

SPECIFICATIONS

EPDM Roofing Membranes

Table #1. Approved Deck/Membrane Assemblies

(See specifications for details)

Decks	EPDM Membrane Attachment		
	Fully-Adhered	Mechanically-Attached (T. Clear air barrier criteria must be incorporated)	Loose-Laid
Metal Deck	Approved/S-TS-1-AD	Approved/S-TS-1-MA	Approved/S-TS-1-LL
Monolithic Concrete	Approved/C-TS-1-AD	No	No
Panel Concrete	Approved/P-TS-1-AD	No	Approved/P-TC-1-LL
Wood Deck	No	Approved/W-TS-1-MA	Approved/W-TS-1-LL
Wood Fiber	Approved/F-TS-1-AD	Approved/F-TS-1-MA	Approved/F-TS-1-LL
Insulated Concrete	No	Approved/I-TS-1-MA	Approved/I-TS-1-LL
Existing System	No	Approved/E-TS-1-MA	Approved/E-TS-1-LL

General

EPDM water-proofing membrane material that meets the requirements of ASTM D 4637-87 is acceptable for use with Lightguard® Protected Membrane Roof Insulation. Acceptable deck / membrane assemblies can be found in Table #1 above.

Membrane installations shall incorporate the current EPDM manufacturer's taped field seam and flashing specifications. The membrane shall be installed in accordance with one of the following specifications:

- The taped-seam specifications of the following Membrane Suppliers: Carlisle Syntec Systems, Celotex Corporation, Firestone Building Products Co., Genflex Roofing Systems, Manville Roofing Systems, Versico Inc.
- The specifications developed by the specifier with prior written approval by T. Clear.
- The T. Clear specifications incorporated in this document.

These specifications can be extended with the application guidelines for Thermoset Membrane Systems by the Single Ply Roofing Institute (SPRI).

Warranty

All T. Clear Protected Membrane Roof systems installed using Lightguard Protected Membrane Roof Insulation shall be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, inspected by a T. Clear inspector, and will be covered by a warranty from T. Clear.

The design criteria for the Lightguard system is to apply the roofing membrane directly to the substrate. The use of insulation below the membrane is acceptable, when it is specified, but insulation below the membrane is not warranted by T. Clear. Additional Styrofoam® Brand insulation, meeting ASTM C-578 type V, VI or VII, can be installed above the membrane and below the Lightguard.

Air Barrier Requirements

Loose laid and mechanically attached EPDM membranes, require a substrate that qualifies as an air barrier. T. Clear Technical Sheet #20 identifies the preparation required for each type of deck where an air barrier is required.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and shall be in accordance with applicable regulatory agency requirements and industry standards. Specific approved decks are listed along with minimal requirements.

1. **Poured Concrete Decks:** Reinforced concrete decks shall have a minimum density of 150 lbs./cu. ft.. Structural lightweight concrete decks shall have a minimum density of 100 lbs./cu. ft.. The deck shall be smooth and have no pronounced ridges or depressions. It must be dry and unfrozen at the time of roofing.
2. **Concrete Plank Decks:** The deck units shall be tightly butted to adjacent units and shall be properly attached and aligned. All side joints between planks shall be key grouted to prevent differential movement and to compensate for misalignment (max. 1/2"). Camber differential between adjacent tees of more than 1/4" must be corrected before roofing by placing grout between adjacent members on a slope of 1"/ft. feathered out to the lower tee. Grout installation shall be smooth without ridges or irregularities. The deck units shall be directly welded to adjacent units. The deck surface must be dry and unfrozen at the time of roofing. If filler materials are added above the structural deck, a 2-ply 18" wide ASTM D2170-89 type IV slip sheet is required at the end of each abutment of the concrete tees over the filler materials. Use of key grouting, or a 12" wide modified bitumen (mopped or torched over the side joints between the deck units) may be used to provide an air barrier.
3. **Poured Gypsum Concrete Decks:** The deck shall be smooth, well troweled, and have no pronounced ridges or depressions. It must be dry and unfrozen at the time of roofing. Provisions must be made in the building design for the water-based material to dry to the underside.
4. **Lightweight Insulating Concrete Decks:** The deck shall be smooth, well troweled, and have no pronounced ridges or depressions. It must be dry and unfrozen at the time of roofing. Provisions must be made in the building design for the water-based material to dry to the underside.
5. **All Steel Decks:** The deck shall be constructed per current Steel Deck Institute (SDI) standards, including:

- 1) Deck gauge shall be no lighter than 22 gauge.
- 2) Side and end joints shall be adequately lapped, mechanically fastened or welded with all loose and broken welds repaired prior to roofing.
- 3) Decking must be adequately supported at all penetrations. Gypsum board, Densdeck or other approved underlayment shall be attached to metal deck in accordance with required fasteners, types and patterns listed in T. Clear's UL classification for 60 psf or 90 psf., a minimum of one fastener per 2 square feet.

