This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 14 16
COLD FLUID APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

.1 Foundations must be waterproofed.

.2 Other below grade waterproofing as required by design configuration and water table indicated in the Geotechnical Report.

.3 Materials not identified in these standards must be identified and approved by the Owner and be approved by the Authority Having Jurisdiction.

.4 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

1.2 REFERENCES

.1 ASTM C836/C836M-15 Standard Specification for High Solids Content, Cold Liquid Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

.2 ASTM D412-15a Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

.3 ASTM E96/E96M-16 Standard Test Methods for Water Vapor Transmission of Materials.

.4 British Columbia Building Code, 2012 Edition (BCBC).

1.3 QUALITY ASSURANCE

.1 Source Quality Control: Waterproofing shall be from a single manufacturer and all products within the system specified shall be compatible. Ensure compatibility with products in Section 07.25.00 Weather Barriers where systems are interconnected.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

.1 Subject to compliance with specifications the following manufacturers are acceptable:

- .1 Bakor
- .2 Custom Building Products.
- .3 Epro Waterproofing Systems Inc.
- .4 Tremco.
- .5 Or approved alternative.

2.2 MATERIALS

.1 Waterproofing: Single component, polymer-modified asphalt material suitable for spray application.

.2 Physical Properties:

PROPERTY	TEST METHOD	TYPICAL VALUE
Colour		Black
Crack Bridging Ability	ASTM D836	Passes - 0° F
Elongation	ASTM D412 Die C	800%
Water Vapour Permeance	ASTM E96	0.07 perms
Hardness	ASTM C836; Shore 00	Passes
Adhesion to Concrete	ASTM C836	Exceeds

2.3 PROTECTION BOARD

.1 Protection Board: 3 mm (1/8 inch) thick, semi-rigid board composed of a mineral fortified asphaltic core formed between two saturated fibreglass felts. Acceptable Product: Sopraboard by Soprema, or approved alternative.

2.4 COMPOSITE SHEET DRAINAGE MATERIALS

.1 Vertical Applications:

.1 Dimpled composite mat with high density polyethylene (HDPE) core and HDPE layers on outside.

.1 Minimum flow rate: ASTM D4716: 132 L/min/m (10.6 gal/min/ft).

.2 Mimimum compressive strength: ASTM D6364: 250 kN/m^2 (5,200 psf).

.3 Subject to compliance with specifications, the following products are acceptable:

.1 Delta-MS by Cosella-Dorken.

.2 Or approved alternative.

.2 Horizontal applications - Type 1:

.1 Drainage composite consisting of polypropylene drainage core of fused entangled filaments onto which a geocomposite fabric is factory laminated.

.1 Water flow rate: ASTM D4491: 4,888 Lpm/m2 (120 gpm/ft2)

.2 Compressive load test: ASTM D1621: 1436 kPa (30,000 psf)

.3 Thickness: 11.43 mm (0.45 in.)

.4 Acceptable products:

.1 Sopradrain Eco-Vent by Soprema.

.2 Or approved alternative.

.3 Horizontal applications - Type 2: Traffic areas below concrete topping.

.1 Drainage composite consisting of polypropylene drainage core with a woven heavy-duty polypropylene filter fabric.

.1 Water flow rate: ASTM D4491: 4,074 Lpm/m2 (100 gpm/ft2)

.2 Compressive load test: ASTM D1621: 862 kPa (18,000 psf)

.3 Thickness: 10 mm (0.4 in.)

.4 Acceptable products:

.1 Sopradrain 18-G by Soprema.

.2 Or approved alternative.

PART 3 - EXECUTION – NOT USED

END OF SECTION

This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 16 16
CRYSTALLINE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

.1 Provide concrete admixture that when added to plastic mix will permanently waterproof, water reduce and air entrain hardened concrete by means of chemically promoting total hydration through a catalyst form of water bearing crystals.

.2 Provide waterproof admixture for concrete mix at foundation walls where indicated, at elevator pit and slab depressions. Refer to Drawings for locations.

.3 Provide cementitious crystalline slurry waterproofing system with accessories where indicated and specified for a complete installation. Provide coating to concrete at the following locations at at locations indicated:

.1 Construction joints, form tie holes.

.2 Crack repair and honeycombed pockets in concrete walls and slabs.

.3 To form cove at junctions of floor/wall and floor/column.

.4 Around pipe and drain penetrations.

.4 Provide crystalline plugs and waterstops as indicated and specified.

.5 Include accessories as required and as specified for a complete installation.

.6 Coordinate scheduling of finish work with work of this Section to ensure that substrates are fully waterproofed before finishing work begins.

.7 Materials not identified in these standards must be identified and approved by the Owner and be approved by the Authority Having Jurisdiction.

.8 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

1.2 REFERENCES

.1 ASTM C309-11 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.2 ASTM E329-14a Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

.3 British Columbia Building Code, 2012 Edition (BCBC).

1.3 PROJECT CONDITIONS

.1 Maintain air temperature and structural base temperature at waterproofing installation area above 5°C (41°F) for 72 hr. before, during and 72 hr. after installation.

.2 Take personal safety precautions when handling and installing materials.

1.4 SUBMITTALS

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

.2 Product Data:

.1 Materials list of items proposed to be provided under this Section.

.2 Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

.3 Manufacturer's current recommended installation procedures which, when reviewed by Consultant, will become basis for accepting or rejecting actual installation procedures used on the Work.

.3 Shop Drawings: Submit Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades.

.4 Samples: For each material used.

.5 Certification: Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of Consultant and Owner for verification.

1.5 QUALITY ASSURANCE

.1 Source Quality Control: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.

.2 Installer Qualifications: A firm with three (3) years' experience in work of type required by this section and have successfully completed at least three projects of similar scope and complexity

.1 Use adequate numbers of skilled workers thoroughly trained and experienced in installation methods and completely familiar with specified requirements for proper performance of the work.

.2 Applicator shall designate a single individual as project foreman who shall be on the site at all times during installation.

.3 Pre-Installation Conference: Convene a pre-installation job-site conference three weeks prior to commencing work of this Section to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

.1 Attendees shall include: Consultant, Contractor, Installer, authorized representative of manufacturer and interfacing trades.

.2 Examine Drawings and Specifications affecting work of this Section. Verify conditions, review installation procedures, and coordinate scheduling with interfacing portions of Work.

.3 Agenda for meeting shall include review of special details, flashing, and transition membranes.

.4 Schedule Coordination: Schedule work so membrane will not be left exposed to weather for longer than time recommended by manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to job site in manufacturer's unopened containers with labels intact and legible at time of use. Maintain products in a dry condition during delivery, storage, handling, installation, and concealment.

.2 Store and handle in compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations.

1.7 PROJECT CONDITIONS

.1 Provide Installer with substrates free of standing water, dirt and debris, loose material, voids and protrusions or deformations which may inhibit application or performance of waterproofing.

.1 Where work of this Section will be installed on concrete or masonry, provide substrates that are free of voids deeper than 10 mm (3/8 in.) and free of surface protrusions more than 6mm (1/4 in.).

