

1.0 GENERAL

1.1 SECTION INCLUDES

- .1 Dampproofing to backfilled sides of poured-in-place concrete foundation walls and footings under the main floor where the main floor is above grade.

1.2 RELATED SECTIONS

- .1 Cast-In-Place Concrete Section 03 30 00
- .2 Air Barriers - Descriptive or Proprietary Section 07 27 00.01

1.3 SUBMITALS

- .1 Product Data: Submit Manufacturers Product Data and Recommended Installation Methods in accordance with Section 01 33 00 Submittal Procedures.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store materials undamaged and, where applicable, in their original wrappings or containers with manufacturer's labels and seals intact. Store materials on a dry floor in a weatherproof enclosure.

2.0 PRODUCTS

2.1 MATERIALS

- .1 General: All materials used in this contract shall be of the highest quality as manufactured by nationally recognized manufacturers and of the type indicated on the drawings and in this specification.
- .2 Dampproofing Material: fluid applied, VOC compliant, one part moisture curing elastomeric modified polyurethane waterproofing membrane.
- .3 Primer shall conform to requirements of CGSB-37-GP-9.

3.0 EXECUTION

3.1 EXAMINATION

- .1 Examine all surfaces to which the work of this Section is to be applied and ensure that all conditions are suitable to provide a complete and satisfactory installation. Conform to manufacturer's requirements for minimum application temperatures and humidity.
- .2 Commencement of work will indicate acceptance of surfaces and conditions.
- .3 Report any unsatisfactory surfaces or conditions to Departmental Representative.

3.2 WORKMANSHIP AND APPLICATION

- .1 Surfaces receiving treatment shall be smooth, hard, free from projections and fins, loose particles, holes, grease, oil or dirt.
- .2 Dampproofing:
  - .1 Dampproofing shall conform to standards of manufacturer's recommended methods of surface application of asphalt emulsions by. The rate of application shall be 1.0 to 1.5 l/m2 or as otherwise recommended by manufacturer.
  - .2 Dampproofing shall be applied in two coats from 100 mm below finished grade down the wall and to the top of the footing. Application shall be by spray or brush.

- .3 Fill all visible porous surfaces or air pockets with specified asphalt mastic after first coat of dampproofing application.
- .4 Special applicator will be required for application of dampproofing to confined spaces.

**3.3 PROTECTION AND CLEAN-UP**

- .1 Protect the work of other sections from damage resulting from the work of this section.
- .2 At the completion of the work, remove all accumulated containers, brushes, and debris, and leave the work in a neat and tidy condition. Deposit rubbish in containers provided.

END OF SECTION 07 11 00

**1.0 GENERAL****1.1 RELATED REQUIREMENTS**

- .1 Sheet Metal Flashing and Trim                      Section 07 62 00

**1.2 REFERENCES**

- .1 ASTM International Inc.
- .1 ASTM D 6164- 05, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .2 Canadian General Standards Board (CGSB):
- .1 CGSB 37-GP-56M- 80b (A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Convene pre-installation meeting one week prior to beginning waterproofing Work, with waterproofing contractor's representative and Departmental Representative
- .1 Verify project requirements.
- .2 Review installation and substrate conditions.
- .3 Co-ordination with other building subtrades.
- .4 Review manufacturer's installation instructions and warranty requirements.

**1.4 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 – Submittals.
- .2 Product Data:
- .1 Provide for review by Departmental Representative prior to commencing work, two copies of most recent technical waterproofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 33 - Health and Safety Requirements for: Primers.
- .3 Provide shop drawings and indicate:
- .1 Flashing, control joints, details.
- .4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.
- .5 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
- .6 Manufacturer's field report: in accordance with Section 01 33 00 – Submittals.

**1.5 QUALITY ASSURANCE**

- .1 For each type of work, obtain primary materials from single manufacturer, which has produced that type of product successfully for not less than 10-Years. Provide ancillary materials only as recommended by manufacturer of membrane materials for use with roofing system specified.

- .2 Installer shall be approved by the manufacturer of the materials and shall be experienced in the application of the materials and shall supply job references to show similar installations in satisfactory waterproof condition at least 5 years of age. Submit project reference and relevant experience as requested by Departmental Representative.
- .3 Mock-ups
  - .1 Construct mock-up in accordance with Section 01 45 00 – Quality Control.
  - .2 Mock-up may be part of finished work if acceptable to Departmental Representative.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Provide and maintain dry, off-ground weatherproof storage.
- .2 Store rolls of membrane in upright position.
- .3 Remove only in quantities required for same day use.
- .4 Handle waterproofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.
- .5 Store and manage hazardous materials in accordance with Section 01 35 33 - Health and Safety Requirements
- .6 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates padding and packaging materials in accordance with Section 01 74 19 – Waste Management Disposal.

**1.7 SITE CONDITIONS**

- .1 Ambient Conditions in accordance with manufacturer's requirements.

