Part 1 General

1.1 RELATED REQUIREMENTS

.1 Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Section, apply to work specified in this section.

1.2 REFERENCE STANDARDS

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 National Research Council Canada (NRC)

.1 National Building Code of Canada [2015] (NBC).

.3 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995 , Fire Tests of Fire stop Systems.

1.3 DEFINITIONS

.1 Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between fire rated wall and floor assemblies.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of ULC or cUL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.

.3 Manufacturer's engineering judgment identification number and drawing details when no ULC or cUL system is available for an application. Engineered judgment must include both project name and contractor’s name who will install firestop system as described in drawing.

.4 Submit material safety data sheets provided with product delivered to job-site.

1.5 QUALITY ASSURANCE

.1 A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

.2 Fire-Test-Response Characteristics: Provide through-penetration fire stop systems and fire-resistive joint systems that comply with specified requirements of tested systems.

.3 Firestop System installation must meet requirements of CAN/ULC-S115-11 or UL 2079 tested assemblies that provide a fire rating as shown in Section 2.03 Clauses R, S & T below.

.4 Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

.5 Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

.6 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a manufacturer's engineering judgment derived from similar ULC or cUL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.

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.

.4 Do not use damaged or expired materials.

.2 Storage and Protection:

.1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

1.8 PROJECT CONDITIONS

.1 Do not use materials that contain flammable solvents.

.2 Scheduling:

1. Schedule installation of CAST IN PLACE firestop devices after completion of floor formwork, metal form deck, or composite deck but before placement of concrete.

2. Schedule installation of Drop-In firestop devices after placement of concrete but before installation of the pipe penetration. Diameter of sleeved or cored hole to match the listed system for the device

3. Schedule installation of other firestopping materials after completion of penetrating item installation but prior to covering or concealing of openings.

.3 Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

.4 Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

.5 During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

Part 2 Products

2.1 PERFORMANCE REQUIREMENTS

.1 Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

2. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

.3 Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

.4 Provide a round fire-rated cable management device whenever cables penetrate fire rated walls, where frequent cable changes and additions may occur. The fire-rated cable management device shall consist of a corrugated steel tube with zinc coating, contain and inner plastic housing, intumescent material rings, and inner fabric smoke seal membrane. The length of the sleeve shall be 12.4 inches. The fire-rated cable management device shall contain integrated intumescent firestop wrap strip materials sufficient to maintain the hourly rating of the barrier being penetrated. The fire-rated cable management device shall contain a smoke seal fabric membrane or intumescent firestop plugs sufficient to achieve the L-Rating requirements of the barrier type. Install device per the manufacturer’s published installation instructions.

.5 Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11.

F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

.6 Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with CAN/ULC-S115-11.

.1 F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.

.2 T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.

.3 W-Rating (if applicable): Class 1 rating in accordance with water leakage test per UL 1479.

.7 Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

.8 Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G21.

.9 Rain and water resistance: provide perimeter joint sealant tested in accordance with ASTM D 6904 with less than 1 hour tack free time as tested in accordance with ASTM C 679.

2.2 MATERIALS

.1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

.2 Approved firestop product assemblies to include all materials, sealants, foams, mineral wool and other devices, which are purpose-made for all firestop conditions, including but not limited to:

.1 Cable penetrations (all types)
.2 Pipe penetrations (all types)
.3 Ductwork penetrations (all types)
.4 Combustible material penetrations (all types)
.5 Construction joints (all types)
.6 Metal deck profile closures
.7 Structurally separated walls and floor assemblies
.8 Electrical box enclosures

.3 For penetrations through a Fire Separation wall provide a firestop system with a "F" Rating as determined by ULC or cUL as indicated below:

Fire Resistance Rating of Separation	Required ULC or cUL "F" Rating of Firestopping Assembly
30 minutes	20 minutes
45 minutes	45 minutes
1 hour	45 minutes
1.5 hours	1 hour
2 hours	1.5 hours
3 hours	2 hours
4 hours	3 hours

For combustible pipe penetrations through a Fire Separation provide a firestop system with a "F" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

.4 For penetrations through a Fire Wall or horizontal Fire Separation provide a firestop system with a "FT" Rating as determined by ULC or cUL which is equal to the fire resistance rating of the construction being penetrated.

.5 Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

Part 3 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 Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion. Verify penetrations are properly sized and in suitable condition for application of materials.

2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.3 COORDINATION

1. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

2. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

.3 Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.

.4 Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector.

3.4 INSTALLATION

.1 Regulatory Requirements: Install firestop materials in accordance with ULC Fire Resistance Directory or UL Products Certified for Canada (cUL) Directory or Omega Point Laboratories Directory.

2. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.