.2 Where work of this Section will be installed on concrete footings, provide wood float or better finish to surfaces scheduled to receive membrane.

.2 Groundwater:

.1 Where work of this Section will encounter groundwater, provide waterproofing manufacturer with sufficient groundwater samples taken from Project at logged locations for manufacturer laboratory analysis.

.2 Manufacturer shall provide written report confirming laboratory testing with regard to suitability of waterproofing system for installation in project conditions.

.3 Do not install products in standing water or when it is raining.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

.1 Subject to compliance with specifications the following manufacturers are acceptable.

.1 Kryton Canada Corp., www.kryton.com, 604-324-8280.

.2 Xypex Chemical Corp., www.xypex.com, 604-273-5265.

.3 Or approved alternative.

2.2 MATERIALS

.1 Admixture: Concrete Waterproofing: Crystalline system to permanently seal concrete and prevent liquids from penetrating in any direction. Additive for exterior foundation walls, added to concrete at time of batching. Acceptable products:

.1 Krystol Internal Membrane “KIM” by Kryton.

.2 Xypex Admix C-500 by Xypex.

.3 Or approved alternative.

.2 Slurry: Waterproofing Membrane: Crystalline compound: non-shrink compound composed of Portland cement, very fine, treated silica sand and various active proprietary chemicals. Acceptable products:

.1 Krystol T1 and Krystol T2 by Kryton.

.2 Xypex Concentrate by Xypex.

.3 Or approved alternative.

.3 Plugs: For sealing cracks and tie-holes. Acceptable products:

.1 Krystol Crack Repair by Kryton.

.2 Patch 'n Plug by Xypex.

.3 Or approved alternative.

.4 Concrete Waterstop System: Cementitious crystalline waterproofing concentrate system: Acceptable Products:

.1 Waterstop Treatment: Krystol Waterstop Treatment (K-321) by Kryton.

.2 Waterstop Grout: Krystol Waterstop Grout (K-322i and K-322x) by Kryton.

.3 Or approved alternative.

PART 3 - EXECUTION – NOT USED

END OF SECTION

This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 21 00
BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

.1 Provide fiberglass batt and blanket, rigid and semi-rigid thermal, mineral wool / rock wool, foamed in place polyurethane foam, spray applied mineral fibre, insulations with accessories for a complete installation as indicated and specified.

.2 Provide insulation in plumbing walls.

.3 Consider off gassing when selecting insulation.

.4 Ensure new products meet all requirements of Authorities Having Jurisdiction.

.5 Materials not identified in these standards must be flagged and approved by Owner and be approved by the Authorities Having Jurisdiction.

.6 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

1.2 REFERENCES

.1 ASTM C518-15 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

.2 ASTM C665-12 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.3 ASTM D1622/D1622M-14 Test Method for Apparent Density of Rigid Cellular Plastics.

.4 ASTM E90-09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.5 ASTM E136-16 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.

.6 ASTM E736/E736M-00(2015)e1 Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.

.7 British Columbia Building Code, 2012 Edition (BCBC).

.8 ULC 102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (CAN/ULC S102).

.9 ULC 701 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering (CAN/ULC S701-11).

.10 ULC 702 Standard for Thermal Insulation Mineral Fibre for Buildings (CAN/ULC S702-14).

.11 ULC 702.2 Mineral Fibre Thermal Insulation for Buildings, Part 2: Application Guidelines (ULC S702.2-15).

.12 ULC 770 Standard Test Method for Determination of Long-term Thermal Resistance of Closed-Cell Thermal Insulating Foams (CAN/ULC S770-15).

PART 2 - GENERAL

2.1 MANUFACTURERS

.1 Subject to compliance with specifications the following manufacturers are acceptable for the products indicated.

.1 Can-Cell Industries Inc.

.2 Demilec.

.3 Dow Corning Corporation.

.4 Fibrex.

.5 Grace.

.6 Johns Manville.

.7 Owens-Corning.

.8 Roxul.

.9 Walltite.

.10 Or approved alternative.

2.2 MATERIALS

.1 Batt Insulation – Thermal and Acoustic: Formaldehyde free, mineral / glass fibre friction fit batt type to CAN/ULC-S702 and ASTM C665, Type 1, R3.5/1" (0.79 lb/ft^3) density, thicknesses as indicated. Minimum R-Value: R3.5 per 1 in. Acceptable products: "Easy Fit" by Johns Manville, "Thermal-Batt" by Owens-Corning or approved alternative.

.2 Rigid Polystyrene Insulation: Extruded rigid polystyrene conforming to CAN/ULC-S701, with maximum water absorption of 0.7% in accordance with ASTM D2842, thickness as indicated, minimum R-value: R5.0 per 1 in.

.1 Type 2: Integral high density skin, minimum compressive strength 30 psi and a minimum five (5) year aged R-value R5.0 per 1 in. Dow "Styrofoam SM" or approved alternative.

.2 Type 4: Minimum compressive strength of 210 kPa and a minimum five (5) year aged value of R5.0 per 1 in. Dow "Styrofoam Highload 100", Owens-Corning "Foamular 900", or approved alternative.

.3 Rigid Polyisocyanurate Insulation: Conforming to CAN/ULC S704 and CAN/CGSB 51.26, minimum compressive strength 138 kpa and minimum R-Value: R28. Product: Johns Manville " E'nrg'y2", or approved alternative.

.4 Semi Rigid Insulation / Mineral Wool Insulation: in fire rated assemblies mineral wool batt, filling well cavity, conforming to BC Building Code requirements for fire rated assemblies, with a mass of 1.22 kg/m^2. Acceptable products: Enertek 1200, Fibrex 1240, Roxul RW40, or approved alternative.

.5 Foamed in Place Polyurethane Foam Insulation: Conforming to CAN/ULC – S705 and CAN/ULC – S705.2. Sprayed polyurethane foam material: Conforming to requirements of CAN/ULC S705.1. Product to utilize a Zero ODS (Zero Ozone Depleting Substance) propellant and be CFC free. Acceptable Products:

.1 BASF Polyurethane Foam Enterprises LLC Canada. Product: Walltite ECO.

.2 Polarfoam PF-7300-0 Soya by Demilec as distributed by Polyurethane Foam Systems Inc., T: 888-783-0751. Or approved alternative.

.3 Provide third party inspection and verification on insulation in accordance with CUFCA standards.

2.3 ACCESSORIES

.1 Acoustical Sealant: Provide non hardening type in accordance with Section 07 92 00 Joint Sealants.

.2 Insulation Fasteners: Insulok / Chanelmate by Dow or approved alternative.

.3 Impaling Pins: Corrosion resistant steel wire spindles of lengths required for insulation thickness, fixed to perforated metal plates suitable for adhesive fixing to concrete substrates, with friction locking washers.

.4 Insulation Clips: Use to fastening semi-rigid insulation to wall sheathing and soffits. Impale type, perforated 51 x 51 mm (2 x 2 in.) steel, 0.7 mm (0.030 in.) thick, adhesive back, spindle of 2.5 mm (0.098 in.) diameter annealed steel, 25.4 mm (1 in.) diameter selflocking washers, length to suit insulation thickness.

