

## **PART 1 - GENERAL**

### **1.1 General Requirements**

- .1 All conditions of the contract and Division 1, General Requirements apply to this section.
- .2 All materials and equipment must be set up in a position satisfactory to the Owner's representative.
- .3 All materials shall be new and free from defects which may impair strength, durability or appearance.
- .4 Scheduling of the work shall be discussed with, and be subject to the approval of the Owner.

### **1.2 References**

- .1 Comply with requirements of the following documents, latest edition:
  - .1 ASTM C719, Standard Test Method for Adhesion and Cohesion of Elastomeric Sealant Joints Under Cyclic Movement (Hockman Cycle).
  - .2 ASTM C920, Standard Specification for Elastomeric Joint Sealants.
  - .3 ASTM C1193, Standard Guide for Use of Joint Sealants.
  - .4 ASTM C1311, Standard Specification for Solvent Release Sealants.
  - .5 ASTM C1330, Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
  - .6 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing
  - .7 SWRI (Sealant, Waterproofing and Restoration Institute) – Sealant and Caulking Guide Specification.
  - .8 The Professionals' Guide, Sealant, Waterproofing and Restoration Institute.
  - .9 Ontario Building Code.

### **1.3 Quality Assurance**

- .1 Contractor Qualifications
  - .1 Execute the Work of this Section by Contractors approved by manufacturers of materials incorporated in the Work; who has equipment, adequate for Project, and skilled tradesmen to perform it expeditiously; and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five (5) years.

- .2 The applicator must supply proper numbers of trained and approved personnel to perform tasks as described in the specification.
- .2 Field Review
  - .1 The Work will be reviewed on behalf of the Owner by the Consultant. The Contractor is required to co-operate with, and provide access and samples to the Consultant. The Contractor shall give the Consultant 24 hours advance notice for inspection and/or testing services.
  - .2 At the request of the Consultant, Contractor shall arrange for the sealant manufacturer's representative to review substrates and completed sealant joints.
- .3 Field Testing
  - .1 The Consultant shall perform localized adhesion testing of random sealant joints as work progresses.
  - .2 At the request of the Consultant, Contractor shall arrange for the sealant manufacturer's representative to perform localized adhesion testing of random sealant joints.
  - .3 Test sealant in contact with samples of materials to be caulked to ensure that proper adhesion will be obtained and no staining of the material will result. Prepare sample joints at the site of each type of sealant for each joint condition. Do not proceed with Work until joint has been approved. Adhesion tests to be done in accordance with manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant Joint Hand Pull-Tab. Note: Tests may need to be done at specific intervals required by the sealant manufacturer to obtain specified warranties.
  - .4 Remove sealant and re-caulk deficient or unapproved joints and test locations.
  - .5 Approved joints will establish minimum acceptable quality of workmanship and will serve as the standard by which subsequent Work will be compared for Acceptance.

#### **1.4 Submittals**

- .1 Product Data: After the award of contract, submit the following:
  - .1 Manufacturer's product data and specifications needed to prove compliance with the specified requirements.
- .2 Samples: Upon request, submit samples of each sealant, each backer rod and each bond breaker to be used.

#### **1.5 Delivery, Storage and Handling**

- .1 Materials to be stored on-site at a location approved by the Owner.

- .2 Deliver all materials to the job site in their original unopened containers, with all labels intact. Verify the sealant(s) and the primer(s) for expiry date upon their arrival to site. Materials shall be used within their stated shelf life.
- .3 Store and use materials in strict accordance with manufacturer's recommendations. Protect from freezing, moisture, water and contact with ground or floor.
- .4 Unless otherwise approved, do not transport any materials through the buildings.

## **1.6 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 local Labour regulations.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use, including but not limited to:
  - .1 Weather dry.
  - .2 Imminent weather forecast, dry.
  - .3 Ensure that sealant and substrate materials are not less than 5°C when applied.
  - .4 Should it become necessary to apply sealants at temperatures below 5°C, consult the sealant manufacturer's technical representative. Proceed on manufacturer's written instruction only.
- .3 Apply sealants only to completely dry and clean surfaces. (Note: Although the joint interface may appear to be dry, the substrate below the immediate joint surface may still be moist. This moisture can migrate rapidly to the joint surface thereby contaminating any surface preparation.