**1.8 MANUFACTURER'S REPRESENTATIVE**

- .1 At the request of the Departmental Representative, the Manufacturer's representative is to visit the site and provide in writing to the Departmental Representative a report of their observations noted. All cost for engagement will be paid by the Contractor.
- .2 Contractor to permit and facilitate access to the site at all times for the above-mentioned Manufacturer's representative.

**1.9 FIELD QUALITY CONTROL**

- .1 The waterproofing contractor is responsible to notify the manufacturer at commencement of waterproofing installation.
- .2 Manufacturer's representative to provide periodic inspections during roofing applications.
- .3 Inspection of completed base sheet is mandatory.
- .4 The waterproofing contractor is required to notify the manufacturer at the base sheet stage of application and is not to proceed with application of cap sheet until base sheet application has been approved by manufacturer in writing.
- .5 Manufacturer is to be notified upon completion of the waterproofing and will provide final inspection before the warranty is issued.

- .6 Deficiencies apparent upon substantial completion inspection must be corrected to the satisfaction of the manufacturer prior to the warranty being issued.
- .7 Contractor to provide at least 1 weeks' notice to the Departmental Representative for field review prior to covering each layer of water proofing component and backfill Contractor's photo record may be accepted only upon approval by Departmental Representative. Any delay in notifying for field review and hence installed material needs to be uninstalled for review will be solely be the responsibility of the Contractor.

#### 1.10 WARRANTY

- .1 The product manufacturer shall issue a written and signed document in the name of the owner, certifying the product will meet all the physical characteristic published by the manufacturer, for a period of 10 years, starting from the date of completion of installation of membranes. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.

### 2.0 PRODUCTS

#### 2.1 MEMBRANE

- .1 Base and Cap sheets: to CGSB 37-GP-56M polyester fibres to ASTM D6164 as follows:
  - .1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, polyester reinforcement, having nominal weight of 180 g/m2.
  - .2 Type 2, fully adhered.
  - .3 Class C plain surfaced for base sheet.
  - .4 Class A granular surface for cap sheet.
  - .5 Grade 2 heavy duty service.
  - .6 Top and bottom surfaces: fusible film.
  - .7 Thickness: 3.0 mm.
  - .8 Acceptable products:
    - .1 Base Sheet – Colphene Flam 180.
    - .2 Cap Sheet – Sopralene Flam 180 GR.
- .2 Liquid applied PMMA membrane fully reinforced with proprietary fleece for water proofing transition: Acceptable manufacturers: Soprema's Alsan RS230 or Siplat's Parapro 123.

#### 2.2 PRIMER FOR HEAT WELDED MEMBRANES

- .1 A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied waterproofing membranes.

#### 2.3 ACCESSORIES

- .1 Waterproofing Mastic:
  - .1 Black, solvent-based mastic containing SBS modified bitumen, fibres and mineral fillers.
- .2 Insulation Adhesive:
  - .1 Water-based single component rubberised liquid coating used as insulation adhesive and crack filler. For applications at temperatures above 2°C only.
- .3 Protection Board:

- .1 A semi-rigid protection board composed of a mineral fortified asphaltic core formed between two saturated fibreglass felts.
- .2 Characteristics:
  - .1 Thickness: 3mm
  - .2 Board Size: Width: 1.22m Length: 1.52m
- .4 Termination Bar:
  - .1 Hexagonal Stainless Steel plate and Stainless Steel fasteners for outboard waterproofing. Standard of Acceptance to meet Factory Mutual.
- .5 Drainage Layer:
  - .1 To be double dimpled sheeting with integral geo-textile made of high density polyethylene. Filter mat to be polyethylene. Compressive strength of approximately 90 kg/m<sup>2</sup>. Drainage capacity of approximately 72 l/min-m. Resistance to root penetration and rotproof.

### 3.0 EXECUTION

#### 3.1 EXAMINATION AND PREPARATION OF SURFACES

- .1 Surface examination and preparation must be completed in conformance with manufacturer's recommendations.
- .2 Before waterproofing work begins, the Departmental Representative and the contractor will inspect and approve substrate condition and ensure that related work has been properly executed. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of the membrane application will mean that substrate conditions are acceptable for work completion.
- .3 Before commencing work, all surfaces must be smooth, dry, clean and free of ice and debris as per manufacturer's recommendations.
- .4 No materials will be installed during rain or snowfall.
- .5 Concrete is existing and an adhesion test is required before membrane application.
- .6 Verify the compatibility of all membrane components with curing compounds, coatings or other materials which are already installed on the surfaces to be treated.
- .7 Any cracks over 3 mm wide should be reported to the Departmental Representative. After review, the crack should be filled in with waterproofing mastic. A 150 mm (6 inches) wide strip of membrane should be installed, centered over the crack.

#### 3.2 METHOD OF EXECUTION

- .1 Work shall be performed on a continuous basis as surface and weather conditions allow.
- .2 Adjoining surfaces shall be protected against any damage that could result from the waterproofing installation.