    1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
    2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
    3. Protect materials from damage on surfaces subjected to traffic.

3.5 FIELD QUALITY CONTROL

.1 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

.2 Keep areas of work accessible until inspection by applicable code authorities.

.3 Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.

.4 Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

.5 Manufacturer’s Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly.

3.6 IDENTIFICATION & DOCUMENTATION

.1 The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.

.2 The Documentation Form for through penetrations is to include:

A Sequential Location Number
The Project Name
Date of Installation
Detailed description of the penetrations location
Tested System or Engineered Judgment Number
Type of assembly penetrated
A detailed description of the size and type of penetrating item
Size of opening
Number of sides of assemblies addressed

Hourly rating to be achieved
Installers Name

.3 The Documentation Form for Construction Joints is to include:

A Sequential Location Number
The Project Name
Date of Installation
Detailed description of the Construction Joints location
Tested System or Engineered Judgment Number
Type of Construction Joint
The Width of the Joint
The Lineal Footage of the Joint
Number of sides addressed
Hourly rating to be achieved
Installers Name

.3 Copies of these documents are to be provided to the general contractor at the completion of the project.

.4 Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's Name, address, and phone number.
3. Through-Penetration firestop system designation of applicable testing and inspection agency.
4. Date of Installation.
5. Through-Penetration firestop system manufacturer's name.
6. Installer's Name.

.5 Permanently attach identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove or change penetrating items or firestopping.

3.7 ADJUSTING AND CLEANING

.1 Remove equipment, materials and debris, leaving area in undamaged, clean condition.

.2 Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

.3 Perform cleaning in accordance to Section 01 74 11 – Cleaning.

3.7 LABOR USE TO INSTALL FIRESTOP SYSTEMS

.1 If firestopping is not assigned to a single-source firestop specialty contractor, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreement.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C919-[08] , Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 19-GP-5M-[1984] , Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).

.2 CAN/CGSB-19.13-[M87] , Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M-[1984] , Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).

.4 CAN/CGSB-19.17-[M90] , One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24-[M90] , Multi-component, Chemical Curing Sealing Compound.

.3 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-[E(2)1993] , Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.

.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 Manufacturer's Instructions:

.1 Submit instructions to include installation instructions for each product used.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00- Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 Construction/Demolition Waste Management And Disposal.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard and packaging material 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 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.7 Divert unused joint sealing material from landfill to 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.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

- .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store and protect joint sealants from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

1.7 SITE CONDITIONS

.1 Ambient Conditions:

- .1 Proceed with installation of joint sealants only when:

.1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.

.2 Joint substrates are dry.

.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Joint-Width Conditions:

.1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 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 Health Canada.

.2 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

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 SEALANT MATERIAL DESIGNATIONS

.1 Sealant Type 1: one component silicone sealant to CAN/CGSB-19.13, type 2, Class 25, shore A hardness of 25 - 30, non sag, neutral curing.

.2 Sealant Type 2: one component paintable acrylic latex, to CAN/CGSB-19.17.

.3 Sealant type 3 - Security Sealant: as specified in Section 07 92 10.13.

.4 Sealant type 4: one component, mildew resistant, silicone rubber sealant, conforming to ASTM C920.

.5 Acoustical Sealant.

.1 To ASTM C919.

.6 Joint Filler: Round closed cell, non-staining, non-absorbent foam, extruded polyethylene shore hardness 20, tensile strength 138-207 KPa oversized 30-50%. For backup to large joints, cavities or voids, use fibreglass wool.

.7 Bond Breaker: Pressure sensitive polyethylene tape, not bondable to sealant.

2.3 SEALANT SELECTION

.1 Perimeters of exterior openings where frames meet exterior façade of building (i.e., Masonry Veneer, Metal Siding, Parging, around exterior windows and doors or other exterior materials) and to all other exterior joints: Sealant Type 1.

.2 Sealant to wet areas: Sealant type 3 to inmate areas, Sealant type 4 elsewerhere.

.3 Between different metails at interior locations, such as between gypsum board and concrete or concrete block: Sealant type 3 to inmate areas, Sealant type 2 elsewhere.

.4 Perimeters of interior frames: Sealant type 3 to inmate areas, Sealant type 2 elsewhere.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primer: in accordance with sealant manufacturer's written recommendations.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative .

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.

.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.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by joint sealants installation.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 ASTM Standards:

.1 ASTM C920-02: Standard Specification for Elastomeric Joint Sealants.

.2 CGSB Standards:

.1 CAN/CGSB-19.24-M90: Multi-Component, Chemical Curing Sealing Compound.

