



INSTALLATION GUIDELINES

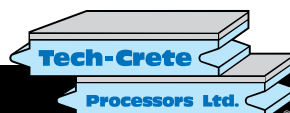
for CTI® and SRI® Insulated Roof Panels



DESCRIPTION:

CTI® and **SRI®** roof panels are pre-finished exterior insulated roof panels intended for use in commercial, industrial and institutional new and retrofit applications. **CTI®** and **SRI®** roof panels consist of STYROFOAM™ brand foam insulation with a factory applied 3/8" (9 mm) thick latex modified concrete topping. Panel size is 2' x 4' (610 mm x 1220 mm) with a tongue and groove

profile along the 4' edge. A 1/8" (3 mm) relief score line is cut into the concrete topping mid way on the 4' edge. Standard foam insulation thicknesses are 2" (50 mm), 3" (75 mm), and 4" (100 mm). **CTI®** and **SRI®** roof panels provide superior insulation and a durable finish in one installation. They can be installed in any weather, with moderately skilled labour.



DESIGN RESPONSIBILITIES:

1. The design authority is responsible for both the design of the roof system, and the selection and specification of the various elements within the system, as they relate to the specific project. It is the responsibility of the design authority to ensure the building structure is designed to support the insulated roof panel system, and all other superimposed loads on the roof.
2. The roof system must be designed to meet applicable building codes, which may require that a thermal barrier be provided between the insulation and the interior of the building. The thermal barrier may consist of the deck, a ceiling assembly or an underlayment board equivalent to ½" (12.7 mm) thick gypsum board with siliconized core and fiberglass facers or equivalent
3. Ensure the dew point location is above the membrane in modified protected membrane assemblies. In general, a minimum of 2/3 of the total thermal resistance should be above the membrane. However, in all cases, it is the responsibility of the design authority to perform the required psychrometric calculations to ensure the dew point is above the membrane.
4. The roof deck must be designed and constructed to minimize water from ponding. The roof deck must be designed and constructed to allow all water to drain within 48 hours. A roof deck slope of 1:30 (3/8" in 12") is recommended. The maximum allowable slope for roof systems incorporating **CTI**® and **SRI**® roof panels is 2:12 (2" in 12").
5. **CTI**® and **SRI**® roof panels are compatible with most membranes. The membrane manufacturer or supplier is responsible for determining that the membrane is compatible with the insulation.
6. Prevent air infiltration under loose laid membranes. Failure to prevent air infiltration to the underside of loose-applied membranes seriously jeopardizes the integrity of the roof. Under certain conditions pressure can build up beneath the membrane which may cause it to expand or billow. It is the responsibility of the designer, contractor and membrane manufacturer to ensure there will be no air infiltration to the underside of loose-applied membranes including infiltration through the deck, all penetrations, parapets and terminations.
7. For multi-layer foam and Tech-Crete® insulated roof panels, ensure that:
 - Underlying layers are extruded polystyrene with a minimum compressive strength of 35 psi (240 kPa).
 - The bottom layer of insulation (the layer directly on the membrane) must be the thickest, or at minimum, equal in thickness to the top layer (e.g. 3" [75 mm] bottom and 3" [75 mm] top).
 - All layers are installed unbonded or unadhered.
 - All joints are staggered or offset from those of the underlying layer.
8. Perimeter securement is required, both to prevent outward movement of the panels, which may allow tongue and groove separation, and to prevent blow-off of panels at local wind design speeds. Perimeter roof edge detail must be higher than the top of the insulated roof panel securement (flashing, strapping or paver securement) in all cases. It is the responsibility of the design authority to ensure that the perimeter securement details are adequate to ensure no panel displacement or blow off at local maximum design wind speeds.
9. **CTI**® and **SRI**® roof panels are not intended as a patio, plaza deck or construction platform.

HANDLING & STORAGE:

CTI[®] and **SRI**[®] roof panels should be stored under cover until installed to minimize water staining and efflorescent discoloration due to condensation moisture. If panels do become wet and freeze, they may stick together. The frozen lift should be allowed to thaw before the panels are removed and care should be taken in separating them.

