Bur On Concrete Plank Deck

General

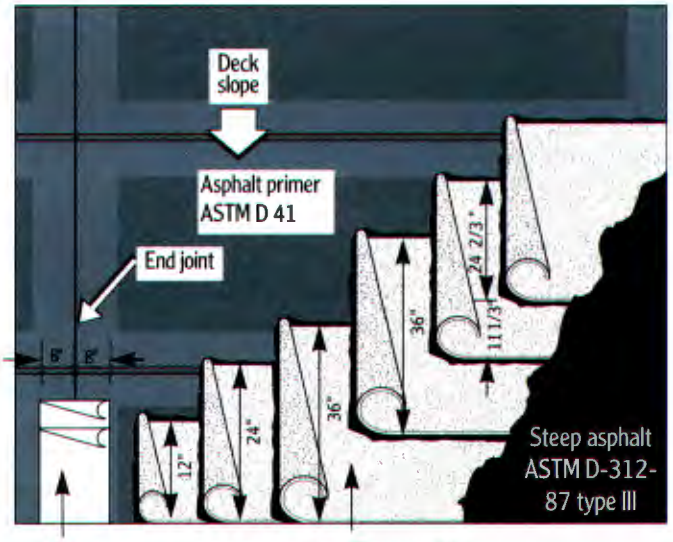
On non nailable decks, a 3-ply membrane constructed with fiberglass felts is mopped to the deck in shingle fashion. This is covered with Lightguard Ballasted Roof Insulation. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from Clear.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should be in accordance with applicable regulatory agency requirements and industry standards.

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 the adjacent members on a slope of 1 inch per foot feathered out onto the low tee. Grout installation should be smooth without ridges or irregularities. The deck units shall be directly welded to adjacent units. The deck surface must be dry and smooth.

If filler materials are added above the structural deck system, a 2-ply, 18" wide slip sheet ASTM D 2170-89, type IV is required at the end of each abuttment of the concrete tees. This slip sheet is installed over the filler materials.



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 water. 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 roof insulation systems is 2 inches per foot and requires the use of ASTM D 312-89, type III asphalt. (Note: Type III asphalt is

the preferred asphalt for all slopes.) ASTM D 312-89, type II asphalt may be used for slopes not to exceed 1 inch per foot. ASTM D 312-89, type I may be used for slopes not to exceed 1/2" per foot when covered with a minimum 6 mil polyethylene sheet to completely cover the asphalt so as not to come in contact with the Lightguard panel.

Built-Up Roof Installation

Sweep the deck free of dust and debris. Prime the concrete surface with asphalt concrete primer (ASTM D41-78) at a rate of one gallon per square. Allow the primer to dry to the touch before continuing with the application of the built-up roof.

Starting at the low point of the roof, if the deck is sloped, uniformly mop the primed surface with steep asphalt (ASTM D-312, type III) at the rate of 25-30 lb. per square. While hot, embed three plies of fiberglass felt (ASTM D-2178, type IV) in shingle fashion, lapping each sheet 24 2/3".

Interply moppings shall be continuous. Complete embedment of felts is required and accomplished by dragging a broom or squeegee over the felt, no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to assure adhesion.

As the work progresses, full mop the surface of the membrane using a minimum coverage of 25-30 pounds per square of ASTM D-312, type III asphalt. Felt should never be exposed overnight or in inclement weather. Bitumen temperature at the kettle shall be controlled so as to not exceed the bitumen manufacturer's recommendations.

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the fastened fiberglass felt, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

Flashings should be of granule surfaced modified bitumen sheet adhered with ASTM D 312-89, type III asphalt or torch applied. All flashing must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used but require periodic maintenance due to weathering that is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted Roof Insulation panels, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1993)
2. Lightguard flashing details (LFD 1993)
3. Lightguard roofing specifications for coal tar pitch bitumen membranes (CTPM 1993)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual (F.M.). 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from within) see the current U.L. Fire Resistance Directory.

T CLEAR CORPORATION
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LIGHTGUARD® Protected Membrane Roof Systems

T. CLEAR CORPORATION

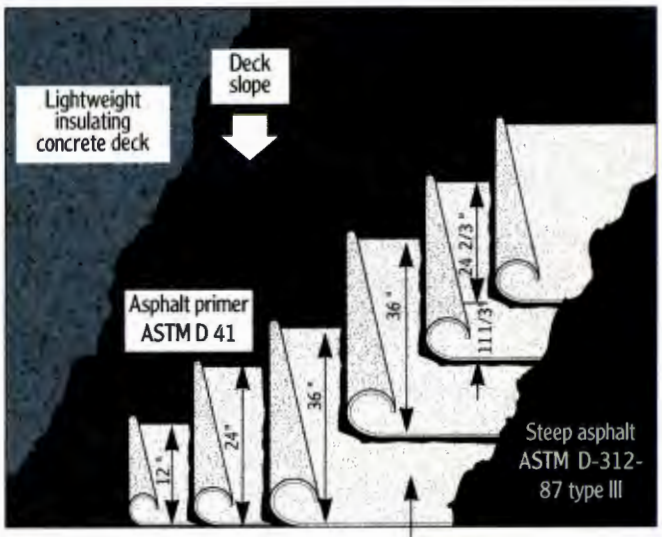
SPECIFICATIONS

Bur On Lightweight Insulating Concrete Deck

General

On non nailable decks, a 3-ply membrane constructed with fiberglass felts is mopped to the deck in shingle fashion. This is covered with Lightguard Ballasted Roof Insulation. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from Clear.

The mechanically attached specification utilizing the fiberglass base sheet and two shingled fiberglass felts for a nailable deck may be used when the lightweight insulating concrete is installed over a permeable form board or slotted metal deck.



Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should be in accordance with applicable regulatory agency requirements and industry standards.

In particular 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 all the water-based material to dry to the underside. The deck shall be considered not sufficiently dry if foaming occurs during application of the steep asphalt.

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 water. 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 roof insulation systems is 2 inches per foot and requires the use of ASTM D 312-89, type III asphalt. (Note: Type III asphalt is the preferred asphalt for all slopes.) ASTM D 312-89, type II asphalt may be used for slopes not to exceed 1 inch per foot. ASTM D 312-89, type I may be used for slopes not to exceed 1/2" per foot when covered with a minimum 6 mil polyethylene sheet to completely cover the asphalt so as not to come in contact with the Lightguard panel.

Built-Up Roof Installation

Sweep the deck free of dust and debris. Prime the concrete surface with asphalt concrete primer (ASTM D 41-78) at a rate of one gallon per square. Allow the primer to dry to the touch before continuing with the application of the built-up roof.

Starting at the low point of the roof, if the deck is sloped, uniformly mop the primed surface with steep asphalt (ASTM D-312, type III) at the rate of 25-30 lb. per square. While hot, embed three plies of fiberglass felt (ASTM D-2178, type IV) in shingle fashion, lapping each sheet 24 2/3".

Interply moppings shall be continuous. Complete embedment of felts is required and accomplished by dragging a broom or squeegee over the felt, no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to assure adhesion.

As the work progresses, full mop the surface of the membrane using a minimum coverage of 25-30 pounds per square of ASTM D-312, type III asphalt. Felt should never be exposed overnight or in inclement weather. Bitumen temperature at the kettle shall be controlled so as to not exceed the bitumen manufacturer's recommendations.

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured fiberglass felt, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

Flashings should be of granule surfaced modified bitumen sheet adhered with ASTM D 312-89, type III asphalt or torch applied. All flashing must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used but require periodic maintenance due to weathering that is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted Roof Insulation panels, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1993)
2. Lightguard flashing details (LFD 1993)
3. Lightguard roofing specifications for coal tar pitch bitumen membranes (CTPM 1993)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual (F.M.). 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from within) see the current U.L. Fire Resistance Directory.

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Bur On Poured Concrete Deck

General

On non nailable decks, a 3-ply membrane constructed with fiberglass felts is mopped to the deck in shingle fashion. This is covered with Lightguard Ballasted Roof Insulation. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from Clear.