#### 3.3 EQUIPMENT

- .1 Maintain all equipment and tools in good working order.

### 3.4 PRIMER APPLICATION

- .1 Surface where heat-welded membrane is applied shall receive an asphalt primer coating at the rate of 0.15 to 0.20 l/m<sup>2</sup>. Application rate may vary depending on surface condition.

### 3.5 WATERPROOFING MEMBRANE INSTALLATION

- .1 To begin application, align the first roll of membrane to a previously drawn chalk line.
- .2 All inside and outside corners must be pre-stripped with a 300 mm (12 in.) wide strip of membrane centered over the corner. This membrane must be installed in direct contact with the substrate not leaving any voids under the membrane strip. Outside corners should be double-lapped.
- .3 Weld the membrane using a propane gas torch.
- .4 Subsequent rolls must be installed in the same manner and should be aligned with the preceding roll with a side lap of at least 75 mm. End laps must be overlapped at least 100 mm.
- .5 Holes and tears in the membrane must be repaired with the appropriate membrane material. The repair must exceed the affected surface area by at least 100 mm.
- .6 Prior to backfilling, it is recommended to protect waterproofing system with protection boards. Backfilling should commence immediately after installation of protection boards.
- .7 The uppermost edge of the membrane is to be mechanically fastened to the concrete substrate using termination bars. The termination bar should surpass the top edge of the membrane.
- .8 Apply mastic on the top edge of termination bar to prevent water accumulation and infiltration.
- .9 Any waterproofing membrane left exposed after backfilling shall be protected from ultra violet and mechanical damages.

### 3.6 DRAINAGE BOARD INSTALLATION

- .1 Using a torch, melt the plastic film on the surface to cover.
- 2 Adhere the drainage panels directly on the exposed bituminous sticky surface by applying a uniform pressure on the entire surface.
- 3 Backfill as soon as possible after protection board installation within 72 hours maximum.

### 3.7 FIELD QUALITY CONTROL

- .1 Inspection and testing of waterproofing systems and application will be carried out by testing laboratory designated by Departmental Representative and paid for by the Contractor.
- .2 Field Review will be carried out on a daily basis during the entire roof installation procedure.

- .3 Written "Daily" inspection reports to be distributed to Departmental Representative.

**3.8 DRAINAGE SYSTEM INSTALLATION COORDINATION**

- .1 Contractor to be aware of the installation of sub-soil drainage in the vicinity of the waterproofing work.
- .2 Any implication in schedule and cost due to the drainage work will be borne by the Contractor.

**3.9 CLEANING**

- .1 Remove bituminous markings from finished surfaces.
- .2 Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION 07 13 52



1.0 GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 01 50 – General Instructions for Construction/Demolition Waste Management and Disposal.
- .2 Section 07 20 00 – Cedar Shakes

1.2 DESCRIPTION

- .1 The work in this section includes but is not limited to:
  - .1 Installation of rigid insulation boards as identified on drawings. Existing roof insulation to be removed.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 00 10 - General Instructions.

2.0 PRODUCTS

2.1 MATERIALS

- .1 Roof Deck Insulation: Closed-cell, polyisocyanurate foam core insulation Type 2 or Type 3 bonded on each side to fiberglass facers during the manufacturing process, dimensional stability to ASTM D2126 <2% in all conditions. Furnish in thickness required to provide minimum thermal resistance or as indicated on the drawings.
- .2 Batt Insulation: Owens-Corning Fiberglass, or approved equal, noise stop blanket friction fit to acoustic partition as indicated on drawings. Exterior wall shall be un-faced friction – fit glass fibre batt insulation, confirming to CSA A101 – Type 1A thickness as indicated.
- .3 Exterior insulation to foundations and underslab: below grade shall be closed cell Type 4 polystyrene insulation. Exterior insulation above grade shall either be protected with an asphalt impregnated protection board or insulation type to be concrete faced insulation board.

2.2 ACCESSORIES

- .1 Mechanical fastener: Galvanized steel as specified by Manufacturer. Insulation board fasteners with appropriate stress-plate washers, manufactured specifically for securing insulation board to decking.
- .2 Adhesive: To CAN/CGSB-71.24 "Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation". Adhesive to be compatible with the materials which it is in contact with.
- .3 Roof Tape: Manufactured specifically for welding of tape over insulation joints, 140 mm wide.
- .4 Roof Deck Vapour Barrier: Refer to Section 07 19 00 Air / Vapour Barrier and Section 07 52 00 Modified Bitumen Membrane.
- .5 Insulation overlay board: Refer to Section 07 52 00 Modified Bitumen Membrane.
- .6 Closed Cell Polyurethane foam, min. density of 2lb/ft<sup>3</sup>.

**3.0 EXECUTION**

**3.1 GENERAL REQUIREMENTS**

- .1 Examine substrates prior to commencement of Work. Surfaces to receive insulation shall be smooth, level, dry, clean, free from dust, dirt and other debris. Notify Departmental Representative in writing of any defects.
- .2 Prepare all surfaces in strict accordance with Manufacturer's written instructions.