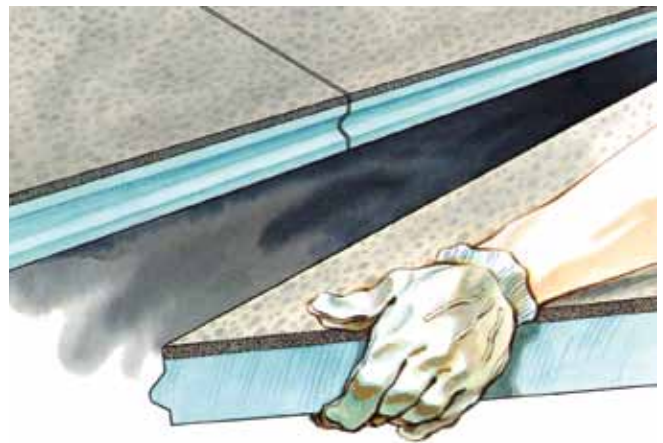
Use reasonable care when unloading and lifting to the roof. Protect corners when crane-sling unloading. Full lifts should be placed so they do not exceed the maximum loading per square foot allowed by the roof structure. Once on the roof, panels should be transported from the lift location to the installation site on a rubber tire cart. (Do not roll cart on installed panels)

Installation should be planned to minimize repeated traffic over installed areas and installation traffic should work away from the installed panels.

Avoid setting lifts of panels or other construction materials on installed sections of panels.

Do not rest panels on their corners at any time during transport or placement. Place panels on the deck by hand. Do not drop panels into position on the deck.

If construction activity is expected on the roof surface after installation of panels, a temporary protective covering of plywood or other resilient material should be considered. This is especially important with the **SRI**[®] roof panels to ensure the surface remains clean. Rinsing or light pressure washing may be required if adequate care is not taken.



PANEL INSTALLATION:

Placement:

Install **CTI**® and **SRI**® roof panels unbonded with staggered joints over the roof membrane. To prevent bonding, the final flood-coat for bituminous B.U.R. membranes must be allowed to cool before applying the insulated roof panels. PVC single ply membranes and coal tar pitch require a slip sheet between the membrane and the insulated roof panels. It is the roofers responsibility to ensure that the **CTI**® and **SRI**® roof panels are not adhered to the membrane.

All panels must be installed tight against the adjacent panels and within ¼" (6 mm) of vertical walls, membrane penetrations or equipment projections.

Use a chalk line to ensure straight lines when placing the first row of panels. Additional rows can be started before the first row is complete. **CTI**® and **SRI**® roof panels must be placed with staggered joints. Start the first row with a whole panel and the second with a half panel. All panels come scored mid way on the 4' edge to assist with installation alignment.

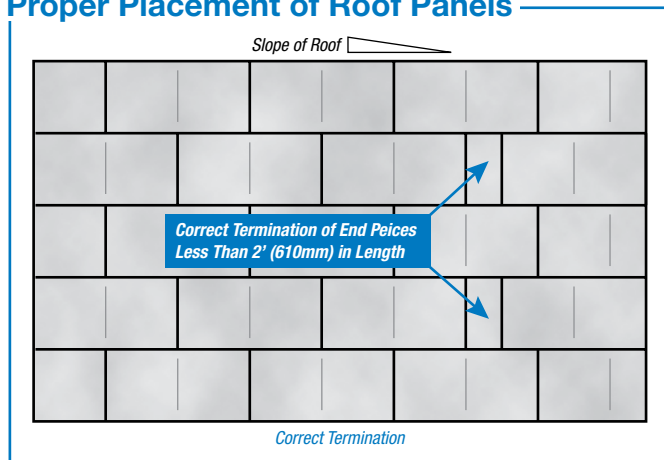
Panels should be laid with the 4' (1220 mm) side aligned in the direction of the roof slope. The

direction in which the roof panels are laid may affect how the panels conform to slope changes or irregularities. Laying panels over slope changes or roof deck anomalies may cause the concrete surface to crack. Scoring the concrete surface to form a control joint is recommended. The cracking of the concrete surface alone will not adversely affect the system or product performance. Broken panels exposing insulation should be repaired or replaced. All exposed insulation shall be coated with exterior latex paint or otherwise protected.

Each row should end with a panel at least 2' (610 mm) in length. To accommodate this requirement, cut the panel second from the end to the required length. Maintain tongue and groove integrity from panel to panel.



Proper Placement of Roof Panels



Cutting:

Panels can be cut or scored with a masonry saw and holes can be drilled with a masonry bit. When abutting vertical walls, membrane penetrations or equipment projections, cut the panels to fit within ¼" (6 mm) of the object. Flashing should be designed to extend at least 4" (100 mm) out over the edge of the **CTI**® and **SRI**® roof panel and must be secured mechanically 3" (75 mm) in from the edge of the panel.

Bridging peaks and valleys:

CTI® and **SRI**® roof panels are able to span minor roof deck anomalies, however, must not bridge roof deck anomalies or imperfections larger than ~1/8" x 1". Larger anomalies or imperfections can be accommodated for by removing an equivalent amount of foam from the underside of the panel. Measure the approximate location of the anomaly or imperfection relative to the edge of the panel to be placed. Using a rasp, wood carving tool or hot knife, remove an equivalent amount of foam from the underside of the panel. Place the panel into position and ensure the panel sits flat and is in full contact with the membrane. This procedure will reduce or eliminate random cracking in the concrete surface caused by uneven roof decks.