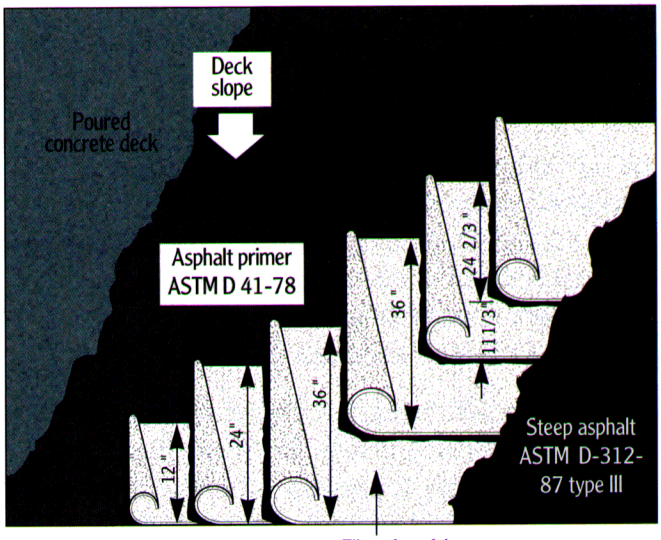
Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should be in accordance with applicable regulatory agency requirements and industry standards.

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. The deck shall be considered not sufficiently dry if foaming occurs during application of the hot bitumen.

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 water. 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 roof insulation systems is 2 inches per foot and requires the use of ASTM D 312-89, type III asphalt. (Note: Type III asphalt is the preferred asphalt for all slopes.) ASTM D 312-89, type II asphalt may be used for slopes not to exceed 1 inch per foot. ASTM D 312-89, type I may be used for slopes not to exceed 1/2" per foot when covered with a minimum 6 mil polyethylene sheet to completely cover the asphalt so as not to come in contact with the Lightguard panel.

Built-Up Roof Installation

Sweep the deck free of dust and debris. Prime the concrete surface with asphalt concrete primer (ASTM D41-78) at a rate of one gallon per square. Allow the primer to dry to the touch before continuing with the application of the built-up roof.

Starting at the low point of the roof, if the deck is sloped, uniformly mop the primed surface with steep asphalt (ASTM D-312, type III) at the rate of 25-30 lb. per square. While hot, embed three plies of fiberglass felt (ASTM D-2178, type IV) in shingle fashion, lapping each sheet 24 2/3".

Interply moppings shall be continuous. Complete embedment of felts is required and accomplished by dragging a broom or squeegee over the felt, no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to assure adhesion.

As the work progresses, full mop the surface of the membrane using a minimum coverage of 25-30 pounds per square of ASTM D-312, type III asphalt. Felt should never be exposed overnight or in inclement weather. Bitumen temperature at the kettle shall be controlled so as to not exceed the bitumen manufacturer's recommendations.

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured fiberglass felt, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

Flashings should be of granule surfaced modified bitumen sheet adhered with ASTM D 312-89, type III asphalt or torch applied. All flashing must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used but require periodic maintenance due to weathering that is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted Roof Insulation panels, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1993)
2. Lightguard flashing details (LFD 1993)
3. Lightguard roofing specifications for coal tar pitch bitumen membranes (CTPM 1993)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual (F.M.). 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from within) see the current U.L. Fire Resistance Directory.

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Bur On Poured Gypsum Concrete Deck

General

On nailable decks, a 3-ply membrane is constructed with a mechanically attached fiberglass base sheet and two plies of fiberglass felt mopped to the base sheet in shingle fashion. This is covered with Lightguard Ballasted Roof Insulation. The mechanical fasteners will be those recommended for this type of deck, and in the pattern specified. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from Clear.

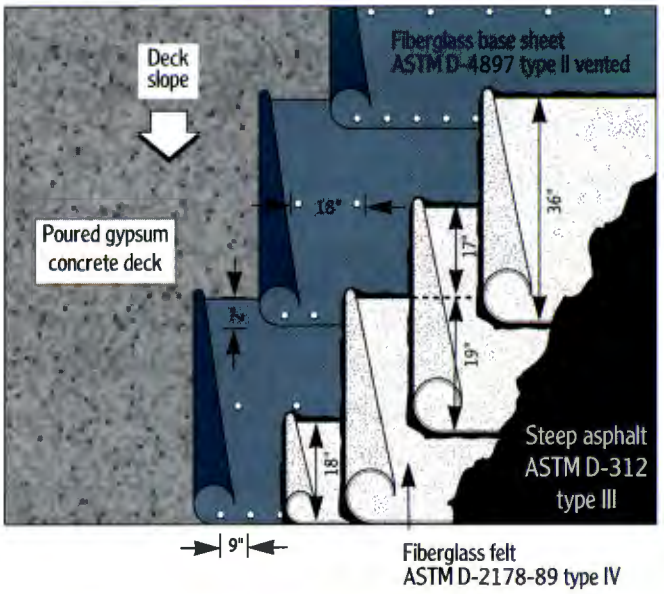
Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should be in accordance with applicable regulatory agency requirements and industry standards.

In particular 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. The deck shall be considered not sufficiently dry if foaming occurs during application of the steep asphalt. The deck must not be primed.

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 water. 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 roof insulation systems is 2 inches per foot and requires the use of ASTM D 312-89, type III asphalt. (Note: Type III asphalt is the preferred asphalt for all slopes.) ASTM D 312-89, type II asphalt may be used for slopes not to exceed 1 inch per foot. ASTM D 312-89, type I may be used for slopes not to exceed 1/2" per foot when covered with a minimum 6 mil polyethylene sheet to completely cover the asphalt so as not to come in contact with the Lightguard panel.

Built-Up Roof Installation

Sweep the deck free of dust and debris.

Starting at the low point of the roof, lay one ply of fiberglass base sheet, ASTM D-4897, type II non perforated, lapping the side joints 2" and the end joints 4". Mechanically fasten along the laps at maximum 9" intervals and at the center of the sheet at 18" intervals using fasteners approved by the deck manufacturer for use in this application. Uniformly mop the attached fiberglass base sheet with steep asphalt (ASTM D-312, type III) at the rate of 25-30 lb. per square. While hot, embed two plies of fiberglass felt (ASTM D-2178, type IV) in shingle fashion, lapping each sheet 19 inches.

Interply moppings shall be continuous. Complete embedment of felts is required and accomplished by dragging a broom or squeegee over the felt, no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to assure adhesion.

As the work progresses, full mop the surface of the membrane using a minimum coverage of 25-30 pounds per square of ASTM D-312, type III asphalt. Felt should never be exposed overnight or in inclement weather. Bitumen temperature at the kettle shall be controlled so as to not exceed the bitumen manufacturer's recommendations.

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured fiberglass felt, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

Flashings should be of granule surfaced modified bitumen sheet adhered with ASTM D 312-89, type III asphalt or torch applied. All flashing must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used but require periodic maintenance due to weathering. This maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted Roof Insulation panels, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1993)
2. Lightguard flashing details (LFD 1993)
3. Lightguard roofing specifications for coal tar pitch bitumen membranes (CTPM 1993)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual (F.M.). 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from within) see the current U.L. Fire Resistance Directory.

T CLEAR CORPORATION
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Bur On Steel Decks, F.M.

General

On non nailable decks, a 3-ply membrane constructed with fiberglass felts is mopped to the prepared deck in shingle fashion. This is covered with Lightguard Ballasted Roof Insulation. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from Clear.

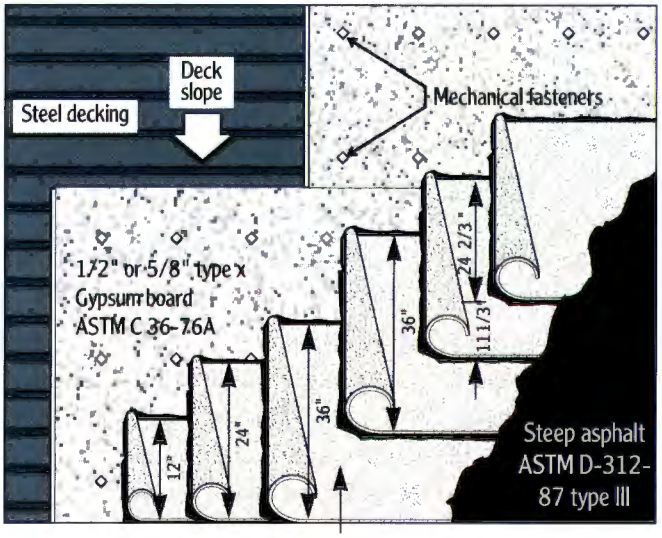
Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should be in accordance with applicable regulatory agency requirements and industry standards.