.5 Vapour Barrier: 6 mil polyethylene to CAN/CGSB 51.34.

.6 Sealing Tape: Ideal, No 375, or approved. Adhesives: To insulation manufacturer's recommendation.

.7 Nails and Staples: Electroplated steel wire of type and size to suit installation.

PART 3 - EXECUTION – NOT USED

END OF SECTION

This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 25 00
WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

.1 Provide weather tight air/moisture barrier at building face, integrated with sill flashings as indicated and specified.

.2 Consultant to summarize elements in the project that make up the air barrier and provide contractors with narrative. Example: the air barrier on this project shall be obtained by connecting and sealing concrete foundations to peel and stick membrane over exterior sheathing. It shall be tied into window and door openings with membrane flashing and sealant and sealed to roofing membrane's air barrier system.

.3 Provide sill, head, and jamb flashing at window openings, door openings, and openings intended to accommodate mechanical and electrical equipment.

.4 Provide through-wall flashing at base of masonry walls and at window sills.

.5 Ensure air barrier is continuous.

.6 Ensure compatibility of all sealants in contact with all membranes.

.7 Materials not identified in these standards must be identified and approved by the Owner and be approved by the Authority Having Jurisdiction.

.8 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

1.2 REFERENCES

.1 Comply with current edition of referenced standards unless indicated otherwise.

.2 ASTM C920-14a Standard Specification for Elastomeric Joint Sealants.

.3 ASTM C1193-13 Standard Guide for Use of Joint Sealants.

.4 ASTM E84-14 Standard Test Method for Surface Burning Characteristics of Building Materials.

.5 ASTM E96/E96M-14 Standard Test Methods for Water Vapor Transmission of Materials.

.6 ASTM E283-04(2012) Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.7 ASTM E2178-13 Standard Test Method for Air Permeance of Building Materials.

.8 ASTM E2357-11 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

.9 British Columbia Building Code, 2012 Edition (BCBC).

.10 CAN/CGSB 51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

1.3 SUBMITTALS

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

.2 Product Data:

.1 Submit three copies of manufacturer's specification and installation instructions for each type of weather barrier, accessory components, flashing materials, related sealants and fastening systems specified.

.2 Submit installation instructions for each product specified including weather forecast requirements.

.3 Samples: Submit two (2) 75 x 75 mm (3 x 3 in.) samples of each product specified, with manufacturer's published data referencing test reports and performance specifications confirming compliance.

1.4 QUALITY ASSURANCE

.1 Source Quality Control: Air barrier membrane components and accessories shall be from a single membrane manufacturer to ensure total system compatibility and integrity.

.2 Pre-installation Conference:

.1 Notify involved parties in advance in order to conduct a pre-installation telephone conference prior to commencement of composite sheet waterproofing installation. Have webcam operable so substrate can be reviewed remotely.

.2 Attendees shall include Owner, Consultant, Installer, and Product Manufacturer's Representative.

.3 At conference, attendees shall:

.1 Inspect the substrate(s).

.2 Review products.

.3 Discuss installation methods and details, including special details and flashing.

.4 Coordinate this work with related and adjacent work.

.5 Discuss weather conditions related to application.

.6 Discuss any other installation related questions or issues.

.3 Mock-up: Mock-up weather barrier system as directed by Consultant indicating sequence of work. Mock-up complete with membrane flashing, metal flashings and sealants.

.1 Coordinate mock-ups with each Related Sections indicated in this Section.

.2 Ensure compatibility amongst adjacent systems prior to installing balance of Work.

.3 Mock-ups may remain in place as standard for work upon Consultant's acceptance as long as they remain undamaged.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.

.2 Label materials with manufacturer's name, product, date of manufacture and directions for storage.

.3 Immediately remove damaged material from jobsite.

.4 Protect materials from damage during transit, handling, storage, and installation in accordance with manufacturer's recommendations.

1.6 PROJECT CONDITIONS

.1 Compatibility between air barrier system products is required. Ensure all components proposed for application are compatible. This includes all products specified in Division 7.

.2 Attach membrane flashings in accordance with manufacturer's recommendations for acceptable weather conditions and temperatures. Attention is drawn to manufacturer's special conditions requiring forecasts for inclement weather.

.3 Ensure preparation work is complete prior to installing barriers.

.4 Do not apply barriers to damp or wet substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

.1 Subject to compliance with specifications the following manufacturers are acceptable:

.1 Henry/Bakor Co., www.henry.com. 1-800-486-1278.

.2 Tremco Inc., www.tremcosealants.com. 1-800-363-3213 or approved alternative.

2.2 BUILDING PAPER / MOISTURE BARRIER

.1 Building Paper:

.1 Two layers Grade D breather type, 30 minute asphalt saturated building paper. Vapour transmission rating shall be a minimum of 35 grams as tested in compliance with ASTM E96 procedure A. Water resistance (indicated in minutes) shall be as tested in compliance with ASTM D779.

.2 Acceptable products:

.1 30 minute Heavy Duty Jumbo Tex by Fortifiber.

.2 30 minute Super by Haltex.

.3 Or approved alternative.

2.3 MOISTURE BARRIER / AIR BARRIER - SELF ADHERED

.1 Self adhered, water resistant, vapour permeable, of reinforced modified polyolefin trilaminate sheet with adhesive backing and 3 piece release film

.1 Acceptable Product: Blueskin VP 160 as manufactured by Henry/Bakor or approved alternative.

.1 Primer: Low VOC solvent based primer with VOC's of less than 250 grams per litre. Acceptable product: Blueskin LVC adhesive or approved alternative.

.2 Moisture Barrier/Air Barrier shall have the following physical properties:

.1 Air Permeance Leakage: < 0.02 L/S/M^2 passes when tested to ASTM E2178.

.2 Water Vapour Transmission: 202 grams/M^2 when tested to ASTM E96 method B.

.3 Water Penetration Resistance Around Nails: Pass when tested AAMA 711-05 and ASTM D1970 modified.

.4 Surface Burning Characteristics: 105 Class A when tested in accordance with ASTM E84.

.5 Flame Spread Index: 0, Class A.

.6 Smoke Developed: 105 Class A to ASTM E84.

2.4 MOISTURE BARRIER / AIR BARRIER - LIQUID APPLIED

.1 Air/Moisture Barrier No. 1: One-component solvent based, vapour permeable, polymer modified bitumen, trowel applied, liquid membrane.

.1 Acceptable Product: Air-Bloc 07 by Henry/Bakor, or approved alternative.

.2 The membrane shall have the following physical properties:

.1 Air permeability: 0.0108 CFM/ft2 @ 1.6 lbs/ft2 to ASTM E 2178 and ASTM E 283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft2 for 1 hour and gust wind load pressure of 62.8 lbs/ft2 for 10 seconds when tested at 1.6 lbs/ft2 to ASTM E 331.

.2 Water vapor permeance: 7 perms to ASTM E 96 Method E

.3 Nominal wet film thickness: 120 mils to 200 mils

.4 Elongation (ASTM D412): 130% (Typical).

