



**Concrete Building Envelope Products**  
800.544.7398 [www.tclear.com](http://www.tclear.com)

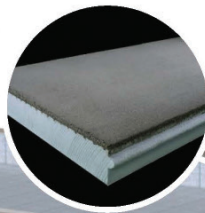
# A Complete Line of Concrete Building Envelope Products



Since 1975

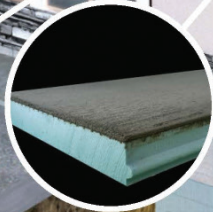
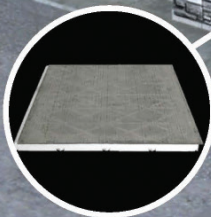
## The Choice is CLEAR

**LightGUARD® and HeavyGUARD®**  
Protected Membrane Roof Panels

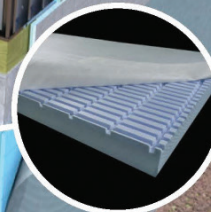


**ProGUARD®**  
Concrete insulated  
sheathing

**ProGUARD DP™**  
Insulated concrete  
board with  
drainage plane



**WallGUARD®**  
Concrete faced insulated  
perimeter wall panels



**ThermaDRY®**  
Insulating  
drainage panels

**Durability. Sustainability. Energy Efficiency**



**Contributes to LEED Points!**

For more information on any T. Clear Products or for a list of nationwide manufacturer's representatives, call T. Clear at **800-544-7398** or email [sales@tclear.com](mailto:sales@tclear.com).

*LightGUARD®, HeavyGUARD®, WallGUARD®, ProGUARD®, and ThermaDRY® are registered trademarks of T. Clear Corporation.*

*Styrofoam™ is a registered trademark of DuPont.*

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# LightGUARD® & HeavyGUARD®

## Protected Membrane Roof Insulation Panels



LightGUARD® & HeavyGUARD® Protected Membrane Roof (PMR) Insulation Panels from T. Clear Corporation combine insulation and ballast to protect the waterproof membrane from wind and damage caused by hail, UV radiation, vandalism, thermal cycling and physical abuse. With a longer life span, reduced maintenance costs and the energy savings of DuPont Styrofoam™ insulation, a T. Clear PMR will pay for itself!

By simply reversing conventional design and placing the insulation above the membrane rather than below, the cause of many life shortening roofing problems can be eliminated. This unconventional arrangement of roofing material—roof deck, roof membrane, LightGUARD® or HeavyGUARD® ballasted roof insulation panels—is commonly referred to as the upside-down system, or Protected Membrane Roofing (PMR) system.

In all areas of the building envelope, the moisture barrier is placed on the warm side of the insulation. With one exception—a conventional roof system. In a T. Clear PMR system the insulation is placed above the waterproof membrane to protect it from the harsh rooftop environment.

Each 2'x4' LightGUARD®/HeavyGUARD® PMR Insulation panel utilizes the superior moisture resistance and high compressive strength properties of DuPont Styrofoam™. A layer of latex-modified concrete is bonded to the surface of each panel further protecting it from physical abuse as well as providing ballast. Each panel has tongue-and-groove edges for easy installation.

### **LightGUARD® & HeavyGUARD® PMR Panels protect any waterproof membrane from the main causes of roof failures, including hail!**

In laboratory tests conducted at Jim D. Koontz & Associates, Inc., LightGUARD® PMR Insulation Panels at 40°F withstood the impact of 2" diameter ice spheres traveling at 109 fps, while HeavyGUARD® panels held their own against 3.5" ice spheres traveling at over 146 fps before cracking. Cracked, not failed as the pvc single-ply membrane under our HeavyGUARD® panels was never touched. The only damage was to the concrete surface of the T. Clear PMR panels. Nothing penetrated the insulation portion!



Protected Membrane Roof Insulation Panels protect the membrane, reduce energy costs and provide an attractive, walkable surface.

- LightGUARD® panels consist of 3/8" latex-modified concrete bonded to 2" or 3" Styrofoam™ and weigh 4.5 lbs./sq. ft.
- HeavyGUARD® panels consist of 15/16" latex-modified concrete bonded to 2" or 3" Styrofoam™ and weigh 11 lbs./sq. ft.
- Each 2'x4' panel is tongue-and-grooved and loose laid over the membrane.
- Styrofoam™ has an R-value of 5 per inch, guaranteed.
- Ballast and insulation are laid in one easy step.
- Reduced and low GWP, recyclable and can be reused in any roof situation or vertical expansion.
- LightGUARD® & HeavyGUARD® are available in 4 attractive color finishes—gray, tan, red and green.
- HeavyGUARD® is perfect for rooftop gardens and light-traffic decks.