1.2 QUALIFICATIONS

.1 Perform Caulking using parties recognized for ability in the trade, having at least five (5) years proven satisfactory experience, to carry out the work and/or supervise skilled mechanics thoroughly trained and competent in the use of caulking and sealing materials using pressure operated equipment.

.2 Perform Work in accordance with the sealant manufacturer's requirements for preparation of surfaces and materials installation instructions.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00.

.2 Submit duplicate copies of manufacturer's product literature for each type of sealant material specified.

1.4 PROTECTION

.1 If sealant can be damaged before it has cured sufficiently, provide adequate protection. If damaged, remove sealant and renew the application.

1.5 DELIVERY/STORAGE

.1 Deliver all materials and store in original wrappings and containers with manufacturer's seals and labels intact, and as recommended by the manufacturer of the sealant.

.2 Maintain containers and labels in undamaged condition.

1.6 ENVIRONMENTAL CONDITIONS

.1 Do not work at temperatures greater or less than those recommended by the manufacturer.

.2 Maintain air temperature range of $4^{O}C$ to $27^{O}C$ in areas to receive sealants, 24 hours before, during application, and until sealants have cured.

.3 Should it become necessary to apply sealants at temperatures below or above this range, advise the Departmental Representative and consult sealant manufacturer and follow the latter's recommendations.

.4 Protect all work against damage and disfigurations and work of other trades against soiling and damage arising out of this work. Upon completion, replace and repair all defective work.

.5 Examine substrate materials, joint voids, and note temperature/humidity conditions. Report unacceptable conditions to the Departmental Representative.

.6 Commencement of work implies acceptance of conditions.

1.7 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 and Occupational Health and Safety.

.2 Product may cause chemical burns on skin if not washed out within 5 minutes or in the eyes if not washed out immediately with water for a period of five minutes.

.1 Goggles, gloves and other suitable safety equipment should be used.

.2 Over time and over exposure can cause a skin reaction to occur.

.3 See manufactures Data Sheet before using.

.3 Ventilate area of work as using acceptable portable supply and exhaust fans.

1.8 COMPATIBILITY

.1 Ensure that all materials used are compatible.

.2 Declaration of Materials Compatibility: Submit written declaration stating that sealant materials are compatible with adjacent materials and substrates and are acceptable to the sealant manufacturer. Include a list of materials, suppliers and manufacturers.

1.9 GUARANTEE

.1 For Work of this Section 07 92 10.13 – Security Sealants, 12 months warranty period prescribed in subsection GC 3.13 of General Conditions "C" is extended to 60 months as described below.

.2 Provide a written guarantee endorsed and issued in the name of Her Majesty the Queen stating that all sealant and caulking work is guaranteed against leakage, cracking and deterioration, shrinkage, loss of cohesion, loss of adhesion, staining of adjacent surfaces, integral staining or failure to provide intended seal; for a period of five (5) years from date of Substantial Performance of the contract and that any defects will be replaced including related materials at no cost to the Departmental Representative.

.3 Provide manufacturers guarantee, that its products are of the quality represented in its product literature and package markings and, when applied in accordance with its current specifications and application instructions, will perform as stated in its product literature.

.4 Include this scope provision within the scope of the Performance Bond.

Part 2 Products

2.1 MATERIALS

.1 Security Type Sealant: Epoxy sealant type 4, 2 component “pick proof”, solvent-free, moisture-insensitive, high-modulus, high-strength, fire retardant, elastic-type epoxy with not less than 5% movement capability; to ASTM D 695. Colour to match adjacent substrate or as selected by the Departmental Representative. To the following properties:

Physical Properties	Part A	Part B	Part A & B
Colour	-	-	colour to match substrate
Viscosity	10,000 CPS	200 CPS	7,000 CPS
Specific Gravity1.3	9.7	1.2	

.2 Joint Cleaner: Non-corrosive solvent recommended by sealant manufacturer for applicable substratematerials.

.3 Primer: Non-staining type recommended by sealantmanufacturer.

.4 Joint Filler: Round closed cell, non-staining, non-absorbent foam, extruded polyethylene shore hardness 20, tensile strength 138-207 KPa oversized 30-50%. For backup to large joints, cavities or voids, use fibreglass wool.

.5 Bond Breaker: Pressure sensitive polyethylene tape, not bondable to sealant.

2.2 COLOURS

.1 Colours: to match adjacent material, as selected by the Departmental Representative.

Part 3 Execution

3.1 PREPARATION

.1 Surface Cleaning: Clean all surfaces required to be caulked, removing all loose particles, dust, oil, wax, protective coatings, mould release agents, and the like, using brush, solvents, or acid etching methods.

