This section includes thermal insulation clad roof panelling, comprising composite panels of 51 mm (2”),76 mm (3”) or 102 mm (4”) thick extruded foam insulation (under side) and special formulated 9 mm (3/8”) thick latex modified concrete faced construction (top exposed). The panels are modular constructed 610 x 1220 mm (2 x 4 feet), site placed on top of a waterproof roof membrane surface, thereby creating a “protected membrane assembly”.. The waterproof membrane is specified in a separate specification section by a specifier. Cross reference is appropriate to that roofing membrane assembly, by selecting the appropriate specification section identified in the “Related Sections” article below. This section requires harmonization with all requirements associated with Division 01 sections as Division 01 sections cite work quality, administrative, procedural and temporary requirements associated with Work on the Project including this section. Harmonize all requirements accordingly. Local requirements for continuity of air barriers, vapour retarders plus wind and suction loads are identified in the National Building Code and apply to the work of this section.

Insulated roof panels are manufactured in a flat faced profile with an interlocking tongue and groove along the longitudinal 1220 mm (4 foot) edge, and a butt joint along the lateral 610 mm (2 foot) edge, to be snug fit to adjacent panels. These panels are used to provide a thermal barrier for the building envelope and to perform a physical protection to the underlying roofing membrane. The combined roofing assembly of materials and securement requirements must be capable of being functionally applicable to wind loads and wind uplift conditions as cited in the building code applicable at ”the place of building”.

This section can be edited to address one of three (3) roof assembly types:

an insulated exposed Grey concrete surface that is exposed to the elements,or

an insulated concrete roof surface with a green roof garden placed over it; or

an insulated White concrete roof surface with Solar reflective heat dissipating properties. Refer to manufacturer’s Product Data and MSDS sheets for product information and limitations. This proform sample section includes proprietary (trade name) specifications. Edit text with required product features and options to avoid conflicting requirements from intended results. Coordinate this edited section with structural substrate construction to ensure compatibility.

# General

## SECTION INCLUDES

In this article, select one of the following insulated metal clad component assemblies that are intended to be part of the content of this section and will not be included in other sections.

### A lower surface composite rigid polystyrene foam insulation and concrete upper topping to form a roof surface, with related flashings and accessory components:

#### [Exposed Grey concrete surface that is exposed to the elements.]

#### [White concrete roof surface for solar heat reflection.]

## RELATED SECTIONS

In this article, indicate those sections that inter-rely on this section. This listing should include those sections that describe subjects or products that support and affect this section directly.

### Section 05 12 00: Structural [steel] [concrete] [ ] building frame.

### Section [ ] – Structural Support Framing: Roof structure and its framing assembly.

### Section 07 26 00 - Vapour Retarders.

### Section 07 27 00 - Air Barriers.

The following referenced sections provide for the roof waterproofing membrane and related components that contribute to a functional roofing assembly, which with this specification section will include insulated roof panels above the waterproofing membrane. The base roofing membrane under the insulated roof panels may be comprised of a variety of built-up membranes, In the paragraphs below, identify that membrane as new or existing – and its composition. The base roof deck surface may be of fluted steel, wood plank,plywood,gypsum panels, various types of concrete or plank deck.

### Section 07 51 53 – Single Ply Roofing – Protected Membrane

### Section [ ] - Roofing Assembly: Multiple Ply Steep Asphalt

### Section 07 62 00 - Sheet Metal Flashing And Trim.

### Section [ ] – [Agricultural] [ ] Roof Cover.]

## REFERENCES

1. List reference standards below, that are included within the text of this section, when edited for a project specification - delete other references that do not apply.

### Underwriters’ Laboratories of Canada (ULC)

### CAN/ULC-S701, Standard for Thermal Insulations, Polystyrene, Boards and Pipe Covering.

### CAN/ULC-S107, Method of Fire Testing of Roof Coverings.

### CAN/ULC-S126, Standard Method of Test for Fire Spread Under Roof Deck Assemblies.

### CAN/ULC-S102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

### American Society for Testing and Materials International(ASTM)

#### ASTM A123/A123M, Zinc (Hot Dip Galvanized) Coatings on Iron or Steel Products.

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

#### ASTM D1621, Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

#### ASTM D2842, Standard Test Method for Water Absorption of Rigid Cellular Plastics.

#### ASTM E96, Standard Test Methods for Water Vapor Transmission of Materials.

#### ASTM D696, Standard Test Method for Determining Coefficient of Linear Thermal Expansion of Plastics between -30C and +30C.