## **PART 2 - PRODUCTS**

### **2.1 Sealant Materials**

- .1 Sealant compounds must:
  - .1 meet or exceed all applicable governmental and industrial safety and performance standards.
  - .2 be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by-laws and regulations.
- .2 Sealant 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.
- .3 Sealant that emits strong odours, contains toxic chemicals or is not certified as mould resistant shall not be used in or near air handling units.
  - .4 Compatibility: All materials in a sealant system shall be compatible with each other and with the substrate.
  - .5 The use of materials other than those specified herein must be approved prior to award of the Contract. If substitute materials are proposed, then the list of materials must be included as part of the Tender Form. This submittal shall include product name, number and data sheets and manufacturer's specifications and installation instructions.
  - .6 All materials listed below must be used on the project. Under no circumstances will substitute materials be used unless approval is first received from the Owner. Use of substitute materials without prior approval can result in the removal and replacement of these materials at no cost to the Owner.

## 2.2 Sealant Material Designations

- .1 General:
  - .1 Colour of sealants shall be selected to match substrates and/or existing sealants and shall be approved by the Owner prior to application.
- .2 Polyurethane Sealant: Single component moisture curing, non-sagging, conforming to CAN/CGSB 19.13:
  - .1 Dymonic by Tremco Ltd.
  - .2 Contractors Weatherproofing Sealant (CWS) by Dow Corning Corporation.
- .3 Butyl Sealant:
  - .1 Tremco Curtainwall Sealant
  - .2 or approved equivalent
- .4 Gasket / Sealant Tape:
  - .1 EMSEAL MST (Multi-Use Sealant Tape) by EMSEAL Joint Systems Ltd.
  - .2 POLYshim II Tape by Tremco Ltd.
- .5 Sealing Mastic / Adhesive
  - .1 M-1 Structural Adhesive/Sealant by Chem Link
  - .2 Sopramastic SP2 by Soprema

- .6 Cleaning Materials:
  - .1 Acceptable cleaners are:
    - .1 Dow Corning Cleaner and Surface Prep
    - .2 Methyleneethylketone (MEK)
    - .3 Isopropyl Alcohol (IPA)
    - .4 Or other solvent cleaner as recommended by sealant manufacturer
  - .2 Surfaces to receive sealants shall not be cleaned with Xylene.
  - .3 Xylene and Toluene shall not be used for cold weather cleaning.
  - .4 All substrate materials shall be cleaned with compatible cleaners.
- .7 Masking Tape:
  - .1 For masking around joints, provide an appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, and which is removable without damage to the substrate.
- .8 Void Filler:
  - .1 Clean, glass fibre batt insulation.
- .9 Cloths For Solvent Cleaning:
  - .1 Cloths for solvent cleaning of surfaces prior to application of sealants shall be clean, white and solvent resistant. Coloured cloths shall not be used. Change cloths frequently as they become soiled during cleaning.
- .10 Primer:
  - .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant. Primer as recommended by sealant manufacturer.
  - .2 The deletion of primer shall be at the sole discretion of the Consultant, with consideration given to manufacturer recommendation and/or field testing results.
- .11 Joint Backing:
  - .1 Backer Rod must be used, where applicable, to control depth of sealant. Acceptable materials are:
    - .1 Closed Cell: Polyethylene, urethane, neoprene or vinyl, extruded closed cell foam, in circular shape with diameter 25% greater than joint width before installation.
    - .2 Hybrid: Extruded polyolefin foam, non-gassing with diameter 25% larger than

joint width SOF-ROD as manufactured by Industrial Thermo Polymers and distributed by Tremco Ltd.

- .2 Bond Breaker Tape must be used, if dimensions of joint do not permit installation of backer rod, to prevent three (3) sided adhesion of sealant. Acceptable materials are:
  - .1 Pressure sensitive adhesive tape recommended by sealant manufacturer that will not bond to the sealant: No. 226 or No. 481 Tape by 3M Canada Inc.
  - .2 Alternatively and where approved by Consultant, wax crayon may be used.