6. **Wood Or Plywood Decks:** The wood or plywood deck must be properly attached to supporting members and must be of sufficient thickness (min. 15/32) to prevent excessive deflection between supporting members and to provide fire classification. Wood roof decks shall consist of well-seasoned lumber, edges of which shall be tongue and grooved, ship-lapped or splined to prevent differential flexing of the boards. Any significant voids shall be covered with attached sheet metal.

7. **Structural Wood Fiber Decks:** The structural wood fiber plank shall be set level, aligned and carefully interlocked with all joints flush and even. Voids (gaps which are 1/8" or greater) or thickness variations and projections which are 1/8" or greater between adjacent wood fiber planks shall be grouted and feathered smooth.

8. **Existing Built-Up Roof Membrane:** A built-up roof with a gravel surface shall have the loose gravel removed by the use of a power broom or vacuum. If the bitumen surface is less than 2 years old or has been resurfaced within 2 years or is a coal-tar pitch surface, a slip sheet of 6 mil polyethylene may be required. A separation board is required between this previously graveled surface and the new EPDM. Smooth surfaced BUR may not require a separation board. The recover specification by T. Clear Corporation must be followed for recovering existing built-up roof systems.

Deck Slope Requirements

Roofs must be designed and constructed to drain water within 48 hours after a rain. A 1/4" per foot slope is recommended. "Dead level" decks of this construction are acceptable with a sufficient number of correctly placed drains. Where a negative slope exists, consideration may be given to increasing the thickness of the insulation over the membrane to displace the water, or appropriate insulation can be added under the membrane to eliminate the negative slope condition. The drain body must be recessed into the deck so that the clamping ring is flush with or below the deck surface. Sumps are recommended. The maximum slope that will be covered by Lightguard Protected Membrane Roof Insulation is 2" per foot.

Specification Requirements Common To All EPDM Installations—Loose Laid, Mechanically Attached and Fully Adhered

The following specifications provide the basis for the installation of the EPDM membrane systems, and are extended by the specifications of the manufacturer supplying the materials for the installation. The materials for the installation of the membrane system must be bought from a single membrane manufacturer.

1. **Insulation Beneath The Membrane:** It is preferable not to use the insulation below the membrane. However, when required for slope, tapered insulation such as extruded polystyrene is recommended.
2. **Seam Tape For EPDM Field Seams And Cover Tape For Flashing Requirement:** All EPDM specifications must use seam tape in the field of the roof and cover tape for all flashing details.
3. **Placement:** The membrane shall be loosely laid over the acceptable substrate (see Membrane Table #1). The membrane shall be allowed to relax a minimum 1/2 hour before final positioning and seaming. With respect to the fully-adhered system, the membrane is partially removed from the substrate so that adhesive can be applied to the substrate. Cuts for penetrations and projections should be carefully executed. The membrane shall be unrolled and positioned with a minimum 3" overlap.

Laps shall be shingled with the slope of the roof, so as not to develop buck water joints.
4. **Seaming:** The cleaned and primed overlapping sheets must be seamed with membrane supplier's tape. The seams shall be checked for continuity and integrity and repaired immediately. Where the edge of the tape does not extend outside the lap by $-0 +1/4"$, the seams will be completed using membrane manufacturer's seam sealant. All T-joints shall be covered with EPDM covered tape.
5. **Termination And Securement:** Membrane securement shall be provided at all membrane terminations at the perimeter of each roof level, section, curb flashing, skylight, expansion joint, interior wall, penthouse, etc.. Securement shall also be provided at angle changes. Mechanical securement at terminations shall be sealed. Pull-out strengths of the securements shall be 100 lb/ lineal foot when tested by the procedures described in the SPRI Wind Design Guide For Ballasted Single Ply Roofing Systems.

6. **Base Flashings:** The longest pieces of flashing material that are practical shall be used to minimize splices. Flashings shall not be applied over thru-wall flashings or weep holes. When using EPDM flashing material on a vertical surface, the seam between the flashing and the main roof sheet must be completed before bonding the flashing to the vertical surface. When using uncured flashing material on a vertical surface, the flashing must be secured before the seam between the main roof sheet and the flashing is completed. Flashing membrane shall extend a minimum 6" onto the main roof sheet beyond the mechanical securement. Care should be taken to ensure that the flashing does not bridge where there is a change of direction (e.g., parapet meets the roof deck). The top of the installed flashings shall be fastened under metal counter flashing, coping cap or metal reglet. The maximum distance between fasteners shall be 8" O.C. applied through a continuous bar to a solid substrate.