**3.2 INSTALLATION**

- .1 Cut and trim insulation neatly to fit spaces. Butt joints tightly. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .2 Keep insulation minimum 50 mm from sidewalls of chimneys and vents. Notify consultants to review all installations around heat emitting devices.
- .3 Lay no more boards than will be covered with completed roofing on the same day. Do not leave installed boards exposed to weather. Provide protection of insulation from rain and moisture.
- .4 Provide water cut-offs at exposed edges of insulation at end of day's work and whenever rain is imminent. Extend cut-offs 140 mm on roof deck, carry up over roof insulation, and extend 140 mm on top of roofing. Remove before continuing installation of insulation.
- .5 Use closed cell polyurethane foam to fill all insulation voids at penetrations and interfaces.

END OF SECTION 07 20 00

1.0 GENERAL

1.1 RELATED SECTIONS

- .1 Section 06 07 00 – Wood Treatment
- .2 Section 06 10 11 – Rough Carpentry
- .3 Section 07 20 00 – Insulation
- 4 Section 07 52 00 – Modified Bitumen Membrane

1.2 DESCRIPTION

- .1 Work includes labour, materials, equipment and services necessary to provide and install cedar shake roofing.

1.3 REFERENCES

- .1 CSA 0118.1 Western Red Cedar Shingles and Shakes.
- .2 Cedar Shake and Shingle Bureau, New Roof Construction Manual.
- .3 CSA B111 Wire Nails, Spikes and Staples.
- .4 Roofing Contractors' Association of British Columbia (RCABC), Roofing Practices Manual. Where the word "should" is used, it shall read as "shall".
- .5 CSA A123.3 M 1979, Roofing felt.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit full size shingles of finish and profile specified.

1.5 QUALIFICATIONS

- .1 The Contractor shall have successfully completed similar work over a period of not less than five years and when required shall submit supporting documentation.
- .2 The Contractor must be officially recognized as an authorized contractor by the roofing materials manufacturer.
- .3 The Contractor is to be a member in good standing of the Roofing Contractors Association of British Columbia (RCABC).

1.6 QUALITY ASSURANCE

- .1 Installer Qualifications: Only competent, qualified tradesmen experienced with membranes shall execute the work of this section.
- .2 Contractor's Field Supervision and Crew Qualifications: Contractor must maintain full-time supervisor/foreman on the job during times roofing work is in progress. Supervisor must have roofing trade certification and have minimum five years' experience in roofing work similar in nature and scope of specified roofing.

- .3 Confirm that surfaces to which membrane is to be applied are in a condition suitable for this application. The commencement of roofing or flashing will imply unconditional acceptance of the surfaces to receive work of this section.
- .4 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .5 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer's instructions. Departmental Representative will designate which document is to be followed.

#### 1.7 WARRANTY

- .1 Provide a manufacturer's standard material guarantee for thirty (30) years.
- .2 Provide a 10 Year RCABC RoofStar warranty. Fee for inspections and administrative work is to be included in the contractors cost. Inspections to be coordinated by the contractor.

#### 2.0 PRODUCTS

##### 2.1 MATERIALS

- .1 Western red cedar shakes: to CSA 0118.1-97, 460 mm length; shingle width and pattern to match existing but not less than 100 mm or more than 350 mm wide. Butt thickness to be greater than 9 mm and shall not exceed 32 mm.
- .2 Cedar shakes: In accordance with CSA-O181.1 "Western Cedars, Shakes and Shakes" and Cedar Shake and Shingle Bureau, New Roof Construction Manual, Premium Grade 1 (100% heartwood, 100% clear and 100% edge grain), grading audited by a Standards Council of Canada accredited agency. Shakes to be Certi-Split Handsplit Shakes (split face and sawn back). Length, width and pattern to match existing.
- .3 Cedar shingles must be preservative treated by means of chemical impregnation. Kiln dried after treatment to less than 19% moisture content.
- .4 Roofing Felt Underlayment for shakes (interwoven): asphalt saturated felt, to CSA A123.3M 179, perforated, 15 lb weight.
- .5 Insulation, refer to Section 02 20 00 Insulation.
- .6 Strapping, refer to Section 06 10 11 Rough Carpentry.
- .7 Recovery board, to be installed over insulation. Board to consist of two asphalt saturated glass mat reinforcement covering a mineral fortified asphaltic core. Bases of design is Soprema Sopraboard, or approved equal.
- .8 Roofing Underlayment (over recovery board): 40 mil self-adhered SBS modified bitumen membrane with glass mat reinforcement and a tri-laminated woven polythene facer. Membrane intended to be used as roofing underlayment for high temperature applications. Basis of design is Soprema Lastobond Shield HT, or approved equal.