.5 Long term flexibility: Pass to CGSB 71-GP-24M

.6 Water tightness (CGSB 37-GP-56M): Pass

2.5 AIR/MOISTURE BARRIER - TROWEL APPLIED

.1 Trowel-Applied Air/Moisture Barrier: One-component solvent based, vapour permeable, polymer modified bitumen, trowel applied, liquid membrane. Membrane shall have the following physical properties:

.1 Air permeability: 0.0108 cfm/ft^2 @ 1.6 lbs/ft^2 to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft^2 for 1 hour and gust wind load pressure of 62.8 lbs/ft^2 for 10 seconds when tested at 1.6 lbs/ft^2 to ASTM E331.

.2 Water vapor permeance: 7 perms to ASTM E96 Method E.

.3 Nominal wet film thickness: 70 mils to 120 mils.

.4 Elongation (ASTM D412): 130% (Typical).

.5 Long term flexibility: Pass to CGSB 71-GP-24M.

.6 Water tightness: When tested to CGSB 37-GP-56M: Pass.

.2 Acceptable Product:

.1 Air-Bloc 07 by Henry/Bakor.

.2 Or approved alternative.

2.6 AIR/MOISTURE BARRIER - SPRAY APPLIED

.1 Spray Applied Air/Moisture Barrier: Water based, vapour permeable, seamless elastomeric polymer modified bitumen, trowel applied, liquid membrane. Membrane shall have the following physical properties:

.1 Acceptable Product: AirBloc 31 by BakorAir-Shield, LMP by W.R. Meadows or approved alternative.

.2 Solids Contents: 58% minimum.

.3 Water vapor permeance: 21 perms to ASTM E96 Procedure B.

.4 Elongation (ASTM D412): 1000.

.5 Flexibility @ -26F (-15C): to ASTM C836: Pass.

.6 Wet Film Thickness: 70 mil (1.52 mm).

.7 Cured Film Thickness: 35 mil (0.76 mm).

.2 Acceptable Product: AirBloc 31 by BakorAir-Shield LMP by W.R. Meadows or approved alternative.

2.7 MEMBRANE FLASHING - SELF ADHERED

.1 Membrane Flashing: Self adhering, SBS modified bitumen, sheet membrane, integrally laminated to a polyethylene film. Suitable for high temperature applications.

.1 Acceptable Product: Blueskin PE 200 HT by Henry/Bakor, or approved alternative.

.2 Self-Adhered membranes shall have the following physical properties:

.1	Membrane Thickness:	1.0 mm (0.040 in. (40 mils)).
.2	Low temperature flexibility:	-43°C (-45°F) to ASTM D146.
.3	Elongation:	250% minimum to ASTM D412-modifed.
.4	Water vapour transmission:	ASTM E96, 2.8 ng/Pa.m2.s. (0.05 perms).

2.8 VAPOUR BARRIER

.1 Vapor/Air Barrier: Conforming to CAN/CGSB 51.34.

.1 Exterior walls and locations indicated: Polyethylene film, 6 mils thick.

.2 Below Concrete Slabs: Polyethylene film, 10 mils thick.

2.9 MEMBRANE FLASHING - THROUGH WALL

.1 Locations: Window jambs, headers, door openings, inside and outside corners, and other transitions.

.1 Acceptable products Blueskin SA by Henry/Bakor, or approved alternative.

.2 SBS rubberized asphalt compound laminated on a blue polyethylene film. Membrane shall have the following physical properties:

.1	Thickness:	1.0 mm (40 mils).
.2	Air leakage:	ASTM E283-91, <0.005 L/s.m² @ 75 Pa.
.3	Tested to ASTM E 2357 for the air barrier assembly,	
.4	Water vapour permeance:	ASTM E96, 1.6 ng/Pa.m².s (0.03 perms).
.5	Low temperature flexibility:	CGSB 37-GP-56M, 30 °C.
.6	Elongation:	ASTM D412-modifed, 200%.

2.10 ADHESIVE PRIMERS FOR SELF ADHERED MEMBRANES

.1 Adhesive Primer for primary self-adhering water resistive air barrier membrane, self-adhering transition membrane and SBS modified bitumen membranes at all temperatures shall be a compatible synthetic rubber based adhesive as recommended by manufacturer.

.1 Solids by weight:0.8 kg/l.

.2 Drying time (initial set): 30 minutes.

.3 Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

2.11 PENETRATION & TERMINATION SEALANT

.1 Termination Sealant: Moisture cure, medium modulus polymer modified sealing compound.

.1 Acceptable Product: Blueskin HE925 BES Adhesive by Henry/Bakor, or approved alternative. Termination Sealant shall have the following physical properties:

.1 Compatible with sheet air barrier, roofing, waterproofing membranes and substrates.

.2 Complies with ASTM C 920, Type S, Grade NS, Class 25.

.3 Elongation: 450 – 550%.

.4 Remains flexible with aging.

.5 Seals construction joints up to 25 mm (1 in.) wide.

.6 Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

2.12 ACCESSORIES

.1 Air barrier membrane components and accessories shall be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

.2 Primer, sheet flashings, liquid membrane, patching membrane, and liquid mastics recommended by barrier manufacturer for intended use and compatible with specified product.

.3 Sealants: Provide sealants in accordance with Section 07 92 00 Joint Sealants.

PART 3 - EXECUTION – NOT USED

END OF SECTION

This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 52 16
SBS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

.1 Modified bituminous sheet roofing work shall be in accordance with RCABC Manual, Roofing Practices Manual, 10 Year Guarantee incorporating vapour retarder and manufacturers published installation instructions.

.2 Where 2 ply SBS roofing is used the base sheet shall be mechanically fastened.

.3 Provide a conventional self-adhered base sheet, primer, and self-adhered granular cap sheet, two-ply SBS roofing system with accessories for a complete roofing system.

.4 Provide cover board, vapour retarder, and rigid insulation as indicated and specified.

.5 Materials not identified in these standards must be identified and approved by Owner and be approved by the Authority Having Jurisdiction.

.6 Obtain and pay for the services of an RCABC approved roofing inspector if one has not already been assigned to the project.

.7 Coordinate the installation of the Vapour Barrier Continuity Strip with the work of Section 06 10 00 Rough Carpentry.

.8 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

1.2 REFERENCES

.1 ASTM C726-12 Standard Specification for Mineral Wool Roof Insulation Board.

.2 ASTM D6162/D6162M-00A(2015)e1 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.3 ASTM D6163/D6163M-00A(2015)e1 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.

.4 ASTM D6164/D6164M-11 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

.5 British Columbia Building Code, 2012 edition.

.6 CAN/CGSB 51.33-M89 Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction

.7 CAN-CSA A247-M86(R1996) Standard Insulating Fibreboard.

.8 CGSB 37 GP-56M (Withdrawn) Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.9 ULC 107 Methods of Fire Tests of Roof Coverings (CAN/ULC S107-10).

.10 ULC 114 Standard Method of Test for Determination of Non-Combustibility in Building Materials (CAN/ULC S114-05).

.11 ULC 701 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering (CAN/ULC S701-11).

.12 ULC 704 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced (CAN/ULC S704-11).