In the case of large roof deck depressions, snap a chalk line and cut the panel with a masonry saw to a depth just below the concrete topping. Place the panel into position and ensure the panel lies flat on the roof membrane.



7th Street Plaza, Edmonton, AB

MICRO CRACKING AND REPAIRS:

The latex modified concrete topping on **CTI**® and **SRI**® roof panels is an attractive, tough and durable surface, designed to provide ballast and to protect the insulation and membrane below. However, like any cementitious wearing surface, this topping is subject to micro-cracking. Extensive testing and in-service experience has shown that cracking in the panel surface will not delaminate or compromise the integrity of the system.

Unevenness in the deck surface can create stress points on the panel or result in “bridging”. Under traffic loads, these peaks and valleys may cause random micro-cracking. Excessive or unusual traffic, using the deck as a staging platform during or after construction or improper or careless handling of the panels can all contribute to excessive cracking. Micro-cracking can be minimized by adhering to the storage, handling and installation recommendations.

Repair minor damages to the concrete topping with a quality latex modified pre-mixed exterior patching cement. For **SRI**® roof panels, apply a quality exterior latex masonry white stain to the patch once cured to match the surrounding panels. For best results, inspect panels before installation and set damaged panels aside to use for fills or in areas where special cutting is required.

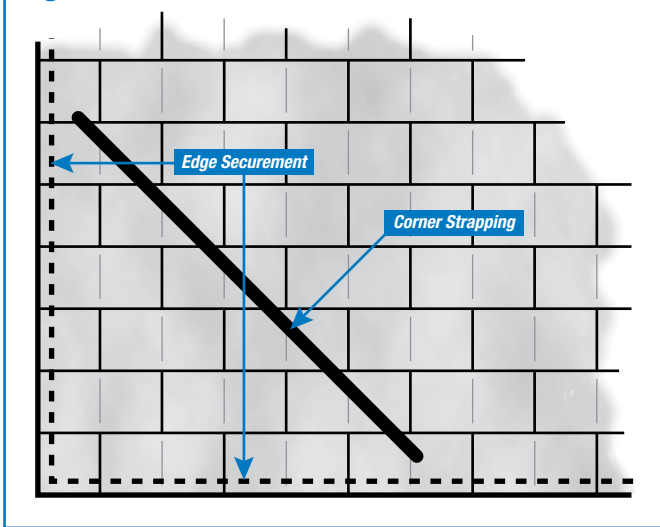
SECUREMENT:

Edge securement is required, both to prevent outward movement of the panels, which may allow separation of the tongue and groove, and to prevent blow-off of insulation panels at local maximum design wind speeds. **CTI®** and **SRI®** roof panels must be secured at all perimeters.

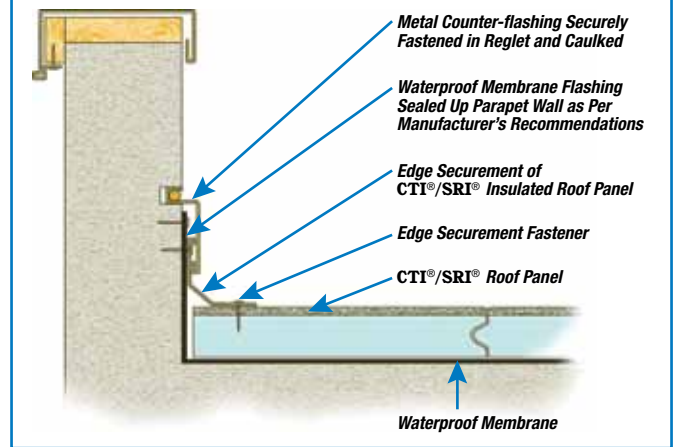
Securement Methods:

There are two methods of edge securement for securing **CTI®** and **SRI®** roof panels. To ensure that there is no displacement or blow-off of insulated panels, most roofs will require only the minimum type of securement shown (edge securement and corner securement). Factors such as building location, building height, occupancy type, area wind speeds, membrane type, roof configuration, parapet height etc., all play a role in determining the type of securement required for any given roof. In all cases, it is the responsibility of the design authority to ensure that the securement details are adequate to ensure no panel displacement or blow-off at local maximum design wind speeds.