- .9 Air/vapour barrier: 63 mil self-adhered SBS modified bitumen with a glass mat reinforcement. Top surface to be sanded. Basis of design is Soprema Lastobond 195, or approved equal.
- .10 Metal Flashings, refer to 07 62 00 Sheet Metal Flashings.
- .11 Nails (for shakes): Fabricate to CSA B111. All fasteners to be stainless steel ring shank type. Nails must have sufficient length to penetrate the underlying strapping a minimum of 25 mm, or in the case of plywood, completely through the sheathing. Staples and T-nails will not be accepted.
- .12 Vent Stack Flashing: Spun Aluminum Plumbing Vent Flashing complete with vandal proof spun aluminum caps.
- .13 Bug Screen, to be stainless steel perforated metal channel. Sample to be provided prior to installation.
- .14 Cedar siding: supply and installation of pre-stained, kiln-dried, select grade, tight knot, Western Red Coast Cedar, Board and Batten siding to match existing, (NLG204), smooth side exposed to view.
- .15 Fascias: Western Red Cedar, selected grade tight knot (NLG204), pre-paint, colour to match existing.
- .16 Exterior Trim: Western Red Cedar, size as indicated on drawings, graded as selected tight knot (NLG204), pre-stained, colour to match existing.

### 3.0 EXECUTION

#### 3.1 GENERAL REQUIREMENTS

- .1 Install cedar shingles in accordance with RCABC Roofing Practices manual RGC system sheet specification STR-CS.
- .2 Whenever the requirements explicitly stated in this specification are more stringent than noted in the above RGC specifications the more stringent requirement will apply.

#### 3.2 AIR/VAPOUR BARRIER (on wood decking)

- .1 Remove existing air/vapour barrier where it is not fully adhered. Surfaces should be clean, free from dirt and debris and have not absorbed water.
- .2 Install air/vapour barrier over existing roof deck and/or air/vapour barrier using manufactures specified laps. Lap a minimum of 50 mm over all existing membranes. Seal edges to the existing wood nailers using manufactures approved sealant. Complete a test patch to confirm adhesion of the new membrane to the existing membrane.

#### 3.3 ROOFING OVERLAY BOARD (on insulation)

- .1 Install overlay board over insulation with 300 min offset. Fasten overlay board into wood nailer below.

#### 3.4 ROOFING UNDERLAYMENT (on roof overlay board)

- .1 Install one layer of roofing underlay horizontally in successive strips with 50 mm horizontal laps arranged to shed water. Vertical laps shall be made where required and have a minimum 50 mm overlap. Membrane to be fully adhered to roofing overlay board. Prime as per manufactures requirements.

### 3.5 SHAKE APPLICATION

- .1 Install one layer of roofing underlay horizontally in successive strips with 200 mm horizontal laps arranged to shed water. Vertical laps shall be made where required and have a minimum 600 mm overlap. Interlay underlay with shakes.
- .2 Install a 760 mm wide strip of roofing underlay prior cedar roofing and flashing installation. All laps in the underlay must be formed to shed water (ie. shingle laps).
- .3 Install cedar shakes in accordance with RCABC Roofing Practice Manual, Cedar Shake and Shingle Bureau, New Roof Construction Manual and CSA-O181.1 "Western Cedars, Shakes and Shakes". Execution of work includes, but is not limited to the following:
  - .1 Starter course to be two layers of shakes.
  - .2 Space shakes from 6 mm to 10 mm.
  - .3 Stagger joints minimum 40 mm in succeeding courses. Ensure that in any 3 courses no two joints are in alignment.
  - .4 Use two nails per shake. Space nails 20 mm from edge and 40 mm above butt line of the following course.
  - .5 Nail heads shall be driven flush and tight but not so the nail head crushes the wood.
- .4 Install shakes to match existing exposure and having triple thickness of shake at any given point.
- .5 Double shakes at eaves, projecting butts 40 mm from first sheathing board.
- .6 Lay shakes with grain perpendicular to eaves.
- .7 Over hips and ridges use shakes of uniform width approximately 150 mm wide. Apply shakes at same weather exposure as field of roof.
- .8 Vertical upstand flashing shall be installed at all vertical intersections.
- .9 Backpan flashing shall extend a minimum of 150 mm up vertical surfaces, 450 mm up the slope and 75 mm beyond the corners. The corners shall be folded, not cut.
- .10 Provide zinc strips at all ridges, hips and shoulders. Exposure 4.

END OF SECTION 07 31 00

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Cedar Shakes Section 07 31 00

1.2 REFERENCES

- .1 The Aluminum Association Inc. (AAI)  
.1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.  
.2 AAI DAF45-03, Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials International (ASTM)  
.1 ASTM A 653/A 653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.  
.2 ASTM A 792/A 792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .3 Roofing Contractors Association of B.C. (RCABC)  
.1 RGC Roofing Practice Manual.
- .4 Canadian General Standards Board (CGSB)  
.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .5 Canadian Standards Association (CSA International)  
.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .7 Green Seal Environmental Standards  
.1 Standard GS-03-93, Anti-Corrosive Paints.  
.2 Standard GS-11-97, Architectural Paints.  
.3 Standard GS-36-00, Commercial Adhesives.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)  
.1 Material Safety Data Sheets (MSDS).
- .9 British Columbia Sheet Metal Association (SMACNA-BC)  
.1 Architectural Sheet Metal Manual- 6<sup>th</sup> Edition 2003.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:  
.1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.  
.2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 33- - Health and Safety Requirements.
- .3 Samples:  
.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.