7. **Penetrations:** All penetrations (pipes, supports, soil stacks, cold vents, etc.) passing through the roofing membrane shall be flashed. The flashing seal shall be made directly to the penetration passing through the roofing system. When bonding directly to metal, clean and prime metal. Apply bonding adhesive to bonding surfaces. Allow to dry to touch. Fold membrane material onto the metal without wrinkling. Roll entire surface to fully mate the materials. Premolded and prefabricated flashings shall be used wherever their installation is practical. In addition to adhesive bonding mechanical clamps shall be used to secure the top of the prefabricated flashing to the penetration. Pipe clusters and unusual shape penetrations that cannot be sealed with membrane or other prefabricated flashings shall be sealed by surrounding them with pourable sealer in a new pitch pan. Water-shedding devices covering pipe clusters are recommended.

8. **Drains:** Existing flashing and asphalt shall be removed providing a clean, smooth surface on all materials between the clamping ring and the drain base in preparation for sealant and membrane. Drain ring should be located at or below deck surface. The use of tapered insulation may be necessary to assure water draining. The seal between the membrane and the drain base shall be provided by sealant under constant, even compression from the drain ring. It is recommended that cracked roof drain bowls and roof drains using lead-packing, oakum or coal tar sealant be replaced with new roof drains.

9. Gravel Stops: The membrane shall be attached to the outside fascia of the building to a properly secured and treated wood nailer. The membrane shall extend below and be sealed to the wood nailer using a termination bar and under membrane sealant. Care must be taken to insure that an air barrier is installed according to Technical Note #20 from T. Clear Corporation to prevent billowing of the membrane.

10. Water Cut-Offs: Measures must be taken to ensure that water does not flow beneath the completed sections of the new roofing system. Water cut-offs shall be provided on a daily basis and at the onset of inclement weather. Water cut-offs shall be removed before the resumption of work.

Attachment Of Membranes

Loose Laid: The membrane will not be attached in the field of the roof. The substrate, if any, between the membrane and the structural deck will not be mechanically attached unless it is required to meet air barrier requirements, as noted in T. Clear Technical Note #20. If multiple layers of insulation are used beneath the membrane, the insulation shall be secured with compatible insulation adhesive to prevent movement.

Mechanically Attached: The substrate for mechanically-attached membranes must be attached to the deck using types of fasteners and patterns to meet the minimum requirements identified in Factory Mutual's Approval Guide for I-60 or higher as required by the specification. The membrane shall be attached using plate, bar anchor, or batten in seam systems, as selected in the designer specifications for the requirements of 60 psf or greater, as specified. Through-membrane penetrating fastener systems and plate-bonded systems are not approved by T. Clear .

Fully Adhered: Over the properly installed and/or prepared surface, fresh, properly stored contact-adhesive shall be applied at the required rate for the substrate in smooth, even coatings without voids, globs, puddles or similar irregularities. The coated substrate shall be allowed to completely dry before positioning the membrane. The membrane shall be unrolled and positioned with proper overlap without stretching or stressing the membrane during placement. Once in place, one half of the sheet shall be turned back and coated with adhesive. When the adhesive has dried sufficiently to produce strings when touched with a dry finger, roll the coated membrane onto the previously coated substrate, avoiding wrinkles. The bonded half of the sheet shall be pressed down with a weighted foam-covered lawn roller. The remaining half

of the sheet shall then be folded back, coated and rolled using the same bonding procedure. Adjoining sheets shall be installed in the same manner. Minimum overlap shall be 3 inches. Laps shall be shingled so as not to develop buck water joints with respect to the slope of the roof.

Adhered with hot steep asphalt (Felt-Backed Membranes Only): For polyester felt-backed EPDM (ASTM D-312 Type III), asphalt may be used as the adhesive provided the substrate is compatible with the asphalt. Asphalt shall be evenly applied according to the membrane manufacturer's specifications. The membrane is unrolled onto the asphalt-coated surface within a time interval to permit the felt backing portion of the membrane to embed in the fluid asphalt coating. The succeeding rolls shall be applied in similar manner with the unbacked edge overlapping the preceding roll, shingled with the slope of the roof. The sheet shall be pressed down with a roller to ensure that the membrane is embedded in the asphalt and seams shall be adhered with tape.

Lightguard Installation

To complete T. Clear Protected Membrane Roof Systems using Lightguard Protected Membrane Roof Insulation panels, see:

1. Lightguard installation, wind design and securement specifications (LIDS 1994)
2. Lightguard flashing details (LFD 1994)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual. Refer to the current F.M. Data Sheet 1-29.
2. All Lightguard roof assemblies are rated Class A (Fire From Without). Obtain specific configuration details from Underwriter's Laboratory (UL) from the current Roofing Materials And Systems Directory.
3. For more information on the hourly rated constructions, (Fire From Within), see the current U.L. Fire Resistance Directory.



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