Deck shall be constructed per all latest Factory Mutual engineering recommendations, including: 1) Deck gauge shall be no lighter than 22 gauge, 2) Side and end joints shall be adequately lapped and welded with all loose and broken welds repaired prior to roofing, and 3) Decking must be adequately supported at all penetrations.

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 water. 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 roof insulation systems is 2 inches per foot and requires the use of ASTM D 312-89, type III asphalt. (Note: Type III asphalt is the preferred asphalt for all slopes.) ASTM D 312-89, type II asphalt may be used for slopes not to exceed 1 inch per foot. ASTM D 312-89, type I may be used for slopes not to exceed 1/2" per foot when covered with a minimum 6 mil polyethylene sheet to completely cover the asphalt so as not to come in contact with the Lightguard panel.

Installation Of Underlayment

In all cases, gypsum board or Densdeck or other approved underlayment will be attached to metal deck in accordance with requirements of types and patterns of fasteners noted in the Factory Mutual Approval Guide (I-60 or I-90 classification.)

Other Class 1 Roof Constructions

As an alternate to gypsum board, Factory Mutual Class 1 insulated steel deck roof construction is accomplished when the individual components of the roof system are as required in the Factory Mutual Approval Guide.

Built-Up Roof Installation

Sweep the deck free of dust and debris.

Starting at the low point of the roof, if the deck is sloped, uniformly mop the primed surface with steep asphalt (ASTM D-312, type III) at the rate of 25-30 lb. per square. While hot, embed three plies of fiberglass felt (ASTM D-2178, type IV) in shingle fashion, lapping each sheet 24 2/3".

Interply moppings shall be continuous. Complete embedment of felts is required and accomplished by dragging a broom or squeegee over the felt, no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to assure adhesion.

As the work progresses, full mop the surface of the membrane using a minimum coverage of 25-30 pounds per square of ASTM D-312, type III asphalt. Felt should never be exposed overnight or in inclement weather. Bitumen temperature at the kettle shall be controlled so as to not exceed the bitumen manufacturer's recommendations.

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured fiberglass felt, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

Flashings should be of granule surfaced modified bitumen sheet adhered with ASTM D 312-89, type III asphalt or torch applied. All flashing must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used but require periodic maintenance due to weathering that is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted Roof Insulation panels, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1993)
2. Lightguard flashing details (LFD 1993)
3. Lightguard roofing specifications for coal tar pitch bitumen membranes (CTPM 1993)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual (F.M.). 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from within) see the current U.L. Fire Resistance Directory.

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LIGHTGUARD® Protected Membrane Roof Systems

T. CLEAR CORPORATION

SPECIFICATIONS

Bur On Structural Wood Fiber Deck

General

On nailable decks, a 3-ply membrane is constructed with a mechanically attached fiberglass base sheet and two plies of fiberglass felt mopped to the base sheet in shingle fashion. This is covered with Lightguard Ballasted Roof Insulation. The mechanical fasteners will be those recommended for this type of deck, and in the pattern specified. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from Clear.

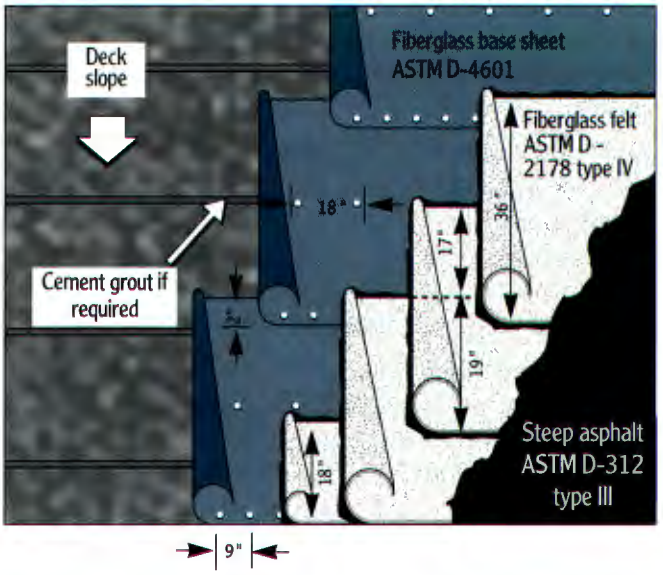
Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should be in accordance with applicable regulatory agency requirements and industry standards.

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

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 water. 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 roof insulation systems is 2 inches per foot and requires the use of ASTM D 312-89, type III asphalt. (Note: Type III asphalt is the preferred asphalt for all slopes.) ASTM D 312-89, type II asphalt may be used for slopes not to exceed 1 inch per foot. ASTM D 312-89, type I may be used for slopes not to exceed 1/2" per foot when covered with a minimum 6 mil polyethylene sheet to completely cover the asphalt so as not to come in contact with the Lightguard panel.

Built-Up Roof Installation

Sweep the deck free of dust and debris.

Starting at the low point of the roof, lay one ply of fiberglass base sheet, ASTM 3-4897, type II non perforated, lapping the side joints 2" and the end joints 4". Mechanically fasten along the laps at center of the sheet at 18" intervals using fasteners approved by the deck manufacturer for use in this application. Uniformly mop the attached fiberglass base sheet with steep asphalt (ASTM D-312, type III) at the rate of 25-30 lb. per square. While hot, embed two plies of fiberglass felt (ASTM D-2178, type IV) in shingle fashion, lapping each sheet 19 inches.

Interply moppings shall be continuous. Complete embedment of felts is required and accomplished by dragging a broom or squeegee over the felt, no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to assure adhesion.

As the work progresses, full mop the surface of the membrane using a minimum coverage of 25-30 pounds per square of ASTM D-312, type III asphalt. Felt should never be exposed overnight or in inclement weather. Bitumen temperature at the kettle shall be controlled so as to not exceed the bitumen manufacturer's recommendations.

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured fiberglass felt, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

Flashings should be of granule surface modified bitumen sheet adhered with ASTM D 312-89, type III asphalt or torch applied. All flashing must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used but require periodic maintenance due to weathering that is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted Roof Insulation panels, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1993)

2. Lightguard flashing details (LFD 1993)

3. Lightguard roofing specifications for coal tar pitch bitumen membranes (CTPM 1993)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual (F.M.). 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 (U.L.) from the current roofing materials and Systems Directory.

3. For information on hourly rated constructions (fire from within) see the current U.L. Fire Resistance Directory.

T CLEAR CORPORATION
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LIGHTGUARD® Protected Membrane Roof Systems

T. CLEAR CORPORATION

SPECIFICATIONS

Bur On Wood & Plywood Deck

General

On nailable decks, a 3-ply membrane constructed with a mechanically attached fiberglass base sheet and two plies of fiberglass felt mopped to the base sheet in shingle fashion. This is covered with Lightguard Ballasted Roof Insulation. The mechanical fasteners will be those recommended for this type of deck, and in the pattern specified. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from Clear.

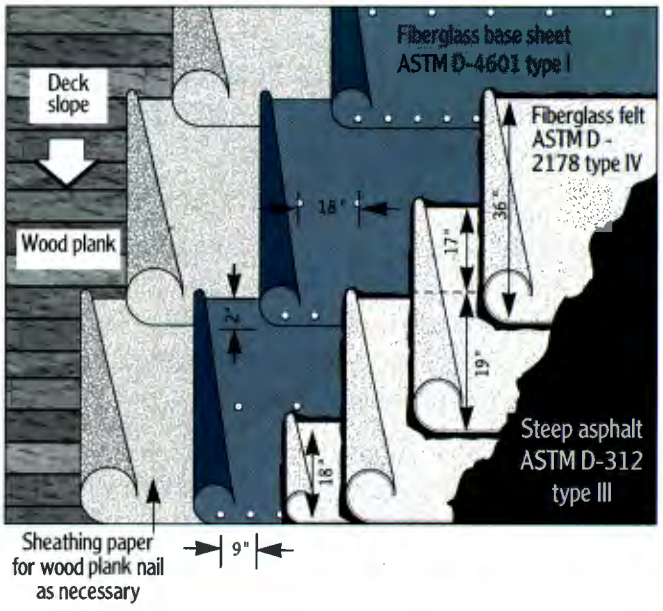
Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should be in accordance with applicable regulatory agency requirements and industry standards.