- .4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  - .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

#### 1.4 QUALITY ASSURANCE

- .1 Upon completion of work, this Contractor shall furnish Owners with a 10 year R.C.A.B.C. guarantee work of this section.
- .2 Provide for inspection in accordance with specifications and Consultant's Standards. Include inspection fees in this contract

#### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

#### 2.0 PRODUCTS

##### 2.1 Sheet Metal Components

- .1 Zinc coated steel sheet: Quality to ASTM-A924/A924M "Standard Specification for General Requirements for Steel Sheet, Metallic Coated by Hot-Dip Process", 24-gauge thickness unless noted otherwise with Z275 designation zinc coating.

##### 2.2 PRE-FINISHED SHEET STEEL COMPONENTS

- .1 Pre-finished steel sheet with factory applied PVDR/Kynar.
  - .1 Class F1S.
  - .2 Colour to be selected by Consultant from Manufacturer's standard range.
  - .3 Specular gloss: 30 units +/- 5 in accordance with ASTM-D523 "Standard Test Method for Specular Gloss".
  - .4 Coating thickness: not less than 200 micrometres.
  - .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM-D822 "Standard Practice for Conducting Tests on Paint and Related Coatings and Materials Using Filtered Open Flame Carbon-Arc Exposure Apparatus" as follows:
    - .1 Outdoor exposure period 5000 hours.
    - .2 Humidity resistance exposure period 5000 hours.

##### 2.3 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CAN/CGSB 37.5.
  - .1 Maximum VOC limit 50 g/L to SCAQMD Rule 1168.
- .3 Underlay for metal flashing: asphalt laminated 3.6 to 4.5 kg kraft paper.
- .4 Sealants.



- .1 Maximum VOC limit 50 g/L to SCAQMD Rule 1168.
- .5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .6 Fasteners: stainless steel, flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .8 Touch-up paint: as recommended by prefinished material manufacturer.
  - .1 Maximum VOC limit 50 g/L to SCAQMD Rule 1113.

## 2.5 FABRICATION

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable RCABC and SMACNA Standards. Guarantee standard as specified in 1.4 Quality Assurance.
- .2 Form pieces in 2400 mm maximum lengths.
  - .1 Make allowance for expansion at joints.
- .3 Hem exposed edges on underside 12 mm.
  - .1 Mitre and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

## 2.6 METAL FLASHINGS

- .1 Form flashings, copings and fascias to profiles indicated of galvanized steel as indicated on drawings.
- .2 Caulk perimeter flashings with specified sealant where necessary to make a proper seal.
- .3 'S' Lock and caulk end joints in flashing. Provide standing seams with concealed clips at corners. Hem exposed edges of flashing a minimum of 12.5 mm for rigidity.
- .4 Provide flashings with edges turned to form a drip. Make proper allowance for expansion and contraction. Face clip flashings with concealed clips (600 mm) on centres.
- .5 Provide flashings at vents, chimneys and control joints.
- .6 Carry face metal down exterior face a minimum of 100 mm or as indicated on drawings.
- .7 Provide metal base and cap flashings to extend to within 25 mm of roof surface.

## 3.0 EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

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

### 3.2 INSTALLATION

- .1 Install sheet metal work in accordance with R.C.A.B.C standards. Guarantee standard as per 1.4 Quality Assurance.
- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal.
  - .1 Secure in place and lap joints 100 mm.
- .4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.
  - .1 Flash joints using S-lock forming tight fit over hook strips.
- .5 Lock end joints and caulk with sealant.
- .6 Install pans, where shown around items projecting through roof membrane.

### 3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION 07 62 00

## 1.0 GENERAL

### 1.1 RELATED REQUIREMENTS

- |    |  |                  |
|----|--|------------------|
| .1 | Gypsum Board Assemblies                        | Section 09 21 16 |
| .2 | Non-Structural Metal Framing                   | Section 09 22 16 |
| .3 | Mechanical                                     | Divisions 21-23  |
| .4 | Electrical Communications/Electronics/Security | Divisions 25-28  |

### 1.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (CAN/ULC)
  - .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 CAN/ULC-S115-07, Fire Tests of Fire stop Systems.

### 1.3 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: NBC 2015): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.
  - .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

### 1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 33 - Health and Safety Requirements.
- .3 Shop Drawings:
  - .1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation for each type of firestop condition.
  - .2 Construction details should accurately reflect actual job conditions.