### **A T. Clear PMR System is the perfect choice for environments with high humidity such as paper and textile mills**

When warm air meets cool air, water vapor condenses. The temperature at which water vapor condenses is called the "dew point."

In conventional roof systems, the dew point is below the waterproof membrane. So when vapor condenses it is deposited into your insulation and spread throughout by

capillary action, decreasing its insulating value. It can literally "rain" inside your building and deteriorate the roof deck over a period of time.

In a T. Clear PMR, the dew point is raised above the waterproof membrane. So, water vapor isn't allowed to condense inside your building.



## Protect Your Investment with T. Clear's Protected Membrane Roof System

| Features                                                                                      | Advantages                                                                                                                                                                                                                                                                      | Benefits                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Engineered concept</b><br><i>(Insulation above the waterproof membrane)</i>                | <ul style="list-style-type: none"> <li>Membrane protected from: <ul style="list-style-type: none"> <li>– Sun's ultraviolet rays</li> <li>– Temperature extremes</li> <li>– Physical abuse</li> <li>– Hail</li> </ul> </li> </ul>                                                | <ul style="list-style-type: none"> <li>Eliminates major causes of leaks and roof failures</li> <li>Reduces yearly maintenance costs</li> <li>Membrane remains pliable longer</li> </ul>                                                                                            |
| <b>During installation membrane is put down before the insulation</b>                         | <ul style="list-style-type: none"> <li>Membrane is installed in a single operation</li> <li>Ballast can be installed later, even in inclement weather</li> </ul>                                                                                                                | <ul style="list-style-type: none"> <li>Building is waterproofed quicker</li> <li>More roofs installed in a shorter time</li> </ul>                                                                                                                                                 |
| <b>Extruded polystyrene</b>                                                                   | <ul style="list-style-type: none"> <li>Retains at least 80% of its R-value for 20 years</li> <li>Is resistant to water from absorption, capillary transmission and freeze-thaw cycles</li> <li>Has high compressive strength properties</li> <li>Reduced and low GWP</li> </ul> | <ul style="list-style-type: none"> <li>Reduces energy costs</li> <li>Long-term performance</li> <li>More predictable thermal efficiency</li> <li>Helps protect membrane from foot traffic and abuse from outside contractors and vandals</li> <li>Environmentally sound</li> </ul> |
| <b>Authorized Contractors</b>                                                                 | <ul style="list-style-type: none"> <li>Better control of installation quality</li> </ul>                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Roof performs better, longer</li> </ul>                                                                                                                                                                                                     |
| <b>Full Range of Warranties</b><br><i>(Including the T. Clear Total Performance Warranty)</i> | <ul style="list-style-type: none"> <li>Choose option that best suits your long-term plan and budget</li> </ul>                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Extended term, wind, and liabilities available</li> </ul>                                                                                                                                                                                   |

Logic will tell you that a PMR utilizing LightGUARD® or HeavyGUARD® ballasted insulation panels will last longer than the typical conventional roof system because the membrane is protected from deterioration and damage. Experience will tell you that yearly maintenance costs are generally limited to clearing drains and checking the membrane along any parapets. A T. Clear PMR will literally pay for itself.



WallGUARD® Concrete Faced Insulated Perimeter Wall Panels are prefinished, “one-step” exterior insulating panels intended for use below and above grade in new or retrofit residential, commercial, industrial and institutional applications. WallGUARD® panels protect and insulate the exposed area of foundations, slab edges, rim joists and other perimeter wall areas. The tongue & groove edges of each panel help assure a tight fit and minimize air infiltration.

WallGUARD® panels consist of reduced and low GWP Styrofoam™ brand extruded polystyrene insulation with a factory applied 5/16” thick latex-modified concrete facing. The finished panel surface is 24”x48” (610mm x 120mm) with a tongue and groove along the 48” edge. Panels are available in standard insulation thicknesses of 2” (50mm) R-10 and 3” (75mm) R-15.

WallGUARD® panels provide building owners with a durable, insulated, abuse-resistant wall cladding and building occupants with a more comfortable environment by insulating the exposed area of the building’s foundation, which can account for 10% or more of total heat loss.