- .1 Concrete: Must be sound, free of grease, laitance, etc. Concrete must be dry.
- .2 Steel: Remove rust, old paints, etc. Solvent cleaners to remove oil, etc.
- .3 Wood: Must be dry and free of paint, oil, etc.
- .4 Plastics: Consult sealant manufacturer for written instructions.

.2 Primer Application: Prior to application of primer where required, test primers for possible yellowing, discolouration, and dirt pick-up when applied over face of porous substrates.

.3 Following testing apply primers to joints following manufacturer's recommendations.

.4 When tests indicate discolouration, dirt pick-up and the like on surfaces, take special precautions when applying, by masking surfaces not required to be primed.

.5 Ensure that the sealant manufacturer's representative reviews site conditions, joint design and installers qualifications. Report unsatisfactory conditions to the Departmental Representative. Ensure that sealants are compatible with adjoining materials.

.6 Ensure that the sealant manufacturer's representative checks container labels, random inspect preparation of substrate materials and random test installed work.

3.2 APPLICATION - GENERAL

.1 One component silicone sealant for exterior caulking and other non-security sealant applications, by Section 07 92 00.

.2 Apply foam bead to within 10 mm of face of joint.

.3 Ensure all surfaces are clean. Caulk only when surface temperature is between $4^{O}C$ and $26^{O}C$.

.4 Apply sealant in accordance with manufacturer's instructions.

.5 Use pressure gun fitted with suitable nozzle.

.6 Ensure finished surfaces of sealant are smooth and free from ridges, wrinkles, or foreign matter.

.7 Prime joints when recommended by manufacturer. Use a brush that will reach all parts of the joints.

.8 Wire brush loose surfaces (such as brick or masonry).

.9 Ensure bead is solid, filling entire space between sides and bedding material, and exerting sufficient pressure on sides to obtain maximum bond, by allowing sealant to bulge out in advance of nozzle.

3.3 APPLICATION OF SEALANTS

.1 Apply sealant in accordance with manufacturer's directions, using a pressure air gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.2 Apply security sealant to all interior joints between dissimilar materials and elsewhere as required or indicated on the Drawings. The only interior areas not requiring Security Sealants are to the Administration Area.

.3 Joints should be filled to approximately 2/3 full and let set for approximately 4 hours, then fill the remainder. The level of epoxy should be just above the surface. Passing a propane torch over the surface an hour after application will break any bubbles. Excess epoxy can be cut off with a scraper the next day.

.4 Cold Temperature: Apply only when temperatures are above 0C.

.5 Provide bond breaker between security sealant and glass. Remove excess bond breaker exposed after sealant has cured.

.6 Joint Design: Fill all spaces that are deeper than width of joint, with approved backup material. Ensure that the backup material fills the joint out to a dimension that is equal to the width of the joint, but in no case less than half the width of the joint.

.7 Sealant Application: Gun apply sealants through a nozzle opening of such shape and diameter that the full bead of sealant is gunned into the joint, filling the joint completely; to the approval of the Departmental Representative.

.8 A superficial or skin bead in joints will not be acceptable.

.9 Tool all beads immediately after application to ensure firm, full contact with the inner faces of the joint. Strike off excess material with tooling stick or knife.

.10 Upon completion ensure caulking surfaces are smooth, even, free from ridges, wrinkles, air pockets, and embedded foreign matter.

.11 Joint Finishes: Finish joints in flush surfaces; fill joints full in internal angles, except as otherwise detailed. Use wet tool as required. Avoid the use of face fillet (or angle bead) joints. CONCAVE OR CONVEX JOINTS WILL BE REJECTED.

.12 Where sharp, exact bead lines are desired, use masking tape. When taping, avoid touching cleaned and primed areas to which sealant is to be applied. Remove masking tape immediately after bead is placed and tooled, to avoid damage to developing surface skin.

.13 Completely fill void with compound into which they are installed. Remove excess immediately following installation.

3.4 BOND BREAKER

.1 Use foam bead as specified, to limit depth of sealant and to act as bond breaker at back of joint (adhesion is not required at back of joint).

.2 Where depth of joint does not permit the use of foam bead, apply paper masking tape to the back of the joint to act as bond breaker.

3.5 CLEANING

.1 Promptly as work proceeds remove all excess material or smears from surfaces beyond joint or surface to be caulked, using solvents as recommended by the manufacturer's representative. If sealant or caulking has set up, employ mechanical removal.

.2 During application, maintain areas of work in clean condition daily removing from the premises and site all rubbish and surplus material.

.3 Clean immediately soiled non-porous materials.

.4 On porous surfaces, remove any excess sealant as recommended by manufacturer.

.5 Sealant manufacturer recommends that equipment must be cleaned after use with Sealant Manufacturers Solvent. Cured material can only be removed by burning.

END OF SECTION