- .4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  - .1 Test reports: in accordance with CAN/ULC-S101 and CAN/ULC-S102.
    - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
  - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.
  - .4 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

#### 1.5 QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Installer: company specializing in fire stopping installations with 5 years documented experience and certified by manufacturer of firestop system.
- .2 Pre-Installation Meetings: convene pre-installation meeting two weeks prior to beginning work of this Section, with contractor's representative and Departmental Representative in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building sub trades.
  - .4 Review manufacturer's installation instructions and warranty requirements.
- .3 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
  - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
  - .2 Twice during progress of Work at 25% and 60% complete.
  - .3 Upon completion of Work, after cleaning is carried out.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .2 Storage and Protection:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
  - .1 Separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management and Disposal.

## 2.0 PRODUCTS

### 2.1 MATERIALS

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
  - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN- ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.
  - .2 Fire stop system rating: F rating to match FRR of wall assembly.
- .2 Service penetration assemblies: systems tested to CAN-ULC-S115.
- .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.
- .4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC 2015 and BCBC 2012.
- .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .10 Sealants for vertical joints: non-sagging.

## 3.0 EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

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

### 3.2 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
  - .1 Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

### 3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

### 3.4 SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by Departmental Representative.
- .2 Install floor fire stopping before interior partition erections.
- .3 Mechanical pipe insulation: fire stop system component.
  - .1 Ensure pipe insulation installation precedes fire stopping.

### 3.5 FIELD QUALITY CONTROL

- .1 Inspections: notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.
- .2 Manufacturer's Field Services:
  - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
  - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
  - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

### 3.6 FIRE STOP LABEL

- .1 All fire stop penetrations shall be labeled. Labels shall be secured to surface directly on both sides of fire stop penetration. Fire stop penetration labels shall include the following information.
  - .1 Name of installer.
  - .2 Date of installation.
  - .3 Type of sealing system.
  - .4 Time duration of sealant.

### 3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

**3.8 SCHEDULE**

- .1 Fire stop and smoke seal at:
  - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
  - .2 Top of fire-resistance rated masonry and gypsum board partitions.
  - .3 Intersection of fire-resistance rated masonry and gypsum board partitions.
  - .4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
  - .5 Penetrations through fire-resistance rated floor slabs, ceilings, roofs and wall assemblies.
  - .6 Openings and sleeves installed for future use through fire separations.
  - .7 Around mechanical and electrical assemblies penetrating fire separations.
  - .8 Rigid ducts: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION 07 84 00





1.0 GENERAL

1.1 RELATED REQUIREMENTS

- |    |                               |                  |
|----|-------------------------------|------------------|
| .1 | Finish Carpentry              | Section 06 20 00 |
| .2 | Sheet Metal Flashing and Trim | Section 07 62 00 |
| .3 | Metal Doors and Frames        | Section 08 11 00 |
| .4 | Gypsum Board Assemblies       | Section 09 21 16 |
| .5 | Exterior Painting             | Section 09 91 13 |
| .6 | Interior Painting             | Section 09 92 13 |

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM C 919- 12, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 ASTM C920-11 Standard Specification for Elastomeric Joint Sealants
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
  - .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit duplicate samples of each type of material and colour.
- .5 Cured samples of exposed sealants for each color where required to match adjacent material.
- .6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Instructions to include installation instructions for each product used.

1.4 QUALITY ASSURANCE / MOCK-UPS

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant.
- .3 Mock-up will be used:

- .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .4 Location to be decided with Departmental Representative.
- .5 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with sealant work.
- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

#### 1.5 DELIVERY, STORAGE & HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.
- .3 Upon completion of Work, after cleaning is carried out.

#### 1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Environmental Limitations:
  - .1 Do not proceed with installation of joint sealants under following conditions:
    - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
    - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
  - 1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
  - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.
- .4 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .5 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .6 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

#### 2.0 PRODUCTS

##### 2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

- .2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.
- .3 Where sealants are qualified with primers use only these primers.
- .4 Standard: For interior and exterior work unless otherwise specified, ensure compatibility of sealants being used and other materials in contact with them, meet VOC level of 250 g/L for architectural sealant.
- .5 Performed Compressible and Non-Compressible back-up materials.
  - .1 High Density Foam.
    - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m<sup>3</sup> density, or neoprene foam backer, size as recommended by manufacturer.
  - .2 Bond Breaker Tape.
    - .1 Polyethylene bond breaker tape which will not bond to sealant.