### Parapet Walls

WallGUARD® panels can also be used to insulate and protect parapet walls. The panels provide for impact resistance with their durable latex modified concrete facing while insulating the parapet to meet continuous insulations requirements.



WallGUARD® panels are installed using specially designed galvanized steel mounting clips, which are included with each pallet of product. They can be installed in any weather, without the need for highly skilled labor. Due to the nature of their installation, WallGUARD® panels can be removed and reused when applicable.



# Protect Your Investment with WallGUARD®

| Features                                                                | Benefits                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Combines protection and excellent insulation in a single product</b> | <ul style="list-style-type: none"> <li>Efficiently protects interior-use areas from adverse temperature changes</li> <li>Damage-resistant mortar facing protects insulation and wall system against physical abuse</li> </ul> |
| <b>Long-term, high insulation value</b>                                 | <ul style="list-style-type: none"> <li>Reduces energy costs. Continuous insulation provides superior thermal efficiency. Reduces condensation problems</li> </ul>                                                             |
| <b>Proven moisture resistance</b>                                       | <ul style="list-style-type: none"> <li>Maintains R-Value</li> </ul>                                                                                                                                                           |
| <b>Tongue and groove panel edge</b>                                     | <ul style="list-style-type: none"> <li>Aids alignment and improves whole wall insulation value</li> </ul>                                                                                                                     |
| <b>Prefabricated hardware</b>                                           | <ul style="list-style-type: none"> <li>Simple, fast and economical installation</li> </ul>                                                                                                                                    |
| <b>Lightweight</b>                                                      | <ul style="list-style-type: none"> <li>Easy to handle at only 4.5 lbs per square foot</li> <li>Cuts easily with a masonry saw blade</li> </ul>                                                                                |
| <b>Reusable</b>                                                         | <ul style="list-style-type: none"> <li>Panels are recyclable and can be removed and reinstalled at a later time</li> </ul>                                                                                                    |
| <b>Latex-modified concrete facing</b>                                   | <ul style="list-style-type: none"> <li>Accepts elastomeric, stucco, paint and other finishes</li> </ul>                                                                                                                       |

WallGUARD® panels should be installed vertically (48" edge) in perimeter applications when possible. Panels are not suited for irregularly shaped buildings with many corners or curved surfaces, or for masonry foundations with many surface irregularities. As with any cement based product, color variation, efflorescence, and/or hairline cracking of the cementitious facing may occur. These phenomenon will not affect the performance of the WallGUARD® panels. If uniform or matching coloring is required, a quality latex masonry coating must be applied.

WallGUARD® panels can be cut on-site using a masonry saw. Whether panels are wet cut or dry cut, all cuttings should be rinsed or blown with condensed air off the surface of the panels, and cut panels should be individually handled until dry or installed.

WallGUARD® panels are shipped in shrink-wrapped pallets of 38 panels both for 2" and 3". Each full pallet comes with securement clips and fasteners in the following quantities:

- (76) galvanized steel securement clips
- (152) 1-3/4" (33mm) concrete screws
- (40) 3-3/4" concrete screws



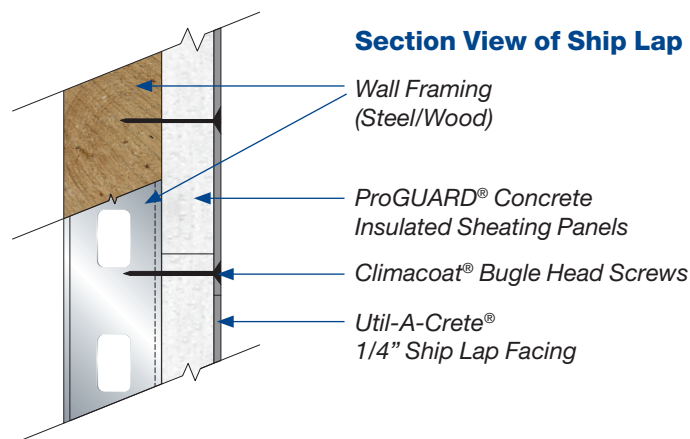
ProGuard® Concrete Insulated Sheathing, manufactured by T. Clear Corp, is a unique next generation building product designed for both commercial and residential applications. It is a light-weight, durable, ready to finish, insulated sheathing that attaches directly to structural studs or concrete walls. By putting the insulation on the outside of the studs, heat transfer through the stud is greatly reduced and the thermal efficiency of the wall system significantly increased. The wall cavity can still be insulated which further enhances the thermal efficiency of the wall system.