The wood or plywood deck must be properly attached to supporting members and must be of sufficient thickness to prevent excessive deflection between supporting members. Wood roof decks shall consist of well-seasoned lumber, edges of which shall be tongued and grooved, ship-lapped or splined to prevent differential flexing of the boards. Any significant voids shall be covered with sheet metal.

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 water. 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 roof insulation systems is 2 inches per foot and requires the use of ASTM D 312-89, type III asphalt. (Note: Type III asphalt is the preferred asphalt for all slopes.) ASTM D 312-89, type II asphalt may be used for slopes not to exceed 1 inch per foot. ASTM D 312-89, type I may be used for slopes not to exceed 1/2" per foot when covered with a minimum 6 mil polyethylene sheet to completely cover the asphalt so as not to come in contact with the Lightguard panel.

Built-Up Roof Installation

Sweep the deck free of dust and debris.

Cover the deck with sheathing paper weighing approximately 5 lbs. per 100 square feet where necessary. Lap each sheet a minimum of 2" and mechanically attach to deck sufficiently to hold in place. Sheathing paper may be omitted for plywood decks.

Starting at the low point of the roof, lay one ply of fiberglass base sheet, ASTM D-4897, type II non perforated, lapping the side joints 2" and the end joints 4". Mechanically fasten along the laps at maximum 9" intervals and at the center of the sheet at 18" intervals using fasteners approved by the deck manufacturer for use in this application. Uniformly mop the attached fiberglass base sheet with steep asphalt (ASTM D-312, type III) at the rate of 25-30 lb. per square. While hot, embed two plies of fiberglass felt (ASTM D2178, type IV) in shingle fashion, lapping each sheet 19 inches.

Interply moppings shall be continuous. Complete embedment of felts is required and accomplished by dragging a broom or squeegee over the felt, no more pressure is required than that exerted by the weight of the "brooming" utensil. During cold weather, effective brooming is essential to eliminate voids and to assure adhesion.

As the work progresses, full mop the surface of the membrane using a minimum coverage of 25-30 pounds per square of ASTM D-312, type III asphalt. Felt should never be exposed overnight or in inclement weather. Bitumen temperature at the kettle shall be controlled so as to not exceed the bitumen manufacturer's recommendations.

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the fastened fiberglass felt, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

Flashings should be of granule surfaced modified bitumen sheet adhered with ASTM D 312-89, type III asphalt or torch applied. All flashing must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used but require periodic maintenance due to weathering that is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted Roof Insulation panels, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1993)
2. Lightguard flashing details (LFD 1993)
3. Lightguard roofing specifications for coal tar pitch bitumen membranes (CTPM 1993)

Fire Classification Information For Lightguard Roof Assemblies

1. All Lightguard assemblies are considered as ballasted systems with respect to Factory Mutual (F.M.). 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from within) see the current U.L. Fire Resistance Directory.

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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 vaccuum. 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: Its 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 Techical 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.

CLEAR
Protected Membrane Roof Systems

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LIGHTGUARD® Ballasted Roofing Systems

T CLEAR CORPORATION

SPECIFICATIONS

Modified Bitumen On Concrete Plank Deck

General

T. Clear approves smooth surfaced, reinforced APP or SBS Modified Bitumen (see materials listing) for a 2 ply membrane. It is constructed by fully mopping a fiberglass (ASTM D-4601) or fully mopping/torching a modified bitumen base sheet to the substrate. Fully mop or torch smooth surfaced modified bitumen sheet(s) to the base sheet to complete the membrane. Minimum thickness of this system shall be 160 mils, not including the base sheet. This is covered with Lightguard® Ballasted Roof Insulation. All installations of the Lightguard system shall be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from T. Clear. All membrane and flashing materials used on a roof shall be supplied by a single manufacturer.

It is the contractors responsibility to operate in a safe manner. It is recommended that all roofing applicators attend a qualified educational program for torch applications such as those offered by RIEI or SERTA.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear and should be in accordance with applicable regulatory agency requirements and industry standards. Prior to the commencement of work, all roof surfaces shall be approved by the T. Clear applicator.

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" shall be corrected before roofing by placing grout between the adjacent members on a slope of 1 inch per foot feathered out to the low tee. Grout installation should be smooth without ridges or irregularities. The deck units shall be structurally attached to adjacent units. The deck surface shall be dry and smooth. A 2 ply, 18" wide slip sheet ASTM D 2170-89, type IV is required at the end of each abutment of the concrete tees or planks.

Deck Slope Requirements

Roofs shall 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 water. The drain body shall 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 roof insulation systems is 2 inches per foot. The use of ASTM D 312-89, type III asphalt is preferred for all slopes. Lower melt asphalt can be used for low or no-slope applications.

Modified Bitumen Roof Installation

Sweep the deck free of dust and debris. Prime the concrete surface with asphalt concrete primer (ASTM D41-78) at a rate of one gallon per square. Do not prime the concrete tees or planks any closer than 8" from any end or side joints. Allow the primer to dry to the touch before continuing with the application of the modified bitumen membrane.

Hot Mopped Application

Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, fully mop one layer of fiberglass (ASTM D-4601) or modified bitumen base sheet perpendicular to the slope, embedding it in ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt and at a rate of 20-25 lbs. per square. Base sheets shall be lapped 2" on all sides and 4" at the ends. The end laps should be staggered no less than 12" apart.

Mop the second sheet perpendicular to the slope, starting at the low point of the roof, as a full sheet. Fully mop the smooth surfaced modified bitumen embedding it in ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt at a rate of 20-25 lbs. per square. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". If additional modified bitumen plies are used, they must be installed in shingle fashion.

Torched Application

Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, weld one layer of torchable modified bitumen base sheet over the roof starting at the low point and applying perpendicular to the slope. A flow of at least a 1/4" shall be obtained around all seams. Base sheets shall be lapped 2" on all sides and 4" at the ends. The end laps should be staggered no less than 12" apart.

Weld the second torchable smooth surfaced sheet perpendicular to the slope, starting at the low point of the roof, as a full sheet. A flow of at least a 1/4" shall be obtained around all seams. The top sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". If additional modified bitumen plies are used, they must be installed in shingle fashion.

Temporary Membrane

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured modified bitumen membrane, temporary water cut-offs are necessary at the end of the workday. Water cut-offs shall be removed prior to continuing the membrane application.

Flashing Installation

T. Clear flashing specifications call out granule surfaced modified bitumen sheets adhered with ASTM D-312-89, type III asphalt or torch applied. All flashings must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used, but require additional periodic maintenance due to weathering. Maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted 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 (F.M.). Refer to 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from without), see the current U.L. Fire Resistance Directory.

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LIGHTGUARD® Ballasted Roofing Systems

T CLEAR CORPORATION

SPECIFICATIONS

Modified Bitumen On Lightweight Insulating Concrete Deck

General

T. Clear approves smooth surfaced, reinforced APP or SBS Modified Bitumen (see materials listing) for a 2 ply membrane. It is constructed by mechanically attaching a modified bitumen base sheet. The mechanical fasteners will be those recommended for this type of deck, and in the pattern specified. Fully mop/torch modified bitumen sheet(s) to the secured sheet. Minimum thickness of this system shall be 160 mils not including the base sheet.

This specification, utilizing the modified bitumen base sheet on a nailable deck may be used when the lightweight insulating concrete is installed over a permeable form board or slotted metal deck. The completed membrane is covered with Lightguard® Ballasted Roof Insulation. All installations of the Lightguard system shall be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from T. Clear. All membrane and flashing materials used on a roof shall be supplied by a single manufacturer.