1.3 SUBMITTALS

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

.2 Product Data: Include installation and maintenance instructions. Submit two (2) copies of the most current technical data sheets. Documents shall describe the physical properties of materials and provide product installation instructions, including restrictions, limitations and other manufacturer recommendations.

.3 Shop Drawings: Include details specific to the installation indicated. Indicate extent of membrane, application over openings, and transitions to other weather barrier membranes.

.4 Samples: Provide two samples each of cap sheet, base sheet, and transition membranes.

.5 Letter of Acknowledgement: Provide the Owner with a letter acknowledging the Contractor and the roofing Installer have read, and will adhere to the BCIT “Information for Contractors” package. The letter shall advise the Owner of any potential impacts that work could have on members of the BCIT community or on BCIT property and assets.

.6 Safety Plan: Submit prior to start of work submit a full Safety plan in accordance with the requirements of the Owner’s Security Emergency Management Contractor Safety Program.

.7 Reports: Field Test Reports: Submit copy of inspection agency (RCABC) reports after each inspection.

1.4 QUALITY ASSURANCE

.1 Installer Qualifications:

.1 The Installer shall be at the time of bidding and throughout the Work a member in good standing of the RCABC.

.2 The Installer shall be an approved Installer of the membrane manufacturer.

.2 Source Quality Control: Roofing and waterproofing materials that form part of the roofing system shall be provided by the same manufacturer.

.3 Inspection Agency:

.1 Work under this Section to be performed using an independent testing agency acceptable by the Owner and acceptable to the RCABC. The purpose of this inspection is to provide a written guarantee backed by the Roofing Contractors’ Association of British Columbia.

.2 Cooperate with and assist the selected agency and do not interfere with or obstruct the Agency during the cut test or inspection procedures. The cost of this inspection shall be included in the Contract Price.

.3 Notify appointed inspection agency of intent to start work forty-eight (48) hours before the commencement of work of this Section and co-operate with the performance of the inspection work.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store materials in their original packaging, in conformance with manufacturer’s recommendations and requirements as described in manufacturer’s technical documentation.

.2 Ensure materials are adequately protected and stored in a dry and properly ventilated area, away from welding flame or spark, and sheltered from the elements and harmful substances.

.3 Store adhesives and solvent-based mastics at a minimum temperature of 5 °C (41 °F).

.4 Carefully store materials delivered in rolls upright; store flashings so as to avoid wrinkling, buckling, scratches or any other damage.

.5 Avoid gathering construction materials on the roof, which may affect the structural integrity by imposing loads exceeding what is admissible.

1.6 PROJECT CONDITIONS

.1 Comply with RCABC Safety Requirements as described in RCABC Roofing Practices Manual.

1.7 GUARANTEE

.1 Obtain and pay for a RCABC written guarantee for a period of ten (10) years from date of Substantial Completion to correct defects due to materials or workmanship, including leakage of water, abnormal aging or deterioration of materials and other failures of membrane and related sheet metal work.

1.8 WARRANTIES

.1 Installer's Standard Workmanship Warranty: The Installer shall provide a written and signed document in the Owner's name certifying that the work executed will remain in place and free of waterproofing defect for a ten-year (10) period from the date of acceptance.

.2 Manufacturer's Standard Materials Warranty: The membrane manufacturer will issue a written and signed document in the Owner's name, certifying that the roofing membranes are free of manufacturing defects for a period of ten (10) years, starting from the date of completion of membrane installation. This warranty shall cover the removal and replacement of defective roof membrane products, including workmanship. The warranty shall remain full and complete for the duration of the period specified. The warranty certificate shall reflect these requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Comply with RCABC requirements. Two (2)-ply roof membrane systems as approved for mopped base and torch applied cap sheet in compliance with ULC Standards and listed in RCABC Approved Products Listing. Soprema products preferred.

2.2 VAPOUR BARRIER SUPPORT PANELS

.1 Gypsum-Fibre Roof Board: Protection Board: Glass fibre-covered roof board, conforming to ASTM E84 and ASTM C1177.

.1 Acceptable Product: Dens Deck by Georgia Pacific or approved alternative.

2.3 VAPOUR BARRIER

.1 Self-Adhesive Vapour Barrier: Self-adhesive membrane composed of SBS modified bitumen, with a surface screen made of high-density polyethylene laminated between two layers of polyethylene films. The self-adhesive under-face is protected with a silicone plastic release film.

.1 Acceptable Product: Sopravap'r by Soprema or approved alternative.

.2 Vapour Barrier Continuity Strip: Waterproofing membrane with composite reinforcement and SBS modified bitumen. The surface is sanded and the under-face is self-adhesive and covered with a silicon release film.

.1 Acceptable Product: Sopralene Stick Adhesive by Soprema or approved alternative.

2.4 INSULATION

.1 General: Insulation products shall be listed in the RCABC Manual as approved products.

.2 Rigid polyisocyanurate insulation: Conforming to (CAN/CGSB-51.26 M86 and CAN/6SB-516P-21M), faced, thickness / thermal resistance, R value of 1.36 RSI/25mm thickness as indicated on drawings. Acceptable Products: As listed in accepted materials list, Tab 2.2 RCABC Roofing Practices Manual.

.3 Polyisocyanurate Insulation: Conforming to (CAN/CGSB-51.26 M86 and CAN/6SB-516P-21M), closed-cell polyisocyanurate foam insulation board laminated on both sides with a fiberglass yarn-reinforced organic paper. Acceptable product: Sopra-Iso Plus by Soprema or approved alternative.

.4 Tapered Insulation Board: Tapered insulation panel made of polyisocyanurate designed to create a 2 percent (%) slope to the roof system.

.5 Sump Insulation Board for Drain Location: Sump insulation panel made of polyisocyanurate designed to facilitate proper drainage around drain.

2.5 BASE SHEET – SELF ADHERED

.1 Base Sheet Membrane for Field Surface: Roofing membrane composed of SBS modified bitumen and a glass mat reinforcement conforming to CGSB 37.56. The surface is covered with a thermofusible plastic film, the underside is covered with a release protection film. Surface shall be marked with three (3) chalk lines to ensure proper roll alignment.

.1 Acceptable product: Colvent Base 810 by Soprema or approved alternative.

2.6 BASE SHEET MEMBRANE FOR FLASHINGS AND PARAPETS

.1 Base Sheet Flashing: Conforming to CGSB 37.56, a SBS modified bitumen membrane and composite heavy duty non-woven polyester glass mat reinforcement. The underface is covered with a release protection film. The surface shall be marked with three (3) chalk lines to ensure proper roll alignment.

.1 Acceptable product: Sopra Flash stick by Soprema

2.7 CAP SHEET MEMBRANE FOR FIELD SURFACES

.1 Cap Sheet: High performance roofing membrane surface is protected by coloured granules. The underface is covered with a release protection film. The cap sheet side lap is part self-adhesive and part thermofusible. Conforming to ASTM D6162 composed of SBS modified bitumen and a composite reinforcement. The surface is protected by coloured granules. The under-face is covered with a release protection film.