#### ASTM C203,Standard Test Method for Breaking Load and Flexural Properties of Block-Type Thermal Insulation.

#### ASTM D2126, Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.

#### ASTM C1549, Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.

#### ASTM E1980, Standard Test Method for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

### Canada Green Building Council (CaGBC)

#### LEED® Canada For New Construction and Major Renovations 2009 and LEED® Canada for Core and Shell Development 2009 Rating System.

### Canadian Standards Association

#### CSA S478-95 (R2007) – Guideline on Durability in Buildings.

### Cool Roof Rating Council

#### Cool Roof Rating Council Rated Products Directory , Product ID 1160-0001.

### Canadian Roofing Contractors Association (CRCA)

#### CRCA Roofing Manuals - 1997.

### Health Canada/Workplace Hazardous Materials Information System (WHMIS)

#### Visit [www.tech-crete.com](http://www.tech-crete.com) for a current copy of the Material Safety Data Sheet (MSDS)

### Canadian Construction Materials Centre (CCMC) Evaluation Listing, published by the Institute for Research in Construction (IRC) of the National Research Center Canada (NRC/CNRC):

####  Evaluation Listing CCMC 04888-L for STYROFOAM™ Tech-Crete Blanks

## SYSTEM DESCRIPTION

Edit and use this article carefully; restrict statements to describe the combined result of the components used to assemble an operating or functional assembly. Confirm ability of pre-installed roof membrane to support insulated roof panels without damage to membrane integrity.

### Assembly and installation of insulated roof panels includes careful placement of panels over pre-installed waterproof membrane roofing.

Wind uplift is determined by many factors including, but not limited to roof deck construction, factors within the roof membrane application and materials used, roof perimeter and parapet design, geographic location of building, affects by surrounding buildings, etc.

### 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.

## PERFORMANCE REQUIREMENTS

Edit this article carefully; restrict statements to identify assembly or system performance requirements or function criteria only. Delete paragraphs not appropriate to the project. Performance specifying permits system manufacturers the latitude to adjust or redesign proprietary systems to achieve requirements specified in this section.

### 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.

### Maximum Allowable Deflection of base roofing Assembly: Determined by roof structure and imposed roof and weather loads.

### 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.

### Drainage: Provide positive drainage to water collectors within roof deck assembly.

### Products: Provide continuity of thermal barrier at building enclosure elements in conjunction with other thermal insulating materials.

### Vapour Retarder: Provide continuity of vapour retarder at building enclosure elements in conjunction with vapour retarders specified in Section 07 26 00.

### Air Seal: Provide continuity of air barrier seal at building enclosure elements in conjunction with air seal materials specified in Section 07 27 00.

## ADMINISTRATIVE REQUIREMENTS

### Section 01 31 00: Project managing and coordination procedures.

### Coordination:

#### Coordinate with other work having a direct bearing on work of this section.

#### Coordinate the Work for installation of adjacent vapour retarder and air barrier seals.

#### Coordinate the Work with installation of other components, materials and attachments.

## SUBMITTALS FOR REVIEW

Consider not requesting submittals if this specification section or drawings sufficiently describe the products of this section. This requested review of submittals increases the possibility of unintended variations to the contract documents, thus increasing a consultant's liability. The following submittals are intended for review to determine eligibility for the project.

### Section 01 33 00: Submission procedures.

### Shop Drawings: Indicate dimensions, layout, panel joints staggered, construction details, and methods of securement. Prepare this submittal as consistent with panel manufacturers written instructions.

### Installation Data: Manufacturer's special installation requirements.

### Submit proof of Manufacturer’s CCMC Evaluation Listing and Listing number

The products in this section offer LEED credits applicable to several aspects, see below

## SUSTAINABILITY

### 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.)

### Manufacturing process includes a comprehensive recycling program.

### 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](http://www.tech-crete.com) . For additional information, call Tech-Crete Processors Ltd at 250-832-9705.

## PRE‑CONSTRUCTION MEETING

### Arrange a pre‑construction meeting in accordance with Section 01 31 19 – Project Meetings.

### Include roofing manufacturers representative, roofing contractor's representative, roofing inspector, the Contractor, Consultant, and Owner.

## QUALITY ASSURANCE

This article includes statements that require quality applicable to the whole section.

