

Part 1 General

1.1 SUMMARY

- .1 A lower surface composite rigid polystyrene foam insulation and concrete upper topping to form a roof surface, with related flashings and accessory components:
 - .1 [Exposed Grey concrete surface that is exposed to the elements.]
 - .2 [White concrete roof surface for solar heat reflection.]

1.2 RELATED REQUIREMENTS

- .1 Section 05 12 00: Structural [steel] [concrete] [] building frame.
- .2 Section [] – Structural Support Framing: Roof structure and its framing assembly.
- .3 Section 07 26 00 - Vapour Retarders.
- .4 Section 07 27 00 - Air Barriers.
- .5 Section 07 51 53 – Single Ply Roofing – Protected Membrane
- .6 Section [] - Roofing Assembly: Multiple Ply Steep Asphalt
- .7 Section 07 62 00 - Sheet Metal Flashing And Trim.
- .8 Section [] – [Agricultural] [] Roof Cover.]

1.3 REFERENCES

- .1 American Society for Testing and Materials International(ASTM)
 - .1 ASTM A123/A123M-15, Zinc (Hot Dip Galvanized) Coatings on Iron or Steel Products.
 - .2 ASTM C203-05a(2012),Standard Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.
 - .3 ASTM C518-15, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - .4 ASTM C1549-16, Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
 - .5 ASTM D696-16, Standard Test Method for Determining Coefficient of Linear Thermal Expansion of Plastics between -30C and +30C.
 - .6 ASTM D1621-16, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
 - .7 ASTM D2126-15, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 - .8 ASTM D2842-12, Standard Test Method for Water Absorption of Rigid Cellular Plastics.
 - .9 ASTM E96-16, Standard Test Methods for Water Vapor Transmission of Materials.
 - .10 ASTM E1980-11, Standard Test Method for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

- .2 Canada Green Building Council (CaGBC)
 - .1 LEED® Canada For New Construction and Major Renovations v4 LEED® Canada for Core and Shell Development v4.
- .3 Canadian Standards Association
 - .1 CSA S478-95 (R2007) – Guideline on Durability in Buildings.
- .4 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Manuals – current edition.
- .5 Canadian Construction Materials Centre (CCMC) Evaluation Listing, published by the Institute for Research in Construction (IRC) of the National Research Center Canada (NRC/CNRC):
 - .1 Evaluation Listing CCMC 04888-L for STYROFOAM™ Tech-Crete Blanks
- .6 Cool Roof Rating Council
 - .1 Cool Roof Rating Council Rated Products Directory , Product ID 1160-0001.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Visit www.tech-crete.com for a current copy of the Material Safety Data Sheet (MSDS)
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S107-10, Method of Fire Testing of Roof Coverings.
 - .3 CAN/ULC-S126-06, Standard Method of Test for Fire Spread Under Roof Deck Assemblies.
 - .4 CAN/ULC-S701-11, Standard for Thermal Insulations, Polystyrene, Boards and Pipe Covering.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Refer to Section 01 31 00 - Project Managing and Coordination Procedures.
- .2 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the Work for installation of adjacent vapour retarder and air barrier seals.
 - .3 Coordinate the Work with installation of other components, materials and attachments.
- .3 Pre-Installation Meeting:
 - .1 Arrange a pre-construction meeting in accordance with Section 01 31 19 – Project Meetings.
 - .2 Include roofing manufacturers representative, roofing contractor's representative, roofing inspector, the Contractor, Consultant, and Owner.

1.5 SUBMITTALS

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

- .2 Action Submittals: Submit when requested by Consultant:
 - .1 Shop Drawings: Indicate dimensions, layout, panel joints staggered, construction details, and methods of securement. Prepare this submittal as consistent with panel manufacturers written instructions.
- .3 Information Submittals: Submit when requested by Consultant:
 - .1 Installation Data: Manufacturer's special installation requirements.
 - .2 Submit proof of Manufacturer's CCMC Evaluation Listing and Listing number
- .4 Sustainable Design Submittals:
 - .1 Minimal Packaging: Materials and manufacturing within a 800 km (500 mile) radius by truck or 2400 km (1500 mile) radius by rail of the project site. (Confirm locations with manufacturer.)
 - .2 Manufacturing process includes a comprehensive recycling program.
 - .3 For potential contribution of Tech-Crete Insulated Roof Panels towards the LEED® certification of the building project, review the sustainability information at www.tech-crete.com . For additional information, call Tech-Crete Processors Ltd at 250-832-9705.
- .5 Closeout Submittals:
 - .1 Maintenance Data: Submit manufacturer's maintenance procedures, including precautions and warnings to prevent damage to panels.

1.6 QUALITY ASSURANCE

- .1 Installer Qualifications: Company specializing in performing the work of this section with training and experience.
- .2 Product Identification: Each pallet of insulated roof panels shall be labelled with product name; manufacturers name or trademark; insulation conforming to ULC S701 Type 4; number of panels per pallet; insulation thickness, and thermal resistance per unit of thickness.
- .3 Insulation must conform to CCMC – Evaluation Listing #04888-L, for NBC compliance.
- 4 Mock-Up:
 - .1 Provide mock-up, which includes assembled components, insulated roofing panels to achieve [five(5)] [] panels wide and [three (3)] [] panels long, associated attachment materials, water drainage network, sealants and seals, and related adjacent construction.
 - .2 Locate [where directed by Consultant.] []
 - .3 Reviewed and accepted mock-up may [not] remain as part of the Work.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Transport, handle, store, and protect delivered products in accordance with manufacturer's instructions.
- .2 Protect panels from weather until installed.