.1 Acceptable Product: Sopralene Stick Hr Gr by Soprema or approved alternative

2.8 CAP SHEET FLASHING FOR FLASHINGS AND PARAPETS

.1 Roofing Cap Sheet Membrane: Roofing membrane conforming to ASTM D6162 composed of SBS modified bitumen with a composite reinforcement and elastomeric bitumen. The surface is protected by coloured granules. The under-face is covered with a release protection film. The cap sheet side lap is part self-adhesive and part thermofusible.

.1 Acceptable Product: Sopralene Stick Hr Gr by Soprema or approved alternative

2.9 PRIMERS

.1 Primer composed of SBS synthetic rubber, adhesive resins and VOC-free solvents. Used as primer to improve the adhesion of self-adhesive membranes.

.1 Acceptable Product: Elastocol Stick Zero By Soprema or approved alternate.

2.10 ADHESIVES

.1 Insulation Adhesvie: Two-component, quick-setting, low-expansion foam urethane adhesive that can be applied at any temperature. NOTE TO SPECIFIER; Select this option when insulation is not mechanically fastened.

.1 Acceptable product: Duotack by Soprema.

2.11 ACCESSORIES

.1 Cant strips to be supplies from 100mm treated Fir or Cedar

.2 Plumbing sheet lead at drains, as per minimum R.C.A.B.C. and minimum of 14.6 kg/m2.

.3 Roofing Cement: Conforming to CAN/CGSB-37GP-4MA. As recommended by membrane manufacturer.

.4 Wood blocking to be supplies from 100mm treated Fir or Cedar.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Prior to start of work, examine areas to receive roofing with Owner, Consultant, Installer, and Roofing Inspection Agency present.

.2 Inspect deck conditions including slopes and wood grounds, flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. Correct unsatisfactory conditions.

.3 The start of roofing work will be considered as acceptance of conditions for work completion.

3.2 PREPARATION

.1 Fence off areas at ground level where equipment is to be used.

.2 Ensure surfaces are clean, smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.

.3 Ensure plumbing, carpentry and other work has been completed and inspected, and approved by the Authority Having Jurisdiction.

.4 No materials will be installed during rain or snowfall.

.5 Protect adjacent faces of buildings. Tarp where necessary to prevent damage to wall finishes during roofing operations.

.6 Clean off drips and smears of bituminous materials.

.7 Repair damage to building interior during roofing operations at no additional cost to the Owner.

.8 Prevent traffic over completed roofing except where required by work above roof level. Comply with precautions deemed necessary by Consultant.

.9 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

3.3 INSTALLATION

.1 Complete roofing in a continuous fashion as surfaces are readied and as weather conditions permit.

.2 Seal joints that are not covered by a cap sheet membrane the same day. Do not install a second cap if any moisture is present in joints.

.3 Protect roofing and waterproofing as installation progresses, including protection of the work of other trades.

.4 Protect the exposed surfaces of finished work to avoid damage during roof installation and material transportation.

.5 Install primer, vapour barrier, insulation, and support panels in accordance with membrane manufacturer’s printed recommendations and instructions.

.6 Installation of Self-adhesive Base Sheet on Field Surface:

.1 Dry unroll base sheet onto substrate, taking care to align the edge of the first selvedge with drain centre (parallel to roof edge).

.2 Remove the silicone release film to adhere the membrane to the substrate. Remove the protective film from the side lap strip.

.3 Ensure each selvedge overlaps the previous one along lines provided for this purpose, and overlaps by 25 mm (1 in) at the ends. Joints may be aligned (no offset) to facilitate the installation of the reinforcing strip.

.4 Seal end laps with a 330-mm (13-in) wide protection strip centered on the joint.

.5 Seal side laps using a torch and a round-nosed trowel.

.6 Avoid the formation of wrinkles, swellings or fishmouths.

.7 Installation of Self-adhesive Base Sheet on Flashings and Parapets:

.1 Apply base sheet flashing only after primer coat is dry.

.2 Before applying membranes, always burn the plastic film from the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply primer for self-adhesive membrane on the area to be covered at the foot of the parapets.

.3 Cut off corners at end laps of areas to be covered by the next roll.

.4 Ensure each selvedge overlaps the previous one along lines provided for this purpose, and by 150 mm (6 in) at the ends.

.5 Position the pre-cut membrane. Remove 150 mm (6 in) of the silicone release film to hold the membrane in place at the top of the parapet.

.6 Gradually peel off remaining silicone release film, pressing down on membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the flashing and the field surface. Smooth the entire membrane surface with a membrane roller for full adhesion.

.7 Install a reinforcing gusset at inside and outside corners.

.8 Seal overlaps at the end of the workday.

.9 Avoid the formation of wrinkles, swellings or fishmouths.

.8 Installation of Reinforced Gussets:

.1 Install reinforcing gussets at all inside and outside corners.

.2 Heat-weld the gussets in place after installing base sheet membrane.

3.4 PROTECTION OF FINISHED WORK

.1 Upon completion of roofing Work advise Owner of recommended procedures for surveillance and protection of roofing during remainder of construction period.

.2 When roofing operations are complete make a final inspection of roofing and prepare a written report describing nature and extent of and defections found in the Work.

.3 Repair or replace defective Work found at time of final inspection. Repair damages to roofing, which occurred subsequent to roofing installation and prior to final inspection.

.4 Ensure work is free from damage and deterioration at time of Substantial Performance.

.5 Where other traffic cannot be avoided, provide local traffic paths and immediate work area protection using 1200 x 2400 x 12 mm (48 x 96 x 1/2 inch) plywood sheets. Arrange protection to prevent scuffing damage of granular top sheet and to prevent puncture/damage of membranes.

END OF SECTION

This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

.1 Provide metal flashings, eave soffits, canopy soffits, eyebrows, sheet metal work, trim, and associated accessories.

.2 Provide sheet metal sill, and lintel flashings with accessories as indicated and specified.

.3 Provide membrane flashings as indicated and specified.

.4 Provide gutters and rainwater leaders and accessories for a complete system as indicated and specified.

.5 Provide pre-manufactured reglets and counter flashing.

.6 Provide sheet metal backing where indicated as support for millwork or electrical panels and similar items.

.7 Provide membrane and metal flashings at door, window, and other wall openings. Ensure metal flashing protects waterproof membrane and sheds water.

.8 Materials not identified in these standards must be identified and approved by the Owner and be approved by the Authorities Having Jurisdiction.

.9 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

1.2 REFERENCES

.1 ASTM A167-99(2009) Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A653/A653M-15e1 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 ASTM B32-08(2014) Standard Specification for Solder Metal.

.4 ASTM B209-14 Specification for Aluminum and Aluminum Alloy Sheet and Plate.

.5 British Columbia Building Code, 2012 Edition (BCBC).

.6 SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) Architectural Sheet Metal Manual.

.7 Roofing Contractors Association of BC, Roofing Practices Manual, current edition.

PART 2 - GENERAL

2.1 SHEET METAL PRODUCTS

.1 Galvanized Sheet:

.1 Prefinished zinc coated steel flashings to be 0.61 mm (24 gauge) except sill flashing 22 gauge and aluminum flashing 0.91 mm (20 gauge) base metal thickness as noted on drawings.

