

## **PART 1 - GENERAL**

### **1.1 GENERAL REQUIREMENTS**

- .1 Comply with requirements of Division 1.

### **1.2 RELATED WORK**

- .1 Section 04 04 99: Masonry – Minor Works.
- .2 Section 06 20 00: Finish Carpentry.
- .3 Section 07 42 43: Composite Metal Wall and Roof Panels.
- .4 Section 07 84 00: Fire Stopping and Smoke Seals.
- .5 Section 09 91 00: Painting.

### **1.3 REFERENCES**

- .1 ASTM C919-12, Standard Practice for use of Sealants in Acoustical Applications.
- .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Moisture Curing.
- .3 CAN/CGSB-19.17-M90, One Component Acrylic Emulsion Base Sealing Compound.
- .4 CAN/CGSB-19.24-M90, Multi-Component, Chemical Curing Sealing Compound.
- .5 CAN/CGSB-19.17-M90, One-Component, Acrylic Emulsion Base Sealing Compound.
- .6 Material Safety Data Sheets (MSDS) – Health Canada/Workplace Hazardous Materials Information Systems (WHMIS).

### **1.4 DEFINITION**

- .1 In this Section “caulking” means sealant.

### **1.5 SUBMITALS**

- .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.

**1.5 SUBMITTALS (continued)**

- .5 Cured samples of exposed sealants for each colour 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.
- .7 Submit for review and acceptance by Departmental Representative, proposed cooling procedures for controlling thermal movement of barrel vault composite metal panels during sealant application and curing period.

**1.6 MOCK-UP**

- .1 Construct mock-ups in accordance with Section 01 45 00 – Testing and Quality Control.
- .2 Construct mock-ups to show location, size, shape and depth of joint complete with back-up material, primer, caulking and sealant.
  - .1 Mock-up will include demonstration of cooling measures to control thermal movement of barrel vault roof panels during sealant application and curing period.
  - .2 Mock-up will include pull test on caulking as a baseline for approval prior to commencement of full installation.
  - .3 Refer also to Section 07 42 23 – Composite Metal Wall and Roof Panels for mock-up requirements for sealants on Wet Seal (caulked) Barrel Vault Roof Panel Assembly.
- .3 Mock-ups will be used:
  - .1 To judge workmanship, substrate preparation, operation of equipment and material application and measures to control thermal movement in barrel vault panels.
- .4 Locate where directed by Departmental Representative.
- .5 Allow 24 hours for review of mock-ups by Departmental Representative before proceeding with sealant work.
- .6 When accepted, mock-ups will demonstrate minimum standard of quality required for this work. Approved mock-ups may not remain as part of finished Work. Remove mock-ups and dispose of materials when no longer required and when directed by Departmental Representative.

**1.7 QUALITY ASSURANCE**

- .1 Use only sealants which are proven to be compatible with materials they are in contact with. Notify Departmental Representative prior to start of sealant work should any sealant specified be considered unsuitable for the purpose intended.

**1.7 QUALITY ASSURANCE (continued)**

- .2 Pre-Construction Meeting:
  - .1 Refer to requirements for Pre-Construction Meeting in Section 07 42 43 – Composite Metal Wall and Roof Panels.
  - .2 Sealant manufacturer to attend this meeting for technical requirements of sealant application for Wet Seal (caulked) Panel Assembly.

**1.8 DELIVERY, STORAGE, AND 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 Store materials in a dry area having an ambient temperature within limitations recommended by material manufacturer.

**1.9 SITE CONDITIONS**

- .1 Environmental Limitations:
  - .1 Do not proceed with installation of joint sealants under following conditions:
    - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 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.

**1.10 ENVIRONMENTAL AND SAFETY REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

**1.10 ENVIRONMENTAL AND SAFETY REQUIREMENTS (continued)**

- .3 Unless otherwise specified, apply sealants when air temperature is between 10°C and 25°C. When air temperature is above 25°C or below 10°C follow sealant manufacturer's recommendations regarding application.
- .4 Ventilate area of Work in accordance with manufacturer's material safety data sheets.

**1.11 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard and packaging material in appropriate on site bins for recycling in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .6 Do not dispose of unused sealant material into sewer system, onto ground or in other location where it will pose health or environmental hazard.
- .7 Dispose of unused sealant material at official hazardous material collections site approved by Departmental Representative.
- .8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .9 Fold up metal banding, flatten and place in designated area for recycling.

**1.12 WARRANTY**

- .1 At no cost to Owner, remedy any defects in work, including work of this and other Sections, due to faults in materials and /or workmanship provided under this Section appearing within a period of two (2) years from date of Substantial Performance.

## **PART 2 - 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 off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.