In addition, the concrete skin provides a durable, ready to finish surface that is installed along with the insulation. Significant labor savings results when the insulation and sheathing are installed in a single unified product.

ProGUARD® consists of a nominal 1/4" thick Util-A-Crete® concrete backerboard that is reinforced with two layers of fiberglass mesh. This 3' x 8' concrete panel is laminated to extruded or expanded polystyrene in standard thicknesses of 1 1/2", 2", 2 1/2", 3", and 4" (the composite panel thicknesses are 1 3/4", 2 1/4", 2 3/4", 3 1/4", and 4 1/4"). Thicker or thinner panels are available in expanded polystyrene only as "Special Request" items.

A 3/4" ship lapped edge is created on all four sides of the panel. This edge detail greatly reduces heat transfer and air leaks through the panel joints when installed on the wall structure. The tough concrete surface is weather resistant and serves as a durable base for trowel or spray applied acrylic exterior finishes, siding or other finish materials.



## Code Approval

ProGUARD® meets the requirements of the following Building Codes:

- International Building Code (IBC)
- International Residential Code (IRC)

Code Listing by NTA, Inc. Listing Report # TCC022305-25

## Insulation

Styrofoam™ has an R-Value of 5 per inch of thickness at 75° F and 2 lb./ft3 density. Expanded Polystyrene has an R-Value of 4.35 per inch of thickness at 75° F. Because the insulation is placed on the outside of the wall studs, heat transfer through the studs is greatly reduced. ASHRAE states that this heat transfer can be as high as 25% on conventional steel stud construction (it will be slightly less on wood stud construction). The stud wall cavity can still be insulated thus creating highly efficient thermal wall system. In addition, by insulating the outside of the stud, it is unlikely that the dew point will be reached within the wall cavity thus preventing condensation and greatly reducing the likelihood of mold and mildew formation within the wall structure.

## Concrete Surface

The Util-A-Crete® fiberglass reinforced concrete surface of ProGUARD® has a compressive strength of 2600 psi providing a hard durable surface that is resistant to impact. The ship-lapped joint detail helps reduce thermal transfer at the panel joints while insuring a continuous concrete surface for the wall. The Util-A-Crete® surface provides a suitable base for the application of synthetic acrylic exterior coatings, siding, synthetic stone, brick and thin-brick.

## Joint Sealing

All panel joints should be sealed with Water Armor™ provided by T. Clear Corp. or an approved equal as specified by the exterior finish manufacturer. The panel joints should be sealed prior to the application of any type of exterior finish.

## Mold, Mildew and Moisture Resistant

Water absorption of ProGUARD® is less than 2% by volume for EPS and 0.3% by volume for XPS when tested in accord with ASTM C 272. The water vapor permeability for both EPS and XPS is less than 0.6 when laminated to the Util-A-Crete® skin indicating that additional building wrap may not be needed. Local codes will dictate the necessity for additional wrap or water resistant coating. Keeping moisture out is the first priority in preventing mold and mildew from forming. ProGUARD® is highly resistant to mold and mildew in accordance with ASTM D3273.

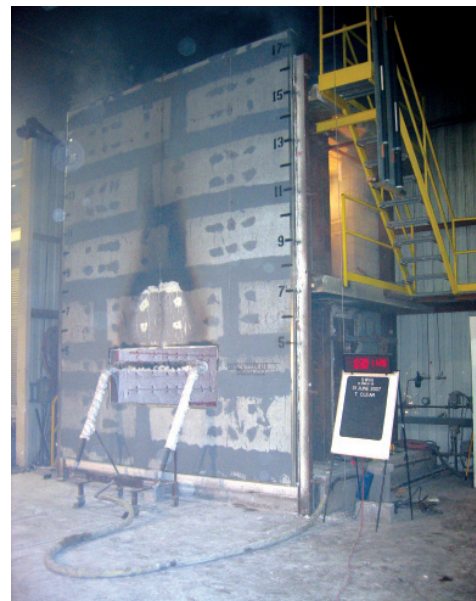
# ProGUARD® can withstand temperatures in excess of 1,700° F and passed the flammability test with high marks!



Wall is built with ProGUARD® applied to outside and sealed. Interior room is lit on fire.