### **PART 3 - EXECUTION**

#### **3.1 Examination of Site Conditions**

- .1 Examine the Drawings and Specifications to determine the extent of the work involved, together with other necessary data affecting the work, as in no circumstances will any claims against the Owner be allowed resulting from failure to ascertain the extent of such work herein described or implied.
- .2 Bidders shall visit the site and acquaint themselves with the existing conditions. Prior to bidding, bidders shall make investigations to satisfy themselves as to the job requirements, existing conditions, and quantities.
- .3 Before any sealant replacement is performed, the type of existing sealant shall be determined. If uncertain as to type, then the sealant manufacturer technical representative shall be contacted to confirm type. Only sealant compatible with the existing shall be installed as part of repairs.
- .4 Inspect existing conditions and substrates upon which work of this section is dependent. Report to the Owner's Representative in writing any defects or discrepancies. Commencement of work implies acceptance of existing conditions and assuming full responsibility for the finished condition of the work.
- .5 Ascertain that sealers and coatings applied to sealant substrates are compatible with the sealant used and that full bond between sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and bond if necessary.
- .6 Inform Owner's Representative of any unusual or deteriorated construction revealed during performance of Work. Allow Owner's Representative to review conditions prior to retrofit.
- .7 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this section.

#### **3.2 Surface Preparation**

- .1 Prepare surfaces in accordance with manufacturer's directions.

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- .2 Before any sealant repairs are made, the type of existing sealant shall be determined. If uncertain as to type, a sealant manufacturer technical representative shall be contacted to confirm type. Only sealant compatible with the existing shall be installed as part of repairs. Polyurethane based sealants are not to be applied over existing silicone sealants.
  - .3 Where existing, remove sealant completely. In no case shall new sealant be applied over old. In addition:
    - .1 Remove existing sealants, dust, oil, grease, oxidation, mill scale, coatings and all other loose material by cutting, brushing, scrubbing, scraping and/or grinding. In no case, however, shall remaining components such as window frames be damaged during surface preparation.
    - .2 Prior to use of any solvents, ensure that solvent does not damage existing materials and finishes.
    - .3 Clean substrates with the recommended solvent cleaner. Apply solvent with a clean cloth, pad or soft paper towel. The applicator cloth or towel shall not leave fiber residue on the substrate surface. The surface should be wiped clean and dried with a second clean cloth to ensure removal of contaminants. If substrate surfaces is still not clean, repeat procedures as needed. Change cloths frequently to prevent depositing contaminants from the cloth onto the substrate surface.
    - .4 Use method of surface preparation suitable for substrate, as recommended by sealant manufacturer and that does not damage existing finishes.
  - .4 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
  - .5 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.
  - .6 Ensure joint surfaces are dry and frost free.
  - .7 At concrete crack locations to receive sealant, use a concrete router to create a minimum 6mm x 6mm (1/4" x 1/4") groove. Remove loose particles present or resulting from routing by sweeping particles out with a dry brush, blowing out joints with oil free compressed air or by vacuuming joints prior to solvent cleaning.
  - .8 Do not install sealant until joints are in compliance with the manufacturer of the sealant and the specific requirements of other sections of the Specification.

### **3.3 Priming**

- .1 The deletion of primer shall be at the sole discretion of the Consultant. Manufacturer's written recommendation, and/or results of in-field adhesion testing, shall be considered by the

Consultant in the decision to delete primer.

- .2 Use only the primer approved by the sealant manufacturer for the particular installation, applying in strict accordance with the manufacturers printed recommendations.
- .3 Prevent staining of adjacent surfaces and priming backer rod/bond breaker during priming of joint interfaces. Where necessary to prevent staining or for neat appearance, mask adjacent surfaces prior to priming and sealant installation.
- .4 Prime only as much area as can be sealed in one (1) hour. If primed areas are exposed to rain or contaminants (dirt, dust, etc.), joint surfaces must be cleaned and re-primed. Follow manufacturer's recommendations for application and cure time.
- .5 If primer is installed accidentally on surfaces other than surfaces to which sealants are to be applied, remove excess primer immediately with clean cloth dampened with recommended cleaner.
- .6 Always pour primers onto the rag or brush, do not dip the rag or brush into the container.