It is the contractors responsibility to operate in a safe manner. It is recommended that all roofing applicators attend a qualified educational program for torch applications such as those offered by RIEI or SERTA.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear and should be in accordance with applicable regulatory agency requirements and industry standards. Prior to the commencement of work, all roof surfaces shall be approved by the T. Clear applicator.

In particular the deck shall be smooth, well troweled, and have no pronounced ridges or depressions. It shall be dry and unfrozen at the time of roofing. Provisions shall be made in the building design for the water-based material to dry to the underside.

Deck Slope Requirements

Roofs shall 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 water. The drain body shall 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 roof insulation systems is 2 inches per foot. The use of ASTM D 312-89, type III asphalt is preferred for all slopes. Lower melt asphalt can be used for low or no-slope applications.

Modified Bitumen Roof Installation

Base Sheet Installation

Sweep the deck free of dust and debris. Prime the deck with asphalt primer (ASTM D 41-78) at a rate of one gallon per square. Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, lay one ply of a modified bitumen base sheet perpendicular to the slope lapping the side joints 2" and end joints 4". Mechanically fasten along the laps at a maximum 9" intervals. Additional fasteners must be placed at the 1/3 points of the sheet in two rows which are staggered-fastened at 18" O.C. maximum. Fastener caps must be a minimum of 2" in diameter. The end laps must be staggered no less than 12" apart.

Hot Mopped Application

Starting at the low point of the roof, mop the modified bitumen sheets to the base sheet. The smooth surfaced modified bitumen sheets are applied perpendicular to the slope, with ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt and at a rate of 20-25 lbs. per square. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Torched Application

Starting at the low point of the roof, weld the torchable smooth surfaced modified bitumen sheets to the base sheet, perpendicular to the slope. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Temporary Membrane

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured modified bitumen membrane, temporary water cut-offs are necessary at the end of the workday. Water cut-offs shall be removed prior to continuing the membrane application.

Flashing Installation

T. Clear flashing specifications call out granule surfaced modified bitumen sheets adhered with ASTM D-312-89, type III asphalt or torch applied. All flashings must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used, but require additional periodic maintenance due to weathering. Maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted 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 (F.M.). Refer to 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from without), see the current U.L. Fire Resistance Directory.

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LIGHTGUARD® Ballasted Roofing Systems

T CLEAR CORPORATION

SPECIFICATIONS

Modified Bitumen On Poured Concrete Deck

General

T. Clear approves smooth surfaced, reinforced or non-reinforced APP or SBS Modified Bitumen (see materials listing) for a 1 or 2 ply membrane on poured structural concrete decks. A single-ply membrane is constructed by applying a modified bitumen sheet which is approved for single-ply applications (see materials listing). A 2 ply membrane is constructed by first attaching a fiberglass (ASTM 4601), or modified bitumen base sheet to the deck. This is followed by a minimum single-ply modified bitumen sheet mopped or torched to the base sheet. The completed membrane is covered with Lightguard® Ballasted Roof Insulation. All installations of the Lightguard system shall be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from T. Clear. All membrane and flashing materials used on a roof shall be supplied by a single manufacturer.

It is the contractors responsibility to operate in a safe manner. It is recommended that all roofing applicators attend a qualified educational program for torch applications such as those offered by RIEI or SERTA.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear and should be in accordance with applicable regulatory agency requirements and industry standards. Prior to the commencement of work, all roof surfaces shall be approved by the T. Clear applicator.

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 shall be dry and unfrozen at the time of roofing. The deck shall be considered not sufficiently dry if foaming occurs during application of the hot bitumen.

Deck Slope Requirements

Roofs shall 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 water. The drain body shall 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 roof insulation systems is 2 inches per foot. The use of ASTM D 312-89, type III asphalt is preferred for all slopes. Lower melt asphalt can be used for low or no-slope applications.

Modified Bitumen Roof Installation

Sweep the deck free of dust and debris. Prime the concrete surface with asphalt concrete primer (ASTM D41-78) at a rate of one gallon per square. Allow the primer to dry to the touch before continuing with the application of the modified bitumen membrane.

Hot Mopped Application

For two or more plies: Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, fully mop one layer of fiberglass (ASTM D-4601) or modified bitumen base sheet perpendicular to the slope to the deck embedding it in ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt and at a rate of 20-25 lbs. per square. Base

sheets shall be lapped 2" on all sides and 4" at the ends. The end laps should be staggered no less than 12" apart.

Mop the second sheet perpendicular to the slope, starting at the low point of the roof, as a full sheet. Fully mop the smooth surfaced modified bitumen sheets embedding them in ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt at a rate of 20-25 lbs. per square. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". If additional modified bitumen plies are used, they must be installed in shingle fashion.

For single ply: Fully mop the smooth surfaced modified bitumen sheets perpendicular to the slope embedding them in ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt at a rate of 20-25 lbs. per square. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12".

Torched Application

For two or more plies: Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, weld one layer of torchable modified bitumen base sheet to the deck starting at the low point and applying perpendicular to the slope. Base sheets shall be lapped 2" on all sides and 4" at the ends. The end laps should be staggered no less than 12" apart.

Weld the second torchable smooth surfaced sheet perpendicular to the slope, starting at the low point of the roof, as a full sheet. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". If additional modified bitumen plies are used, they must be installed in shingle fashion.

For single ply: Weld the torchable smooth surfaced sheet perpendicular to the slope, starting at the low point of the roof, as a full sheet. A flow of about a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12".

Adhered Application

See approved manufacturer's specific instructions for installing peel-and-stick membranes.

Temporary Membrane

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured modified bitumen membrane, temporary water cut-offs are necessary at the end of the workday. Water cut-offs shall be removed prior to continuing the membrane application.

Flashing Installation

T. Clear flashing specifications call out granule surfaced modified bitumen sheets adhered with ASTM D-312-89, type III asphalt or torch applied. All flashings must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used, but require additional periodic maintenance due to weathering. Maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted 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 (F.M.). Refer to 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from without), see the current U.L. Fire Resistance Directory.

T CLEAR CORPORATION

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LIGHTGUARD® Ballasted Roofing Systems

T CLEAR CORPORATION

SPECIFICATIONS

Modified Bitumen On Poured Gypsum Concrete Deck

General

T. Clear approves smooth surfaced, reinforced APP or SBS Modified Bitumen (see materials listing) for a 2 ply membrane constructed with a mechanically attached fiberglass (ASTM D-4601) or modified bitumen base sheet. The mechanical fasteners will be those recommended for this type of deck, and in the pattern specified. Fully mop or torch modified bitumen sheet(s) to the base ply. Minimum thickness of this system shall be 160 mils not including the base sheet. This is covered with Lightguard® Ballasted Roof Insulation. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from T. Clear. All membrane and flashing materials used on a roof shall be supplied by a single manufacturer.

It is the contractors responsibility to operate in a safe manner. It is recommended that all roofing applicators attend a qualified educational program for torch applications such as those offered by RIEI or SERTA.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear and should be in accordance with applicable regulatory agency requirements and industry standards. Prior to the commencement of work, all roof surfaces shall be approved by the T. Clear applicator.

In particular the deck shall be smooth, well troweled, and have no pronounced ridges or depressions. It shall be dry and unfrozen at the time of roofing. Provisions shall be made in the building design for the water-based material to dry to the underside.

Deck Slope Requirements

Roofs shall 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 water. The drain body shall 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 roof insulation systems is 2 inches per foot. The use of ASTM D 312-89, type III asphalt is preferred for all slopes. Lower melt asphalt can be used for low or no-slope applications.

Modified Bitumen Roof Installation

Base Sheet Installation

Sweep the deck free of dust and debris. Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, lay one ply of fiberglass base sheet (ASTM D-4601), or a modified bitumen sheet perpendicular to the slope lapping the side joints 2" and end joints 4". Mechanically fasten along the laps at a maximum 9" intervals. Additional fasteners must be placed at the 1/3 points of the sheet in two rows which are staggered-fastened at 18" O.C. maximum. Fastener caps shall be a minimum of 2" in diameter. The end laps shall be staggered no less than 12" apart.