Flame is placed beneath window cutout in wall as well.



After 30 minutes, ProGUARD® is intact – only smoke damage on the outside.



When ProGUARD® is cut away, the foam 2 feet above the flame is like new!



The Gypsum beneath the ProGUARD® is completely free of smoke or fire damage.

ProGUARD® meets the rigorous requirements of NFPA 285 Standard Method of Test for the evaluation of Flammability Characteristics of Exterior Non-load bearing Wall Assemblies

Containing Combustible Components when used in conjunction with mineral wool as the insulation for the ProGUARD® header panels.

ThermaDRY® Insulating Drainage Panels are manufactured using 2'x8'x2" panels of Styrofoam™ brand extruded polystyrene or expanded polystyrene. Closely spaced vertical and horizontal channels cut into one side of the ThermaDRY® panels provide rapid drainage of foundation walls. Adhered to the channel surface is a



spunbonded geotextile filtration fabric which helps prevent soil from entering and clogging the channels. This fabric also overlaps the sides and end of the panels to help prevent soil from clogging the edge channels at the panel joints.

ThermaDRY® provides time and labor savings by featuring drainage, insulation and protection in one easy step. The high compressive strength polystyrene withstands installation abuse and geopressure while reducing long-term energy consumption by insulating below grade foundation walls. The potentially damaging effects of soil water, hydrostatic pressures and freeze-thaw cycling are greatly reduced by ThermaDRY® panels.

ThermaDRY® is easy to install without the need for special tools or equipment. The panels are 2'x8' and are erected vertically, typically over the waterproofing providing for protection of the waterproofing during backfill.

There are three types of ThermaDRY® Insulating Drainage Panels— Type 750 (25psi), Type 1250 (40psi) and Type 1750 (60psi). Each can be used to full advantage in varied structures other than basement or foundation walls. They will, for example, insulate and protect bridge abutments, retaining walls, earth-sheltered structures, culverts, lagging or forms. Types 1250 and 1750 can also be used for horizontal applications such as plaza decks.

The type of ThermaDRY® panels selected for use on any given foundation or structure will depend on the amount of pressure exerted by the soil.

### New Plaza Design using ThermaDRY® Insulating Drainage Panels

The current systems have worked very well for many years, but they can be difficult to detail and expensive to install. ThermaDRY® offers a simpler, more economical method of approach. This method allows the paver or poured concrete wearing surfaces to be installed directly on the surface of the ThermaDRY® Insulating Drainage Panels. These panels inherently provide the drainage and ventilation pathways which are necessary below the plaza wearing surface and both the high strength and long term thermal efficiency of Styrofoam™ insulation in the current design are maintained in this new design. More importantly, by using ThermaDRY® panels, the costly pedestal system needed in conventional pedestal-paver construction is eliminated and in poured concrete construction, the use of ThermaDRY® panels mean the costly and cumbersome installation of pea gravel and two layers of filter fabric is eliminated.

| Panel Property                           | ASTM Method | Type 750       |        | Type 1250      |        | Type 1750      |        |
|------------------------------------------|-------------|----------------|--------|----------------|--------|----------------|--------|
|                                          |             | Styrofoam XPS  | EPS    | Styrofoam XPS  | EPS    | Styrofoam XPS  | EPS    |
| Thickness: Inches                        |             | 2              | 2      | 2              | 2      | 2              | 2      |
| Edge Treatment                           |             | Square         | Square | Square         | Square | Square         | Square |
| R-Value                                  | C518        | 9.4            | 8      | 9.4            | 8      | 9.4            | 8      |
| Compressive Strength                     |             | 25psi/3600 psf |        | 40psi/5760 psf |        | 60psi/8640 psf |        |
| Design Compress Strength* (x.60%)        | D1621       | 2160 psf       |        | 3460 psf       |        | 5180 psf       |        |
| Flow Rate** gpm/ft                       | D4716       | 9.5            |        | 12             |        | 12             |        |
| <b>Recommended Load*** (Plaza Decks)</b> |             |                |        |                |        |                |        |
| Static Load                              |             | N/A            |        | 1250 psf       |        | 1750 psf       |        |
| Dynamic Load                             |             | N/A            |        | 700 psf        |        | 1000 psf       |        |

\* An appropriate design factor, such as 3 to 1 for static loads should be applied to minimize compressive creep.

\*\* Flow rate at 500 lbs per square foot load

\*\*\* Includes drainage channels