Edge & Corner Securement



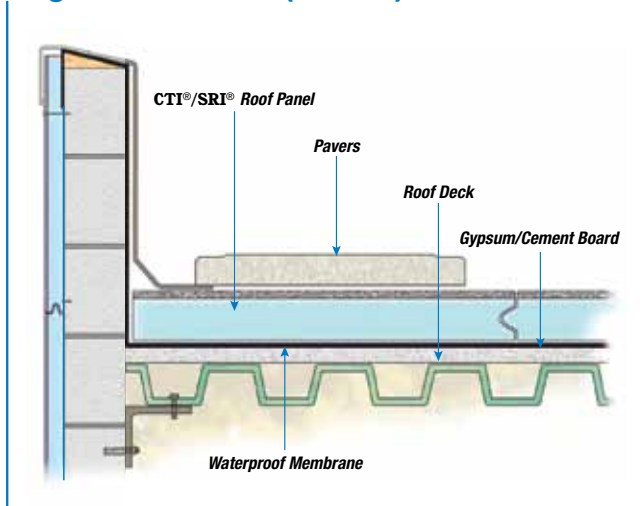
Edge Securement (Metal Counter-Flashing)



1. Metal Counter-Flashing Edge Securement:

- Metal counter-flashing for edge securement should consist of minimum 24 gauge galvanized sheet metal.
- The base of the metal counter-flashing should allow a minimum 4" (100 mm) overlap over the concrete topping.
- The metal counter-flashing must be fastened to the concrete topping as well as the parapet wall. Fasteners shall be placed at a maximum of 18" (460 mm) on centre.
- Fasten the counter-flashing to the **CTI®** and **SRI®** roof panel using 1" (25 mm) or 1 ¼" (31 mm) self-tapping concrete screws. Ensure correct counter-drill sizes are used according to the fastener manufacturer. Fasteners must be a minimum of 3" (75 mm) from any **CTI®** and **SRI®** panel edge. Hammer type drills, explosive or other impact-actuated fastening systems must not be used for fastening to the **CTI®** and **SRI®** roof panels. Fasten counter-flashing to the parapet wall using appropriate fasteners.

Edge Securement (Pavers)



2. Paver Edge Securement

Metal counter-flashing is typically a more cost effective securement solution and provides superior wind uplift resistance. However, concrete pavers can be used to provide better resistance to buoyancy or where metal counter-flashing attachment is not possible or impractical. Pavers must be 2' x 2' (610 mm x 610 mm) and weigh 25 lb/ft² (122 kg/m²). If walkways are needed for continuous traffic, pavers or other suitable material should be used.

Corner Strapping

Use a minimum 24 gauge galvanized metal strapping at least 1 ½" (37 mm) in width, 8' (2400 mm) long with a ½" (12 mm) hem on both sides.

Install strapping as shown using 1" (25 mm) or 1 ¼" (31 mm) self-tapping concrete screws installed at a maximum of 2' (610 mm) on centre with a minimum of two fasteners installed per panel. Hammer type drills, explosive or other impact-actuated fastening systems must not be used for fastening to the **CTI**® and **SRI**® roof panels.

Ensure that the ends of the metal strapping pieces do not coincide with **CTI**® and **SRI**® roof panel joints.

Pavers can be used for corner strapping, provided an equivalent diagonal length of roof corner is secured. Pavers must be 2' x 2' (610 mm x 610 mm) and weigh 25 lb/ft² (122 kg/m²).

Law Courts, Edmonton, AB



MEMBRANE INSPECTION:



CTI® and **SRI®** roof panels can be easily removed and replaced without harming the panels or the membrane.

Simply insert a knife or saw blade between two adjacent panels, taking care not to damage the membrane. Cut off the tongue and lift the panel out. Other panels in all four directions can now be disassembled and removed by disengaging the tongue and grooves. After inspecting or repairing the membrane, reassemble the panels, replacing the panel without the tongue last. Fasten this panel to adjacent panels with minimum 24 gauge galvanized metal strapping, which will compensate for the missing tongue and retain the panel interlocking mechanism.

Note: Occasionally it may be necessary to remove the tongue on more than one panel to allow for removal. Ensure all panels with the tongue removed are re-secured when replaced.

Maintenance

CTI® and **SRI®** roof panels are self-ballasted, light weight insulated roof panels. They can accept maintenance foot traffic, but they are not intended for use as a patio, plaza deck or construction platform. A regularly scheduled maintenance program of inspection and cleaning will ensure long term durability of all roof components. Cleaning may be required to maintain Solar Reflectance Index values.

Warning

STYROFOAM™ brand foam insulation is combustible and may constitute a fire hazard if improperly used or installed. The insulation contains a flame-retardant additive to help inhibit ignition from small fire sources. During shipping, storage, installation and use, this material should not be exposed to open flames or other ignition sources.

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