### **3.4 Back-Up Material**

- .1 When using backing material comprised of tubular or rod stock, avoid lengthwise stretching of the material. Do not twist or braid backer material.
  - .2 Provide a stiff blunt-surfaced wood or plastic installation tool, having shoulders designed to ride on the finished surface and a protrusion of the required dimensions to assure a uniform depth of backup material below the sealant. Do not puncture the exterior skin or surface of the backer material. A screwdriver and other similar sharp pointed items are prohibited. Where punctured or otherwise damaged, the backer material shall be removed and replaced with new.
- .3 Using the approved tool, smoothly and uniformly place the backup material to achieve the proper depth to width ratio required, compressing the backer material 25% to 50% and securing a positive fit. Do not insert the depth of the backer material beyond 13mm (1/2").
- .4 Install backing material to a depth to provide a caulked joint meeting the depth requirement as set out in the sealant manufacturer's specifications and outlined in Figure 1 below.
- .5 Install specified bond breaker tape, or other acceptable bond breaker where backer rod cannot be installed due to joint profile.

### **3.5 Mixing**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions. Only manufacturer approved and recommended paddles shall be used.

### 3.6 General Installation

- .1 Install sealant in compliance with sealant manufacturer's recommendation. Joint designs and profiles shall be as described below and in accordance to Sealants: The Professionals' Guide, Sealant, Waterproofing and Restoration Institute. Joint designs deviating from those listed below and as described in the aforementioned document shall not be accepted.
- .2 Where surfaces adjacent to joints are likely to become coated with sealant during application, or where irregular surface or sensitive joint border exist, mask edges with masking tape prior to sealing.
- .3 Do not apply work of this section on surfaces which are wet, damp or have frost.
- .4 Equipment:
  - .1 Apply sealant under pressure with power-actuated hand gun, with manually operated hand gun, or by other appropriate means.
  - .2 Use guns with a nozzle of proper size and length, and providing sufficient pressure to completely fill the joints as designed.
  - .3 Provide suitable nozzle extensions where double stage joints are installed.
  - .4 Provide appropriate nozzles to create profiles required. This may require custom cutting of nozzles tips.
- .5 Apply sealant in continuous beads. Fill joints completely to required depths with sealant compound. Use sufficient pressure to fill all voids and joints.
- .6 Ensure that the new sealant is adhered to substrates a minimum of 6mm (1/4") at each side of joint. Depth of sealant at center to be a maximum of 13mm (1/2") while maintaining a 2:1 joint width to depth ratio.
- .7 Tool joints to a slight concave bead, smooth and free from ridges, wrinkles, sags, air pockets and imbedded impurities. Tooling to be performed by proper metal or wood tool. Finger tooling joints will not be accepted.
- .8 Remove excess compound promptly as work progresses and upon completion.
- .9 Where possible (i.e. for new cladding installations), install sealant as a recessed joint (at least 3/4" back from face of the joint) to allow for sealant replacement in the future without removing the existing sealant.

### 3.7 Fillet Bead

- .1 If backer rod cannot be installed into joint then provide bond breaker at inside corners. Bond breaker to extend 3mm (1/8") onto substrates.

- .2 Install sealant to provide minimum 6mm (1/4") vertical and horizontal leg of sealant onto substrate, or more where gap exists between assemblies. Minimum adhesion to be 6mm (1/4") onto substrate. Minimum depth of sealant to be 6mm (1/4").
- .3 Where a proper fillet bead cannot be obtained because the window frames are installed flush or near flush with finished cladding surface, provide a sealant bead profile (similar to a band-aid joint) to meet the above minimum requirements for sealant depth and contact with substrates.

### 3.8 Butt Joints

- .1 For butt joints, maintain the following width to depth ratio (Note: Depth of sealant shown at middle of joint):

Joint Width (mm)	Sealant Depth (mm)
<12	6
12	6 to 8
25	8 to 10
18	9 to 12
25	10 to 15

- .2 For joints wider than 19mm (3/4"), it may be necessary to apply the sealant in several passes (depending on joint configuration, weather conditions, access and material type). Follow the sealant manufacturer recommendations for maximum joint width and application methods.

### 3.9 Cleaning

- .1 Remove sealant smears and droppings using recommended cleaners as work progresses as follows:
  - .1 Non-Porous Surfaces: Immediately remove all excess sealant adjacent to the joint with one of the recommended solvents as work progresses.
  - .2 Porous Surfaces: Allow sealant to develop initial cure, then remove by abrasion or other mechanical means. Caution should be exercised to maintain original surface integrity.

**END OF SECTION – 07 92 00**