### Installer Qualifications: Company specializing in performing the work of this section with training and experience.

### 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.

### Insulation must conform to CCMC – Evaluation Listing #04888-L, for NBC compliance.

## MOCK-UP

Use this article for assessing full sized erected assemblies for review of installation techniques, coordination of related work, testing, or observation of operation. A mock-up may also be used for assessing field applied finishes.

### Section 01 45 00: Requirements for mock-up.

### 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.

### Locate [where directed by Consultant.] [ .]

### Approved mock-up may [not] remain as part of the Work.

## DELIVERY, STORAGE, AND PROTECTION

### Section 01 61 00: Transport, handle, store, and protect delivered products in accordance with manufacturer’s instructions.

### Protect panels from weather until installed.

## WARRANTY

This article extends the warranty period beyond the one (1) year contract warranty period. Extended warranties add to construction cost and may present difficulties to the Owner by enforcing them. Specify with caution. The third paragraph below may be modified to suit actual roofing assembly specified.

### Section 01 78 00: Closeout Procedures, warranties.

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

# Products

## MANUFACTURERS

This article is for proprietary specifying with one manufacturer. Select the Roof Panel assembly that is required for this project. Refer to Tech-Crete Product Description and associated MSDS Sheet.

### Tech-Crete Processors Ltd., [CTI®Roof Panel] [SRI®Roof Panel], in modular sections, website: www.tech-crete.com, Telephone: 250-832-9705.

### Substitutions: Not permitted.

## PANEL SECUREMENT

### Galvanized Steel, minimum 22 gauge: ASTM A123/A123M-08, Zinc-Coated (Galvanized), Z275 (G90) Designation or Stainless Steel, or Galvalume.

### Concrete Pavers 610 x 610 mm (2’x2’) min 25 lb/ft2

### Fasteners must be corrosion resistant

## INSULATION

When selecting the panel insulation thickness and R Value, also consider the thickness and R Value of any insulation within the roofing construction (the whole assembly). Also calculate and consider the dew point position in the complete roof assembly. Ensure the dew point is above the membrane.

### 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.

### Thermal resistance: RSI 0.87/25 mm to ASTM C518.

### Foam Compressive Strength: 240 kPa (35 PSI) in accordance with ASTM D1621.

### Water Absorption: ASTM D2842: <0.7 % by volume

### Water Vapour Permeance: 0.8 perms in accordance with ASTM E96

### Insulation Thickness: [51] [76] [102] mm ([2] [3] [4] inches).

## CONCRETE TOPPED AND SOLAR REFLECTIVE INSULATED ROOF PANELS

### Edge Treatment: Tongue and groove along longitudinal foam edges, butt joint along lateral foam edges.

### Concrete: Latex modified concrete mix, 9 mm (3/8”) thick.

### Surface Finish: Smooth

### Colour: [Grey colour – CTI® Roof Panels.] [White for solar reflective-SRI® Roof Panels.]

Expand the coating requirements described where fasteners may be exposed to industrial or corrosive environments.

### Fasteners: Standard type to suit application; hot dip galvanized or stainless steel.

### Field Repair and Touch-up: As recommended by panel manufacturer.

## COMPONENTS

Edit the following paragraphs accordingly to project requirements.

### Panel sizes:

#### .Width: [610]mm ([24] inches).

#### Length: [1220]mm ([48] inches).

#### Thickness: [51] [76] [102] mm ([2] [3] [4] inches)

# Execution

## EXAMINATION

### Section 01 70 00: Verify existing conditions and substrates before starting work.

### Verify that roof deck assembly is sloped to drain ready to receive insulated roof panels

### Remove substrate surface irregularities before installing panels. Sweep and clear debris clear of roofing surfaces to receive panels.

### Ensure roof membrane is complete and inspected prior to panel installation. (Consider electronically testing membrane integrity prior to panel installation)

## INSTALLATION

### Install roof panel assembly to manufacturer’s written instructions. Install panels tight, with butt joint lines and control joint lines, staggered from adjacent panel.

### Install panels with staggered joints in alignment.

### 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.

### SRI Roof panels require additional care during installation to ensure the surface remains clean. Limit and cover traffic areas to preserve the white surface.

### Maintain neat panel appearance.

## CLEANING

This article is intended to supplement cleaning requirements specified in Division 01 sections. Edit this article to supplement Division 01 statements.

### Section 01 74 00: Cleaning installed work.

### Carefully remove and collect site cuttings, foam bits and shipping packaging for re- cycling.

### **END OF SECTION**