.2 All prefinished zinc coated steel sheet to conform to ASTM A653, Grade A, Structural Quality, Z275 (G.90).

.2 Aluminum Sheet: ASTM B209/B209M, 0.51 mm (0.020 in.) nominal thick alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

.1 Exposed Coil-Coated Finishes:

.1 Three-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both colour coat and clear topcoat.

.2 Colour: As selected by Consultant from manufacturer's full range.

.3 Rain Water Leaders: 20 gauge prefinished aluminum,100 mm, square. Colour: As selected by Consultant from manufacturer's full range.

.3 Underlayment: Where steel is to be installed directly on cementitious or wood substrates, install a course of paper slip sheet and a course of polyethylene underlayment.

2.2 FABRICATION

.1 Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA Standards Manual and RCABC Manual.

.2 Fabricate for waterproof and weather-resistant performance; with expansion provision for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates.

.3 Shop form, lap and weld corners and angle into one piece 450 mm (18 inches) minimum each way from corner or angle.

.4 Form exposed sheet metal work without oil canning, buckling and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.

.5 Concealed Surfaces: Back-paint using alkali-resistant bituminous coating.

.6 Sill Flashing:

.1 Hem drip legs of copings and flashings at 45° and secure drips with nailed or screwed concealed continuous edge strips of same gauge and material. Use concealed fastenings wherever possible.

.2 Make "S-lock" type seams or "Standing" type seams as per RCABC Roofing Practices Manual joints with opening away from prevailing winds. Install with joints, and seams that are permanently weatherproof.

.3 Provide roof penetration flashings of galvanized steel. Construct over curbs projecting above roof surface. Ensure edges lap roofing at least 100 mm (4 inches). Form hemmed drip on bottom edge. Turn up inside top edge to prevent run in over top.

.4 Construct corners mitred and soldered. Fasten down with lead headed or washered screws. Refer to RCABC, Roofing Practices Manual for additional information on curb flashings.

.5 Fabricate doors and window sill flashings with ‘dog ear’ end damns, folded, not cut.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Comply with manufacturer's installation instructions and recommendations, SMACNA Standard Manual and RCABC Manual.

.2 Make allowances for expansion and contraction for material being used.

.3 Ensure waterproof membranes and membrane flashings are installed properly prior to installation of metal flashing.

END OF SECTION

This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 84 00
FIRESTOPPING AND SMOKE SEALS

PART 1 - GENERAL

1.1 SUMMARY

.1 Provide fireproof firestopping, fire safing, and smoke seal materials and accessories as indicated and specified.

.2 Firestopping, fire safing, and smoke seals shall be installed by a single installer certified by the firestopping manufacturer for installation of their products. Certification shall have been received within the last 12 months. Firestopping Installer shall provide Letters of Assurance to Consultant prior to installation and at completion of installation.

.3 Obtain and pay for the services of Supporting Registered Professional in the area of Fire Protection Engineering. The scope of services for this shall include but not be limited to the following:

.1 Submit a Model Schedule S-B: ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW by Supporting Registered Professional (SRP). See AIBC/APEGBC Practice Note 16.

.2 Provide engineering and selection of firestopping materials and installation methods to meet the requirements of Contract Documents.

.3 Working closely with the project stakeholders and specifically but not exclusively with the Consultant, sub consultants, firestopping manufacturer, firestopping installer, contractor.

.4 Organize and attend Pre-installation Conference.

.5 Produce and/or assemble all required documentation/submittals.

.6 Provide site reviews and reports to ensure proper installation of firestops.

.7 Provide final site review and report

.4 Provide firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire resistance rated construction by maintaining an effective barrier against the spread of flame, smoke and/or hot gases through penetrations, fire resistive joints, and perimeter openings in accordance with the requirements of Building Code.

.5 Provide tested firestop systems at the following locations:

.1 Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical bus-ways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

.2 Safing slot gaps between edge of floor slabs and curtain walls.

.3 Openings between structurally separate sections of wall or floors.

.4 Gaps between the top of walls and ceilings or roof assemblies.

.5 Expansion joints in walls and floors.

.6 Openings and penetrations in fire-rated partitions or walls containing fire doors.

.7 Openings around structural members which penetrate floors or walls.

.6 Materials not identified in these standards must be identified and approved by the Owner and be approved by the Authority Having Jurisdiction.

.7 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

1.2 REFERENCES

.1 Comply with current edition of referenced standards unless authority having jurisdiction recognizes earlier version.

.2 British Columbia Building Code, 2012 Edition (BCBC).

.3 Canadian Electrical Code, latest edition.

.4 Fire Resistance Ratings Directory, Underwriters Laboratories of Canada (ULC).

.5 FM (Factory Mutual), FM 4991, Approval of Firestop Contractors.

.6 FCIA (Firestop Contractors International Association) - Manual of Practice.

.7 NFPA (Fire) 251, Standard Methods of Tests of Fire Endurance of Building Construction and Materials, 2006 edition.

.8 ULC (Underwriters Laboratories of Canada) - List of Equipment and Materials for:

.1 Building Materials.

.2 Fire Resistance.

.3 Firestop Systems and Components.

.9 ULC 101 Standard Methods of Fire Endurance Tests of Building Construction and Materials (CAN/ULC S101-14).

.10 ULC 102 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies (CAN/ULC S102).

.11 ULC 702 Standard for Thermal Insulation Mineral Fibre for Buildings (CAN/ULC S702-14).

.12 ULC 115 Standard Method of Fire Tests of Firestop Systems (CAN/ULC S115-11).

.13 WHI (Intertek/Warnock Hershey).

1.3 DEFINITIONS

.1 Firestopping (Fire safing): A sealing or stuffing material or assembly placed in spaces between building materials to arrest the movement of smoke, heat, gases, or fire through wall or floor openings.

1.4 SYSTEM DESCRIPTION

.1 Firestop system installation to meet requirements of CAN4-S115-M, ULC S-115-M or UL 2079 tested assemblies that provide a fire rating as indicated in this Section.

.2 Proposed firestop materials and methods shall conform to requirements of authority having jurisdiction.

.3 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, submit manufacturer's engineering judgment recommendation derived from similar ULC or cUL system designs or other tests 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 (September 7, 1994, as may be amended from time to time).

1.5 SUBMITTALS

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

.2 Product Data:

.1 Provide 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. Include installation diagrams where appropriate.

.2 Installation Data: Manufacturer's special preparation and installation requirements.

.3 Provide Material Safety Data Sheets: Provided with product delivered to job-site for each type of material used.

.3 Shop Drawings / Schedule: Provide schedule including:

.1 Application type.

.2 Products to be used.

.3 Identification of sequencing and coordination issues.

.4 Submit binder of typical detail drawings showing each of the fire stopping details required for penetrations to rated partitions, including sleeved and unsleeved details. Provide details of the following penetrations.

.1 Penetration to one hour rated horizontal separation.

.2 Penetration to two hour rated horizontal separation.

.3 Penetration to one hour rated vertical separation.