Hot Mopped Application

Starting at the low point of the roof, mop the modified bitumen sheets to the base sheet. The smooth surfaced modified bitumen sheets are applied perpendicular to the slope, with ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt and at a rate of 20-25 lbs. per square. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Torched Application

Starting at the low point of the roof, weld the torchable smooth surfaced modified bitumen sheets to the base sheet, perpendicular to the slope. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Temporary Membrane

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured modified bitumen membrane, temporary water cut-offs are necessary at the end of the workday. Water cut-offs shall be removed prior to continuing the membrane application.

Flashing Installation

T. Clear flashing specifications call out granule surfaced modified bitumen sheets adhered with ASTM D-312-89, type III asphalt or torch applied. All flashings must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used, but require additional periodic maintenance due to weathering. Maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted 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 (F.M.). Refer to 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from without), see the current U.L. Fire Resistance Directory.

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LIGHTGUARD® Ballasted Roofing Systems

T CLEAR CORPORATION

SPECIFICATIONS

Modified Bitumen On Steel Deck

General

T. Clear approves smooth surfaced, reinforced APP or SBS Modified Bitumen (see materials listing) for a 2 ply membrane. It is constructed by mechanically attaching a fiberglass (ASTM D-4601) or modified bitumen base sheet through a minimum 1/2" Type X gypsum board, Densdeck or other T. Clear approved underlayment, to the metal deck. Attachment shall be in accordance with requirements of types and patterns of fasteners noted in either Factory Mutual Approval Guide (1-60 or 1-90 classification) or UL listing for system being installed. This is followed by modified bitumen sheet(s) mopped or torched to the base sheet. Minimum thickness of this system shall be 160 mils not including the base sheet. The completed membrane is covered with Lightguard® Ballasted Roof Insulation. All installations of the Lightguard system shall be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from T. Clear. All membrane and flashing materials used on a roof shall be supplied by a single manufacturer.

It is the contractors responsibility to operate in a safe manner. It is recommended that all roofing applicators attend a qualified educational program for torch applications such as those offered by RIEI or SERTA.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear and should be in accordance with applicable regulatory agency requirements and industry standards. Prior to the commencement of work, all roof surfaces shall be approved by the T. Clear applicator.

The deck shall be constructed per all latest Factory Mutual Engineering or Steel Deck Institute recommendations, including: 1) Deck gauge shall be no lighter than 22 gauge, 2) Side and end joints shall be adequately lapped and mechanically fastened or welded with all loose and broken welds repaired prior to roofing, and 3) Decking shall be adequately supported at all penetrations.

Deck Slope Requirements

Roofs shall 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 water. The drain body shall 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 roof insulation systems is 2 inches per foot. The use of ASTM D 312-89, type III asphalt is preferred for all slopes. Lower melt asphalt can be used for low or no-slope applications.

Other Rated Roof Constructions

As an alternate to minimum 1/2" Type X gypsum board, Factory Mutual Class 1 insulated steel deck roof construction is accomplished when the individual components of the roof system are as required by the Factory Mutual Approval Guide.

Modified Bitumen Roof Installation

Attach a minimum 1/2" Type X gypsum board, Densdeck or other approved underlayment to the metal deck with a minimum of four fasteners per 4' x 8' sheet. The gypsum board or other underlayment shall be placed with edges parallel to the direction of the flutes and bear on the top surface. Sweep the deck free of dust and debris. Immediately install the mechanically attached base sheet.

Base Sheet Installation

Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, lay one ply of fiberglass base sheet (ASTM D-4601), or a modified bitumen sheet perpendicular to the slope lapping the side joints 2" and end joints

4". Mechanically fasten into the steel deck along the laps at a maximum 9" intervals. Additional fasteners must be placed at the 1/3 points of the sheet in two rows which are staggered-fastened at 18" O.C.. maximum. Fastener caps must be a minimum of 2" in diameter. The end laps must be staggered no less than 12" apart.

Hot Mopped Application

Starting at the low point of the roof, mop the modified bitumen sheets to the base sheet. The smooth surfaced modified bitumen sheets are applied perpendicular to the slope, with ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt and at a rate of 20-25 lbs. per square. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Torched Application

Starting at the low point of the roof, weld the torchable smooth surfaced modified bitumen sheets to the base sheet, perpendicular to the slope. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Temporary Membrane

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured modified bitumen membrane, temporary water cut-offs are necessary at the end of the workday. Water cut-offs shall be removed prior to continuing the membrane application.

Flashing Installation

T. Clear flashing specifications call out granule surfaced modified bitumen sheets adhered with ASTM D-312-89, type III asphalt or torch applied. All flashings must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used, but require additional periodic maintenance due to weathering. Maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted 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 (F.M.). Refer to 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from without), see the current U.L. Fire Resistance Directory.

T CLEAR CORPORATION

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LIGHTGUARD® Ballasted Roofing Systems

T CLEAR CORPORATION

SPECIFICATIONS

Modified Bitumen On Structural Wood Fiber Deck

General

T. Clear approves smooth surfaced, reinforced APP or SBS Modified Bitumen (see materials listing) for a 2 ply membrane constructed with a mechanically attached fiberglass (ASTM D-4601) or modified bitumen base sheet. The mechanical fasteners will be those recommended for this type of deck, and in the pattern specified. Fully mop or torch modified bitumen sheet(s) to the base sheet. Minimum thickness of this system shall be 160 mils not including the base sheet. This is covered with Lightguard® Ballasted Roof Insulation. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from T. Clear. All membrane and flashing materials used on a roof shall be supplied by a single manufacturer.

It is the contractors responsibility to operate in a safe manner. It is recommended that all roofing applicators attend a qualified educational program for torch applications such as those offered by RIEI or SERTA.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear and should be in accordance with applicable regulatory agency requirements and industry standards. Prior to the commencement of work, all roof surfaces shall be approved by the T. Clear applicator.

The structural wood fiber panels must be set level, aligned and carefully interlocked with all joints flush and even. Voids (gaps which are 1/8" or greater), thickness variations or projections which are 1/8" or greater between adjacent wood fiber panels shall be grouted and feathered smooth.

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. 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 roof insulation systems is 2 inches per foot. The use of ASTM D 312-89, type III asphalt is preferred for all slopes. Lower melt asphalt can be used for low or no-slope applications.

Modified Bitumen Roof Installation

Base Sheet Installation

Sweep the deck free of dust and debris. Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, lay one ply of fiberglass base sheet (ASTM D-4601), or a modified bitumen sheet perpendicular to the slope lapping the side joints 2" and end joints 4". Mechanically fasten along the laps at a maximum 9" intervals. Additional fasteners must be placed at the 1/3 points of the sheet in two rows which are staggered-fastened at 18" O.C. maximum. Fastener caps must be a minimum of 2" in diameter. The end laps must be staggered no less than 12" apart.

Hot Mopped Application

Starting at the low point of the roof, mop the modified bitumen sheets to the base sheet. The smooth surfaced modified bitumen sheets are applied perpendicular to the slope, embedded in ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt and at

a rate of 20-25 lbs. per square. A flow of at least 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Torched Application

Starting at the low point of the roof, weld the torchable smooth surfaced modified bitumen sheets to the base sheet, perpendicular to the slope. A flow of at least 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Temporary Membrane

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the modified bitumen membrane, temporary water cut-offs are necessary at the end of the workday. Water cut-offs must be removed prior to continuing the membrane application.

Flashing Installation

T. Clear flashing specifications call out granule surfaced modified bitumen sheets adhered with ASTM D-312-89, type III asphalt or torch applied. All flashings must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used, but require additional periodic maintenance due to weathering. Maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted 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 (F.M.). Refer to 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from without), see the current U.L. Fire Resistance Directory.

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LIGHTGUARD® Ballasted Roofing Systems

T. CLEAR CORPORATION

SPECIFICATIONS

Modified Bitumen On Wood & Plywood Deck

General

T. Clear approves smooth surfaced, reinforced APP or SBS Modified Bitumen (see materials listing) for a 2 ply membrane constructed with a mechanically attached fiberglass (ASTM D-4601) or modified bitumen base sheet. The mechanical fasteners will be those recommended for this type of deck, and in the pattern specified. Fully mop or torch modified bitumen sheet(s) to the base sheet. Minimum thickness of this system shall be 160 mils not including the base sheet. This is covered with Lightguard® Ballasted Roof Insulation. All installations of the Lightguard system must be in accordance with current specifications approved by T. Clear, installed by a T. Clear approved contractor, and will be covered by a warranty from T. Clear. All membrane and flashing materials used on a roof shall be supplied by a single manufacturer.