18 WARRANTY

- .1 Provide manufacturers five (5) year limited warranty to include panel replacement for delamination of concrete topping.

Part 2 Products

21 MANUFACTURERS

- .1 Tech-Crete Processors Ltd., [CTI®Roof Panel] [SRI®Roof Panel], in modular sections, website: www.tech-crete.com, Telephone: 250-832-9705.
- .2 Substitutions: Not permitted.

22 DESCRIPTION

- .1 Assembly and installation of insulated roof panels includes careful placement of panels over pre-installed waterproof membrane roofing.
- .2 Comply with requirements for continuity of building air barriers, vapour retarders plus wind and suction loads as identified in the National Building Code and applicable local requirements.

23 PERFORMANCE CRITERIA

- .1 Roof Deck Assembly Components: Design and size components to withstand flexing and physical distortion due to dead and live loads caused by positive and negative wind pressure acting normal to plane of roof membrane and roof cladding surfaces.
- .2 Maximum Allowable Deflection of base roofing Assembly: Determined by roof structure and imposed roof and weather loads.
- .3 Movement: Accommodate thermal and wind/uplift loads within assembly without damage to components or deterioration of seals, movement within assembly and between components, when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.
- .4 Drainage: Provide positive drainage to water collectors within roof deck assembly.
- .5 Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with other thermal insulating materials.
- .6 Vapour Retarder: Provide continuity of vapour retarder at building enclosure elements in conjunction with vapour retarders specified in Section 07 26 00.
- .7 Air Seal: Provide continuity of air barrier seal at building enclosure elements in conjunction with air seal materials specified in Section 07 27 00.

24 INSULATED ROOF PANEL COMPONENTS

- .1 Panel sizes:
 - .1 Width: [610]mm ([24] inches).
 - .2 Length: [1220]mm ([48] inches).
 - .3 Thickness: [51] [76] [102] mm ([2] [3] [4] inches)

2.5 INSULATION

- .1 STYROFOAM™ Tech-Crete Blanks by DOW Chemical, extruded polystyrene, conforming to code requirements, in accordance with CAN/ULC-S701 Type 4. In multiple layer applications, CAN/ULC-S701 Type 4 insulation must also be used for the lower layer.
- .2 Thermal resistance: RSI 0.87/25 mm to ASTM C518.
- .3 Foam Compressive Strength: 240 kPa (35 PSI) in accordance with ASTM D1621.
- .4 Water Absorption: ASTM D2842: <0.7 % by volume
- .5 Water Vapour Permeance: 0.8 perms in accordance with ASTM E96
- .6 Insulation Thickness: [51] [76] [102] mm ([2] [3] [4] inches).

2.6 CONCRETE TOPPED AND SOLAR REFLECTIVE INSULATED ROOF PANELS

- .1 Edge Treatment: Tongue and groove along longitudinal foam edges, butt joint along lateral foam edges.
- .2 Concrete: Latex modified concrete mix, 9 mm (3/8") thick.
- .3 Surface Finish: Smooth
- .4 Colour: [Grey colour – CTI® Roof Panels.] [White for solar reflective-SRI® Roof Panels.]
- .5 Fasteners: Standard type to suit application; hot dip galvanized or stainless steel.
- .6 Field Repair and Touch-up: As recommended by panel manufacturer.

2.7 PANEL SECUREMENT

- .1 Galvanized Steel, minimum 22 gauge: ASTM A123/A123M, Zinc-Coated (Galvanized), Z275 (G90) Designation or Stainless Steel, or Galvalume.
- .2 Concrete Pavers 610 x 610 mm (2'x2') min 25 lb/ft²
- .3 Fasteners must be corrosion resistant

Part 3 Execution

3.1 EXAMINATION

- .1 Verify existing conditions and substrates before starting work.
- .2 Verify that roof deck assembly is sloped to drain ready to receive insulated roof panels
- .3 Remove substrate surface irregularities before installing panels. Sweep and clear debris clear of roofing surfaces to receive panels.
- .4 Ensure roof membrane is complete and inspected prior to panel installation. (Consider electronically testing membrane integrity prior to panel installation)

3.2 INSTALLATION

- .1 Install roof panel assembly to manufacturer's written instructions. Install panels tight, with butt joint lines and control joint lines, staggered from adjacent panel.
- .2 Install panels with staggered joints in alignment.
- .3 In multiple layer applications the lower layer of insulation must be equal to or thicker than the insulation on the Tech-Crete insulated roof panel used. Ensure insulation joints are offset in multiple layer applications.
- .4 SRI Roof panels require additional care during installation to ensure the surface remains clean. Limit and cover traffic areas to preserve the white surface.
- .5 Maintain neat panel appearance.

3.3 CLEANING

- .1 Carefully remove and collect site cuttings, foam bits and shipping packaging for recycling.

END OF SECTION