### **2.2 MATERIALS**

- .1 Sealants:
    - .1 Exterior use:
      - .1 Sealant (Type "A"): one part, moisture curing type to CAN/CGSB-19.13. Acceptable material: # 790 - Silicone Building Sealant by Dow Corning, SikaSil-C990 by Sika Canada Inc., or approved equal.
      - .2 Sealant (Type "B"): one part, moisture curing type to CAN/CGSB-19.13. Acceptable material: # 795 - Silicone Building Sealant by Dow Corning, SikaSil-C995 by Sika Canada Inc., or approved equal.
    - .2 Interior use:
      - .1 Sealant (Type "C"): one part, air curing, siliconized acrylic latex to CGSB 19-GP-17M. Acceptable material: Tremflex 834 by Tremco, Sonolac by Sonneborn or approved equal.
      - .2 Floor Control Joints Sealant (Type "D"): to CAN/CGSB-19.13 two component polyurethane, moisture curing. Acceptable material: TF-100 by Sonneborn, or approved equal.
  - .3 Colours: to be selected by Departmental Representative from manufacturer's standard colours.
  - .4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.
- .2 Primers, thinners: as recommended by sealant manufacturer, non-staining type.
  - .3 Preformed compressible and non-compressible back-up materials:
    - .1 Polyethylene, urethane, neoprene or vinyl foam: extruded closed cell foam backer rod. Size: oversize 30 to 50%.
    - .2 Neoprene or butyl rubber: round solid rod, Shore A, hardness 70.
    - .3 High density foam: 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.

**2.2 MATERIALS (continued)**

- .4 Bond Breaker: closed cell polyethylene or vinyl foam tape which will not bond to sealant.
- .5 Joint cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- .1 Examine joints to be caulked and report in writing to the Departmental Representative any defects in work of other Sections which would impair installation, performance and warranty of sealants.
- .2 Do not commence installation of sealants until conditions are acceptable.
- .3 Start of work implies acceptance of conditions.

**3.2 PROTECTION**

- .1 Protect completed work from staining or contamination. Repair any damage caused by sealants.

**3.3 PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean and prepare 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.
- .6 Chemically clean non-porous surfaces such as metal and glass, taking care to wipe solvents dry with clean cloth. Use solvents recommended by sealant manufacturer.
- .7 Prepare porous surfaces such as masonry and concrete to sealant manufacturer's specifications.

**3.4 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 recommendations. Apply primer immediately prior to caulking.

### 3.5 **BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint backup to achieve correct joint depth and shape, with approximately 30% compression.
- .3 Provide additional joint backup material for use on barrel vault composite metal roof panel joints. Allow 50% additional joint back-up material sized to suit both vertical and horizontal panel joints..

### 3.6 **APPLICATION**

- .1 Sealant:
  - .1 Apply sealant in accordance with manufacturer's written instructions.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.
  - .3 Ensure sealants used can accommodate metal composite wall and roof panel temperature rise during sealants' curing period.
- .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 **SEALANT**

- .1 Provide caulking between framing members and adjoining work and where required to render work weather tight.
- .2 Effectively seal window units to adjacent building elements to provide for continuity of air and vapour barrier in all locations.
- .3 Fill voids between aluminum window framing and surrounding building elements with foamed-in-place insulation.

**3.7 SEALANT (continued)**

- .4 Composite Metal Roof Panels: effectively seal joints between curved barrel vault roof panels in accordance with panel manufacturer's requirements so as to render roof panels water-tight.
  - .1 Ensure sealant physical properties can accommodate metal panel temperature rise during curing period (+50 degree C variance).
  - .2 Take into account thermal movement of composite metal roof panels so that applied sealant and joint back-up retains its profile.
  - .3 Follow accepted cooling procedures established during mock-up, to prevent sealant deformation (ie. bulging out of the joint) during the curing period.

**3.8 FIELD QUALITY CONTROL**

- .1 Sealant manufacturer shall provide periodic site inspection and technical assistance during the various phases of the project, to ensure work is properly executed.
- .2 Sealant manufacturer shall issue written reports on sealant application at conclusion of each phase of the work.

**3.9 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean adjacent surfaces immediately.
  - .3 Remove excess and droppings, using recommended cleaners as work progresses.
  - .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.
- .3 Waste management: separate waste materials in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.

**3.10 PROTECTION**

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



**3.11 SCHEDULE**

- .1 Apply sealant Type "A" at the following exterior locations:
  - .1 Between dissimilar (porous) materials in exposed locations except where specifically indicated otherwise.
  - .2 At all perimeters of non-porous to porous materials and where indicated on drawings.
  - .3 At penetrations through exterior building elements.
  - .4 Below door thresholds (two beads).
  - .5 and where indicated on drawings.
- .2 Apply sealant Type "B" at the following exterior locations:
  - .1 At all perimeters of metal to metal joints and glass to metal joints.
  - .2 Perimeters of exterior openings where aluminum windows, entrance frames, aluminum louvres, etc. meet exterior facade of building.
  - .3 At perimeter of steel door frames and exterior façade of building.
  - .4 and where indicated on drawings.
- .3 Apply sealant Type "C" at the following interior locations:
  - .1 Between dissimilar materials in exposed locations except where specifically indicated otherwise.
  - .2 Perimeter of steel door, screen frames, louver frames, etc where gap between frame and wall exceeds 1.5 mm or where gap is irregular.
  - .3 Control joints in masonry elements and joints between masonry walls.
  - .4 Perimeter of cabinets, access panels, and control panels.
  - .5 and where indicated on drawings.
- .4 Apply self-levelling polyurethane sealant Type "D" at interior floor control joints in concrete slabs-on-grade
- .5 Where sealant requires painting use acrylic emulsion type caulking.

**END OF SECTION**