It is the contractors responsibility to operate in a safe manner. It is recommended that all roofing applicators attend a qualified educational program for torch applications such as those offered by RIEI or SERTA.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear and should be in accordance with applicable regulatory agency requirements and industry standards. Prior to the commencement of work, all roof surfaces shall be approved by the T. Clear applicator.

The wood or plywood deck shall be properly attached to supporting members and shall be of sufficient thickness to prevent excessive deflection between supporting members. Wood roof decks shall be tongue and grooved, ship-lapped or splined to prevent differential flexing of the boards. Any significant voids shall be covered with sheet metal.

Deck Slope Requirements

Roofs shall 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 water. The drain body shall 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 roof insulation systems is 2 inches per foot. The use of ASTM D 312-89, type III asphalt is preferred for all slopes. Lower melt asphalt can be used for low or no-slope applications.

Modified Bitumen Roof Installation

Base Sheet Installation

Sweep the deck free of dust and debris. Cover the deck with a rosin or unsaturated sheathing paper weighing approximately 5 lbs. per 100 square feet when necessary. Lap each sheet a minimum of 2" and mechanically attach to deck sufficiently to hold in place. Sheathing paper may be omitted for plywood decks. Starting at the low point of the roof, with a 1/2 width sheet as the first sheet and following with full sheets, lay one ply of fiberglass base sheet (ASTM D-4601), or a modified bitumen sheet perpendicular to the slope lapping the side joints 2" and end joints 4". Mechanically fasten along the laps at a maximum 9" intervals. Additional fasteners must be placed at the 1/3 points of the sheet in two rows which are staggered-fastened at 18" O.C. maximum. Fastener caps shall be a minimum of 2" in diameter. The end laps shall be staggered no less than 12" apart.

Hot Mopped Application

Starting at the low point of the roof, mop the modified bitumen sheets to the base sheet. The smooth surfaced modified bitumen sheets are applied perpendicular to the slope, with ASTM D-312-89 type III asphalt, applied at the EVT of the asphalt and at a rate of 20-25 lbs. per square. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Torched Application

Starting at the low point of the roof, weld the torchable smooth surfaced modified bitumen sheets to the base sheet, perpendicular to the slope. A flow of at least a 1/4" shall be obtained around all seams. The sheet is installed with a minimum 3" side laps and 6" end laps. Offset end laps a minimum of 12". Minimum thickness of this system shall be 160 mils not including the base sheet. If additional modified bitumen plies are used to achieve the 160 mil thickness, they must be installed in shingle fashion.

Temporary Membrane

It is not acceptable to include any temporary membrane as a part of a completed membrane. Install completed membrane in final form on a day-to-day basis. If the slope of the deck is such that water might flow under the secured modified bitumen membrane, temporary water cut-offs are necessary at the end of the workday. Water cut-offs shall be removed prior to continuing the membrane application.

Flashing Installation

T. Clear flashing specifications call out granule surfaced modified bitumen sheets adhered with ASTM D-312-89, type III asphalt or torch applied. All flashings must be completed in each area prior to installing Lightguard Ballasted Roof Insulation. Conform to details shown in architectural drawings, and install according to T. Clear flashing specifications. Non granule surfaced modified bitumen sheets may be used, but require additional periodic maintenance due to weathering. Maintenance is not included in the T. Clear warranty.

Other Relevant T. Clear Specifications

For installation of Lightguard Ballasted 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 (F.M.). Refer to 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 (U.L.) from the current roofing materials and Systems Directory.
3. For information on hourly rated constructions (fire from without), see the current U.L. Fire Resistance Directory.

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Air Barrier Requirements

Loose laid and mechanically attached thermoplastic 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.

Dew Point Control

The optimum dew point location is in the extruded polystyrene above the waterproofing membrane. This optimum dew point location is achieved when all or most of the insulation is above the waterproofing membrane. Preferred System design places less than 1/3 of the insulation R-Value beneath the membrane. Adding insulation beneath the membrane can lower the location of the dew point to below the membrane and adversely affect the performance of the roofing system.

Deck Condition

The erection and design properties for performance of the deck are not the responsibility of T. Clear Corporation and should 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 minimal 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. T. Clear requires that only fully adhered systems be installed over monolithic concrete decks . If tapered insulation is used to obtain slope in dead level applications, the insulation must be adhered to the concrete deck. The insulation shall be covered with a minimum 1/4" Dens-Deck Overlayment board, or a 1/2" gypsum board which is adhered to the insulation.

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 should 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. Use of key grouting, or a 12" wide modified bitumen (mopped or torched over the side and end joints between the deck units) may be used to provide an air barrier. Fully-adhered thermoplastic systems are acceptable for concrete plank decks. If a loose-laid or mechanically attached thermoplastic system is specified, a minimum 1/4" Microfoam, extruded polystyrene recovery board or equivalent is required between the deck and the membrane.

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. Loose-laid or mechanically attached thermoplastic systems require a minimum 1/4" Microfoam, extruded polystyrene recovery board, a non-woven polyester sheet, a non woven polypropylene sheet or equivalent between the deck and the membrane.

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. Loose-laid or mechanically attached thermoplastic systems require a minimum 1/4" Microfoam, extruded polystyrene recovery board, a non woven polyester or polypropylene sheet or equivalent between the deck and the membrane.

5. Steel Decks : The deck shall be constructed per current Steel Deck Institute (SDI), including 1) deck gauge shall be no lighter than 22 gauge, 2) side and end joints shall be adequately lapped, mechanically attached or welded with all loose and broken welds repaired prior to roofing, and 3) decking must be adequately supported at all penetrations. Gypsum board, Densdeck, extruded polystyrene, isocyanurate board or other approved underlayment shall be attached to the 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 4 square feet for 60 psf and a minimum of one fastener per 2 square feet for 90 psf. Thermo-plastic systems can be fully adhered to an appropriate overlayment on metal decks.

6. Wood Or Plywood Decks: The wood or plywood deck must be properly attached to supporting members and must be of sufficient thickness (minimum 15/32 plywood) 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 sheet metal that must be hemmed on all open edges a minimum 0.5" in order to prevent damage to the membrane by sharp metal edges. Some thermoplastic systems can be fully adhered to wood or plywood decks. If a loose-laid or mechanically attached thermoplastic system is specified, a minimum 1/4 inch Microfoam, extruded polystyrene recovery board, polyester or polypropylene slip sheet, or equivalent is required between the deck and the membrane.

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 that are 1/8 inch or greater), or thickness variations and projections that are 1/8 inches or greater between adjacent wood fiber planks shall be grouted and feathered smooth. Some thermo-plastic systems can be fully adhered to structural wood fiber decks.

8. Existing Built-Up Roof Membranes: A built-up roof with a gravel surface shall have the loose gravel removed by the use of a power broom. If the bitumen surface is less than 2 years old, a coal tar pitch

surface, or has been resurfaced within 2 years, then a slip sheet of 6 mil polyethylene will be required. A loose-laid or mechanically attached thermoplastic system is acceptable for existing BUR roofs. A minimum 1/4 inch extruded polystyrene recovery board or equivalent is required between the old and new membrane. Contact the membrane supplier or review the membrane manufacturer's data to achieve assurance that the membrane is compatible with the existing roofing material. 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 inch per foot slope is recommended. "Dead level" decks using heat welded thermoplastic membranes 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 tapered 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 Ballasted Roof Insulation is 2 inches per foot.

Specification Requirements Common To All Thermoplastic Installations– Loose Laid, Mechanically Attached and Fully Adhered

The following specifications provide the basis for the installation of the thermoplastic 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 purchased from a single membrane manufacturer.