## 2.2 SEALANT TYPE

- .1 S-1:
  - .1 ASTM C920, polyurethane or polysulfide.
  - .2 Type M.
  - .3 Class 25.
  - .4 Grade NS.
  - .5 Shore A hardness of 20-40.
- .2 S-2:
  - .1 ASTM C920, polyurethane or polysulfide.
  - .2 Type M.
  - .3 Class 25.
  - .4 Grade P.
  - .5 Shore A hardness of 25-40.
- .3 S-3:
  - .1 ASTM C920, polyurethane or polysulfide.
  - .2 Type S.
  - .3 Class 25, joint movement range of plus or minus 50 percent.
  - .4 Grade NS.
  - .5 Shore A hardness of 15-25.
  - .6 Minimum elongation of 700 percent.
- .4 S-4:
  - .1 ASTM C920, polyurethane or polysulfide.
  - .2 Type M.
  - .3 Class 25,
  - .4 Grade NS.
  - .5 Shore A hardness of 25-40.
- .5 S-5:
  - .1 ASTM C920, polyurethane or polysulfide.
  - .2 Type M.

- .3 Class 25.
- .4 Grade P.
- .5 Shore A hardness of 25-40.
- .6 S-6:
  - .1 ASTM C920, silicone, neutral cure.
  - .2 Type S.
  - .3 Class: Joint movement range of plus 100 percent to minus 50 percent.
  - .4 Grade NS.
  - .5 Shore A hardness of 15-20.
  - .6 Minimum elongation of 1200 percent.
- .7 S-7:
  - .1 ASTM C920, silicone, neutral cure.
  - .2 Type S.
  - .3 Class 25.
  - .4 Grade NS.
  - .5 Shore A hardness of 25-30.
  - .6 Structural glazing application.
- .8 S-8:
  - .1 ASTM C920, silicone, acetoxycure.
  - .2 Type S.
  - .3 Class 25.
  - .4 Grade NS.
  - .5 Shore A hardness of 25-30.
  - .6 Structural glazing application.
- .9 S-9:
  - .1 ASTM C920, silicone.
  - .2 Type S.
  - .3 Class 25.
  - .4 Grade NS.
  - .5 Shore A hardness of 25-30.
  - .6 Non-yellowing, mildew resistant.
- .10 S-10:
  - .1 ASTM C920, coal tar extended fuel resistance polyurethane.
  - .2 Type M/S.
  - .3 Class 25.
  - .4 Grade P/NS.
  - .5 Shore A hardness of 15-20.
- .11 S-11:
  - .1 ASTM C920, polyurethane.
  - .2 Type M/S.
  - .3 Class 25.
  - .4 Grade P/NS.
  - .5 Shore A hardness of 35-50.
  - .6 Structural glazing application.

- .12 S-12:
  - .1 ASTM C920, polyurethane.
  - .2 Type M/S.
  - .3 Class 25, joint movement range of plus or minus 50 percent.
  - .4 Grade P/NS.
  - .5 Shore A hardness of 25-50.
- .13 S-13:
  - .1 Pick-proof sealant: two component 100% solids epoxy gel, no VOC, odourless, fast drying, self-priming, non-sag for use on horizontal and vertical services. Acceptable Product:
    - .1 Sika Anchor Fix 3.

### 2.3 CAULKING COMPOUND

- .1 C-1: ASTM C834, acrylic latex.
- .2 C-2: One component acoustical caulking, non-drying, non-hardening, synthetic rubber.

### 2.4 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

## 3.0 EXECUTION

### 3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

### 3.2 SURFACE PREPARATION

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

### 3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

**3.4 BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

**3.5 MIXING**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

**3.6 APPLICATION**

- .1 Sealant.
  - .1 Apply sealant in accordance with manufacturer's written instructions and ASTM C919.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
  - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealant.

**3.7 CLEANING**

- .1 Clean adjacent surfaces immediately and leave work clean and neat. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints.

**3.8 LOCATIONS**

- .1 Exterior Building Joints, Horizontal and Vertical:
  - .1 Metal to Metal: Type S-1, S-2.
  - .2 Metal to Masonry or Stone: Type S-1.
  - .3 Masonry to Masonry or Stone: Type S-1.
  - .4 Threshold Setting Bed: Type S-1, S-3, S-4.
  - .5 Masonry Expansion and Control Joints: Type S-6
- .2 Metal Reglets and Flashings:
  - .1 Flashings to Wall: Type S-6.
  - .2 Metal to Metal: Type S-6.
- .3 Sanitary Joints:
  - .1 Pipe Penetrations: Type S-12.

- .4 Interior Caulking:
  - .1 Typical Narrow Joint 6mm, (1/4 inch) or less at Walls and Adjacent Components: Type C-1 and C-2.
  - .2 Perimeter of Doors, Windows, Access Panels which Adjoin Concrete or Exterior Walls: Types C-1 and C-2.
  - .3 Joints at Masonry Walls and Columns, Piers, Concrete Walls or Exterior Walls: Types C-1 and C-2.
  - .4 Expose Isolation Joints at Top of Full Height Walls: Types C-1 and C-2.
  - .5 Exposed Acoustical Joint at Sound Rated Partitions Type C-2.
  - .6 Concealed Acoustic Sealant Types S-4, C-1 and C-2.
  - .7 Wet cell and Showers and Washrooms in Admission and Discharge area Sealant Type S-13.

END OF SECTION 07 92 00