sealants and bulk sealants using mechanical mixer capable of mixing without mixing air into material, strictly in accordance with manufacturer's directions and recommendations. Continue mixing until material is homogeneously blended, uniform in colour and free from streaks of unmixed material. Install compound prior to start of hardening or curing cycle.
- .14 Seal joints in surfaces to be painted before surfaces are painted. Where surfaces to be sealed are prime painted in shop before sealing check to make sure prime paint is compatible with primer and sealant. If they are incompatible, inform Contract Administrator and change primer and sealant to compatible types approved by Contract Administrator.

- .15 Where irregular surface or sensitive joint border exists, apply masking tape at edge of joint to ensure joint neatness and protection.
- .16 Prime joints as required by sealant manufacturer. Prime sides of joints for type of surface being sealed prior to application of joint backing, bond breaker or sealant.

3.3 APPLICATION

- .1 Apply sealant using hand operated guns or pressure equipment fitted with suitable nozzle size and equipment approved by sealant manufacturer. Apply in accordance with manufacturer's directions and recommendations.
- .2 Force sealant into joint and against sides of joints to obtain uniform adhesion. Use sufficient pressure to completely fill all voids in joint regardless of variation in joint widths and to proper joint depth as prepared. Ensure full firm contact with interfaces of joint. Superficial pointing with skin bead shall not be acceptable.
- .3 Finish face of compound to form smooth, uniform beads. At recesses in angular surfaces, finish compound with flat face, flush with face of materials at each side. At recesses in flush surfaces, finish compound with concave face flush with face of materials at each side.
- .4 Compound may be tooled, provided that such tooling does not damage seal or tear compound. Avoid pulling of sealant from sides.
- .5 Tool surfaces as soon as possible after sealant application or before any skin formation has occurred, particularly when using silicone sealants.
- .6 Joint surfaces shall be straight, neatly finished, free from ridges, wrinkles, sags, dirt, stains, air pockets and embedded foreign matter or other defacement and be uniform in colour, free from marbling and/or colour streaking due to improper mixing or use of out of shelf life products.

3.4 SEALANT SCHEDULE

- .1 Use one of sealants specified for each type in following locations. Ensure sealant chosen for each location is recommended by manufacturer for use for conditions encountered.
- .2 Refer to Drawings for sealing work not specifically listed in this Section.
- .3 Seal following joints with Sealant Type B:
 - .1 Exterior hollow metal steel door and screen frames, both sides.
 - .2 Joints between thresholds and slabs.

3.5 REPAIR

- .1 Remove any compounds not complying with requirements specified herein. Exercise care in removal operations not to mar or damage finishes adjacent to joints. Repeat preparation, priming and installation of new material as specified to provide finished Work complying with specified requirements, and acceptable to the City. Do such repair Work at no extra cost to the City.

3.6 CLEANING

- .1 Immediately clean adjacent surfaces which have been soiled and leave Work in neat, clean condition. Remove excess materials, compounds smears or other soiling resulting from application of sealants. Use recommended cleaners and solvents.

3.7 PROTECTION OF COMPLETED WORK

- .1 Provide approved, non-staining means of protection for completed joint sealant installations where required to protect work from mechanical, thermal, chemical and other damage by construction operations and traffic.
- .2 Maintain protection securely in place until completion of Work. Remove protection when so directed by the City.

END OF SECTION