1. Insulation Beneath The Membrane: It is preferable not to use more insulation below the membrane than required to protect the membrane from sharp objects or uneven substrates. However, when insulation is required for slope, tapered insulation such as extruded polystyrene is recommended. The addition of insulation under the membrane may change the dew point in the system. Care must be given to the roofing system design in order to keep the dew point above the waterproofing membrane. The insulation must be secured with compatible insulation adhesive to prevent movement. Slip sheets may be required between insulation and PVC based Thermoplastic membranes. Consult membrane manufacturer or T. Clear for requirements and use.

2. Seams: All approved thermoplastic membrane specifications must use heat welded seams in the field of the roof. All flashing details shall use heat welded or solvent welded seams.

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 inch overlap. Laps shall be shingled with the slope of the roof, so as not to develop buck water joints.

4. Seaming: The sheets must be seamed using a proper heat welder designated by the membrane manufacturer. The seams shall be checked for continuity and integrity and repaired immediately.

5. Termination And Securement: Positive membrane securement shall be provided at all membrane terminations. Termination bars shall be installed at the perimeter of each roof level, section, curb flashing, skylight, expansion joint, interior wall, penthouse, etc. Securement shall be provided at all angle changes. Mechanical securement at terminations shall be sealed. Pull-out strengths of the securements shall be 100 lbs/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 available shall be used to minimize splices. Precoated compatible metal flashings shall be used wherever their installation is practical. Flashings shall not be applied over thru-wall flashings or weep holes. When using thermoplastic 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. Flashing membrane shall extend a minimum 6 inches 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 inches 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. Precoated compatible metal flashings shall be used wherever their installation is practical. When bonding directly to metal, clean and prime the metal thoroughly. 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. 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. Pitch pans must be maintained by the building owner. Water-shedding devices covering pipe clusters are recommended.

8. Drains: Existing flashing, asphalt or other material 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. Cracked roof drain bowls and roof drains using lead -packing, oakum, or coal tar sealant, shall be replaced with new roof drains.

9. Gravel Stops: The deck membrane shall be installed over the perimeter by properly securing it to a treated wood nailer on the outside fascia of the building. The membrane shall extend below and be sealed to the outside of 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 Tech Note #20.

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 1-60 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. Air barriers, as described in T. Clear Tech Note #20 must be included.

Fully Adhered: Over the properly installed and/or prepared compatible substrate, fresh, properly stored compatible adhesive designed for the membrane being installed 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 out 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 heat-welded and 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 thermoplastic materials, 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.

Lightguard Installation

Slip sheets may be required between insulation and PVC based Thermoplastic membranes. Consult membrane manufacturer or T. Clear for requirements and use. To complete Lightguard PMRI systems, see:

1. Lightguard installation, wind design, and securement specifications (LIDS 1995)

2. Lightguard flashing details (LFD 1995)

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). See T. Clear current listings.

3. For more information on the hourly rated constructions (Fire From Within), see the T. Clear current listings from the UL Directory.

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LIGHTGUARD®
Protected Membrane Roof Insulation

SPECIFICATIONS

Thermoplastic Roofing Membranes

Table #1. Single-Ply Membranes

Manufacturer	Designation	Fully Adhered	Mechanically Attached	Loose Laid	Not Recommended For Monolithic Concrete Decks*
Bond Cote Systems	Bond Cote 40 mil		X	X	X
Burke Industries	Burkeline M358 MF**		X	X	X
	Burke Elvaloy	X	X	X	
	Burkeline M560 Vac Q**			X	X
Carlisle Syntec	Hychoice**	X	X	X	
Duro-Last	Durolast 45 mil		X	X	X
	Durolast 50 mil		X	X	X
Hyload	Hyload 250			X	X
JPS Elastromerics	Hi-Tuff**	X	X	X	
	Hi-Tuff EP	X	X	X	
Republic Powdered Metals	Geoflex			X	X
Sarnafil	G476 PVC			X	X
Seal Dry	SYS 3000, 5000, 7000	X	X	X	
Seaman	Fibertite		X	X	X
Trocal	SRB-50 or 60			X	X
Tremco	Tremco HP 4510**	X	X	X	
Versico	Versiweld	X	X	X	

*Suitable for all other standard types of decks including Metal Decks, Panel Concrete, Wood Decks, Wood Fiber, Insulated Concrete and existing systems.
**Technically a thermoset material, but acts as a thermoplastic during installation.

General

Thermoplastic water-proofing membranes are acceptable for use with Lightguard® Protected Membrane Roof Insulation (PMRI). Acceptable membranes can be found in Table #1 above.

The membrane shall be installed in accordance with one of the following specifications:

- The specifications of the membrane manufacturer and shall incorporate only those materials supplied by a single manufacturer.
- The specifications developed by the specifier must have prior written approval by T. Clear.
- The T. Clear specifications incorporated in this document.

These specifications can be extended with the application guidelines for Thermoplastic Membrane Systems by SPRI.

Warranty

All installations of the Lightguard PMRI systems must be in accordance with current specifications approved by T. Clear, installed by a contractor approved by T. Clear and the membrane supplier, inspected by a T. Clear inspector, and will be covered by a warranty from T. Clear.

The design criteria for the Lightguard PMRI 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 "R" Brand insulation, meeting ASTM C-578 type V, VI or VII, can be installed above the membrane and below the Lightguard.

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Protected Membrane Roof Insulation

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 Insulationshall 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.

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Protected Membrane Roof Insulation

SPECIFICATIONS

Short Form Specifications

Note: All specifications use [ ] to indicate architects' options.

LIGHTGUARD® Specifications

Install [2"] [3"] LIGHTGUARD insulation according to T. Clear specification 4.3.2 and 4.3.3 over [approved membrane]. All installations of the LIGHTGUARD Systems must be in accordance with current specifications approved by T. Clear, installed by a T. Clear Approved Contractor and will be covered by a warranty from T. Clear.

EPDM Specifications

Install [mil] EPDM water-proofing membrane material that meets the requirements of ASTM D 4637-87. The EPDM membrane shall be installed by experienced contractors that are approved for installation of the membrane by Clear [and the membrane supplier]. EPDM membrane shall be installed in accordance with the installation specification for taped seamed membranes by [Carlisle Syntec Systems] [Celotex Corporation] [Firestone Building Products] [Genflex Roofing Systems] [Manville Roofing Systems] [Versico, Inc.]; [The Architects Specification, approved by T. Clear]; [T. Clear].

Attachment of Membrane[Options]

[Fully Adhered]
EPDM taped seamed membrane shall be fully adhered to [{1/2"} {5/8"}] Gypsum Board mechanically fastened over minimum 22 ga. steel deck meeting the requirements of the Steel Deck Institute] [Monolithic Concrete] [Concrete Panels] [Wood Fiber] following specifications for fully adhered systems.

[Mechanically Attached]
EPDM taped seamed membrane shall be mechanically fastened to [{minimum 22 ga.} Metal Deck] [Wood Deck] [Wood Fiber Deck] [Insulating Concrete Deck] [Existing Roofing System] which has an air barrier [minimum 6 mil polyethylene] [selected vapor barrier material] applied over the deck and beneath mechanically attached [Gypsum Board] [Fire Classified Insulation] The [Gypsum Board] [Insulation] shall be fastened using a minimum of one fastener per two square feet. Installation of the air barrier shall be in accordance with the requirements of T. Clear Technical Note #20. The mechanical attachment of the membrane shall be adequate to resist a [60] [90] psf uplift. Existing membranes and some other decks may not require additional air barrier. Determination of the adequacy of the air barrier shall be made by the T. Clear Advisor/Inspector before membrane installation.

[Loose Laid]
EPDM taped seamed membrane shall be installed loose over [{minimum 22 ga.} Metal Deck] [Concrete Panels] [Wood Deck] [Wood Fiber Deck] [Insulating Concrete Deck] [Existing Roofing System] which has an air barrier [minimum 6 mil polyethylene] [selected vapor barrier material] applied over the deck and beneath mechanically attached [Gypsum Board] [Fire Classified Insulation]. The [Gypsum Board] [Insulation] shall be fastened using a minimum of one fastener per two square feet. Installation of the air barrier shall be in accordance with the requirements of T. Clear Technical Note #20. Existing membranes, or key grouted or sealed concrete panels and some other decks may not require additional air barrier. Determination of the adequacy of the air barrier shall be made by the T. Clear Advisor/Inspector before membrane installation.

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