.4 Penetration to two hour rated vertical separation.

.4 Samples:

.1 Prior to start of application provide a sample of the label intended for installation at penetrations. Sample shall be laminated and include the following information:

.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 inspecting agency. Date of Installation. Through-Penetration firestop system manufacturer's name.

.4 Installer's Name.

.5 System Design Listings: Submit system design listings, including illustrations from a qualified testing and inspection agency that is applicable for each firestop configuration.

.6 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

.7 Installer Qualifications: Submit qualifications of firm and Installers demonstrating their capabilities and experience.

.8 Letters of Assurance: Provide Letters of Assurance for firestopping in accordance with requirements of Authority having jurisdiction, BC Building Code Schedules S-B and S-C.

1.6 QUALITY ASSURANCE

.1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience and FAIC Manufacturer Member in good standing.

.2 Installer Qualifications: Installer’s Qualifications: Experienced Installer certified, licensed, or otherwise qualified by firestopping manufacturer as having the necessary experience, staff, and training to install manufacture’s products per specified requirements.

.3 Installer shall be:

.1 Licensed by the province or local authority where applicable.

.2 Successfully completed not less than five (5) comparable scale projects.

.3 A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

.4 Single Source Responsibility: Obtain firestop systems for each type of penetration and construction situation from a single primary firestop systems manufacturer.

.5 Pre installation Conference: Convene one (1) week before starting work of this section.

.6 Mock-up:

.1 Provide mock-up of applied firestopping assemblies in size and location as directed by Consultant.

.2 Apply firestop material to a representative penetrated masonry, concrete, stud wall, and substrate surface.

.3 Obtain Consultant's acceptance of mock-up before start of Work.

.4 Retain and maintain accepted mock-ups during construction in undisturbed condition as a standard for judging completed work.

.5 Mock-up may remain as part of the finished Work upon approval by Consultant.

.7 Ensure a manufacturer's direct representative (not distributor or agent) is 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

1.7 COORDINATION

.1 Coordinate work of this section with work of other Sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

.1 Coordinate location and proper selection of cast-in-place firestop devices. Ensure device is installed before placement of concrete.

.2 Provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interference.

.3 Coordinate construction of openings and penetrating items to ensure that firestopping assemblies are installed according to specified requirements.

.4 Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.

1.8 DELIVERY, STORAGE AND PROTECTION

.1 Transport, handle, store, and protect products.

.2 Deliver firestopping products in original, unopened containers with labels intact and legible, identifying product and manufacturer.

.3 Store and handle firestopping materials to manufacturer's instructions.

1.9 PROJECT CONDITIONS/SITE CONDITIONS

.1 Apply materials when temperature of substrate material and ambient air is within range recommended by firestopping manufacturer.

.2 Maintain this minimum temperature before, during, and for three (3) days after installation of materials.

.3 Provide ventilation to manufacturer's instructions in areas to receive solvent cured materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

.1 Subject to compliance with specifications, through penetration firestop systems and joint systems shall be listed in the U.L.C Fire Resistance Directory – Volume III or UL Products Certified for Canada (cUL) Directory, and this Specification. Systems of the following manufacturers are acceptable:

.1 Hilti.

.2 Or approved alternative.

2.2 FIRESTOPPING – GENERAL

.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.

2.3 MATERIALS

.1 Obtain firestopping products from one manufacturer.

.2 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.

.3 Pre-Installed firestop devices for use with non-combustible and combustible pipes (closed and open systems), conduit and/or cable bundles penetrating concrete floors and/or gypsum walls; the following products are acceptable:

.4 Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

.5 Sealants or caulking materials for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

.6 At penetrations through Fire Rated Assemblies: Provide 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.

.7 Joints: Provide firestop system with an Assembly Rating as determined by CAN4-S115-M, ULC-S115-M or UL 2079 which is equal to the fire resistance rating of the construction being penetrated.

.8 Rock Wool Insulation / Mineral Wool: Conforming to CAN/CGSB 51.10 Type 2, Class 4 and CAN/ULC S102.

.1 Semi-Rigid Board: RXL 40 by Roxul or approved alternative.

.2 Masonry Locations: Cavity Rock by Roxul or approved alternative.

.3 Steel Stud Locations: Roxul Plus by Roxul or approved alternative.

2.4 FIRESTOP SEALANT

.1 Subject to compliance with the specifications the following sealants are acceptable.

.1 FS One by Hilti.

.2 Or approved alternative.

PART 3 - EXECUTION – NOT USED

END OF SECTION

This document contains standards that are the minimum requirements for BCIT construction projects. The information in the document is organized using the MasterFormat® and SectionFormat® systems. It is not a specification; it is intended to supplement the Consultant's own documents. Do not use this information as a standalone specification.

SECTION 07 92 00
JOINT SEALING

PART 1 - GENERAL

1.1 SUMMARY

.1 Sustainability Goals - Mandatory Compliance: comply with allowable VOC levels for all adhesives, sealants, paints and other coatings as outlined in Division 1.

PART 2 - PRODUCTS

.1 Acceptable Sealants:

	Description	Acceptable Products	Typical Applications
Type 1	Urethane (two part, non-sag)	1) Tremco Dymeric 240 2) Sikaflex 2C NS	1) Exterior sealant joints with joint widths greater than ¾ but less than 2". 2) Custom color applications. 3) Precast panels exterior and interior seals.
Type 2	Urethane (one part, non-sag)	1) Tremco Dymonic FC 2) Sikaflex 1A	1) Exterior sealant joints with joint widths less than ¾". 2) Interior sealant joints.
Type 3	Silicone (one part, non-sag)	1) Dow Corning Contractors Weatherproofing Sealant 2) Dow Corning 795 Silicone Building Sealant 3) Tremco Spectrem 2 4) GE Silpruf 5) Tremco Tremsil 600	1) Exterior sealant joints with joint widths up to 2". 2) Do not use where caulking is to be painted unless it is to be painted with silicone based paints. For exterior weather seals.
Type 4	Thermoplastic synthetic rubber (one part)	1) Guertin GS1010 2) Tremco 830 3) ISO Pro series Quand	1) Sealant around interior perimeter of windows, doors and other wall penetrations.
Type 5	Flexible synthetic rubber (1 part, nonskinning/ nonhardening)	1) Tremco Acoustical Sealant	1) Sealant for sealing the interior polyethylene air/vapour barrier. 2) Acoustic Assemblies.
Type 6	Silicone, single component (neutral cure for high temperature application)	1) Tremco TREMstop (Fyre-Sil)	1) Sealant joints at locations where high temperature sealant application is required (i.e. fire stopping.)
Type 7	Thermoplastic synthetic rubber (one part)	1) OSI Pro series Quad	1) Sealant used to join laps in Tyvek sheathing membrane to achieve air tightness continuity
Type 8	Mildew resistant silicone	1) Dow Corning 786 2) Tremco Tremsil 200	1) At perimeter of toilets and showers.
Type 9	Acrylic latex one part	1) Tremco 834	1) Exposed interior conditions between trim and penetrations frames.

PART 3 - EXECUTION – NOT USED

END OF SECTION