

Lightweight Insulating Concrete Systems



A sustainable, high performance roof insulation solution.



▲ A Siplast Lightweight Insulating Concrete System and Paradiene 20/30 FR Roof System were installed on this Nevada hospital.

This high-rise luxury condominium tower on the beach at Marina Del Rey, California is protected by a complete Siplast System of torch grade Paradiene and Siplast Lightweight Insulating Concrete.



Innovation

The lightweight insulating concrete roof insulation systems offered by Siplast have a long and proud history of over seventy years that began in the 1930s in the northern United States.

At that time, building codes requiring fire resistive properties began gaining popularity, and the fire resistant thermal barrier provided by lightweight insulating concrete roof decks helped to meet this new need. Today there are hundreds of thousands of successful lightweight insulating concrete decks in North America.

Advantages

Siplast Lightweight Insulating Concrete Systems combine the unique properties of lightweight insulating concrete and premium expanded polystyrene foam insulation board. The resulting sustainable roof insulation system has a smooth, monolithic surface ideal for roofing application, and works to prolong membrane life. Siplast Lightweight Insulating Concrete Systems provide high performance solutions to industry concerns such as slope-to-drain, moisture resistance, high compressive strength, dimensional stability, and the ability to mechanically fasten the roofing membrane to the insulation. The systems offer solutions to regulatory concerns including fire and wind resistance, code approvals, stable R-values, and environmental safety. Finally, Siplast Lightweight Insulating Concrete Systems provide solutions to building owners' requirements – they are sustainable, economical, reroofable, fully guaranteed, and proven.

Quality

Siplast is committed to placing the same emphasis on quality, long-term roof insulation solutions that has built our strong reputation as an industry leader and innovator in advanced roofing and waterproofing systems. Siplast

Research and Development continually studies issues related to application quality control, long-term performance, and the impact of substrates on roof membrane life.

Application

Siplast Lightweight Insulating Concrete Systems are installed exclusively by Siplast Select Lightweight Insulating Concrete Contractors. These independent professionals have met the qualifications of the toughest contractor certification program in the industry – ours. Their proven skill and dedication have demonstrated time and again that they regard themselves as members of a team dedicated to installing great roofs for their building owner customers.

System Responsibility

Siplast is the only commercial manufacturer to offer a complete roof system package that combines SBS-modified bitumen membranes with the stability and thermal performance of lightweight insulating concrete. This single source of materials ensures quality products designed and produced to work together. Siplast Lightweight Insulating Concrete, used together with our high performance roof membranes and fasteners, create a complete system with total responsibility from a single manufacturer.

For building owners who do not need the benefits of a total system guarantee, Siplast offers a ten-year Roof Insulation Performance Guarantee on all approved applications. Under its terms, Siplast guarantees the roof insulation's actual resistance to heat flow (provided the roof membrane remains leak free) and the reroofability of the insulation should the roof membrane require replacement.



▲ The Insulcel-RT Lightweight Insulating Concrete System and a Paradiene 20 TS/ 30 TG Roof Membrane System were chosen for this bank in Puerto Rico.



▲ Siplast Lightweight Insulating Concrete and over 7,000 squares of torch grade Paradiene work as a complete system to protect this fruit and vegetable market in the Bronx.

Products

Siplast Lightweight Insulating Concrete is available in four mix designs: ZIC, NVS, Insulcel, and Zonocel. The four designs represent a range of compressive and tensile strengths, allowing a choice of system based on substrate and project circumstances. Each design encapsulates Insulperm Insulation Board in insulating concrete. This provides fire protection, prevents air infiltration, and bonds the system to the substrate.

ZIC

The standard ZIC mix is a 1:6 ratio of Portland cement volume to ZIC Concrete Aggregate volume. ZIC is used in new construction applications over slotted galvanized metal decking. The standard 1:6 mix requires a minimum 2-inch thickness of ZIC over the top of the Insulperm Insulation Board.

NVS

The NVS mix is a 1:3.5 ratio of Portland cement volume to NVS Concrete Aggregate volume. NVS is engineered for use over

non-venting substrates and in reroofing and re-cover applications. Because of its higher compressive and tensile strengths, NVS requires only a 1-inch minimum thickness over the top of the Insulperm Insulation Board.

Zonocel

The Zonocel mix is a combination of Insulcel-PB pregenerated cellular foam and ZIC Concrete Aggregate. Zonocel is used in new construction applications over slotted galvanized metal decking. Zonocel is placed at a minimum 2-inch thickness over the top of the Insulperm Insulation Board.

Insulcel

The Insulcel mix is a combination of Insulcel-PB pregenerated cellular foam with a Portland cement/water slurry. The result is an economical roof insulation system appropriate for jobs located in climates that are conducive to proper curing of cellular concrete. Insulcel Insulating Concrete is placed at a minimum 2-inch thickness over the top of the Insulperm Insulation Board.



▲ This impressive complex in northern California is protected by a Paradiene 20/30 System installed over Siplast Lightweight Insulating Concrete.

Insulperm Insulation Board

Insulperm is a premium-quality, CFC-free expanded polystyrene insulation board of nominal 1 pcf density specifically designed for use in Siplast Lightweight Insulating Concrete Systems. When installed in a stair-step configuration, it is the base for the system's slope-to-drain capability.

RT Surface Treatment

RT Surface Treatment is a heat-activated, asphalt-based pellet that is broadcast into the surface of newly poured Insulcel Lightweight Insulating Concrete. It provides enhanced bonding when semi-adhered Paradiene 20 TS is applied directly to the surface of an Insulcel Lightweight Insulating Concrete deck. When Paradiene 20 TS is torch-applied, the membrane and pellets are heat welded, resulting in a unique, highly engineered system with a first ply that is not only adhered to the deck surface, but also mechanically bonded to the concrete without penetrating the membrane.

Zono-tite and NVS Base Sheet Fasteners

Zono-tite and NVS Base Sheet Fasteners are designed to penetrate and hold in lightweight concrete. Each fastener has a two-piece stem that spreads when driven, producing an inverted wedge. This shape offers withdrawal resistance of more than 40 pounds of force per fastener at the time of installation. Withdrawal resistance increases with age.

Each base sheet fastener is sized for its specific application. The Zono-tite nominal 2-inch length is designed for use with ZIC, Insulcel, and Zonocel concretes. The NVS nominal 1-inch length is for use with NVS Systems. A specially designed roofing disk allows achievement of FM Approvals 1-90 or higher wind uplift resistance. The roofing disk is preassembled with each fastener where required.

Zono-Patch Patching Compound

Zono-Patch is a unique mixture of cementitious binders, low-density fine aggregates, and proprietary additives formulated for the repair of new and existing lightweight insulating concrete surfaces. It is resistant to moisture and sets up quickly. Its special formulation makes it possible to feather-edge patches to zero thickness and skim-coat rough surfaces.

Siplast Lightweight Insulating Concrete and Ordinary Rigid Board Insulation

Fire resistance, durability, high compressive strength, and excellent resistance to moisture and heat flow are important characteristics of quality roof insulations. In addition to these characteristics, Siplast Lightweight Insulating Concretes offer many unique advantages that make them superior to ordinary rigid board insulation.



▲ On this reroofing project, a thin slurry coat of lightweight insulating concrete is poured in place, correcting substrate irregularities and bonding the Insulperm Insulation Board to the substrate.



▲ Decreasing thicknesses of Insulperm Insulation Board form the slope-to-drain contour of the finished system.



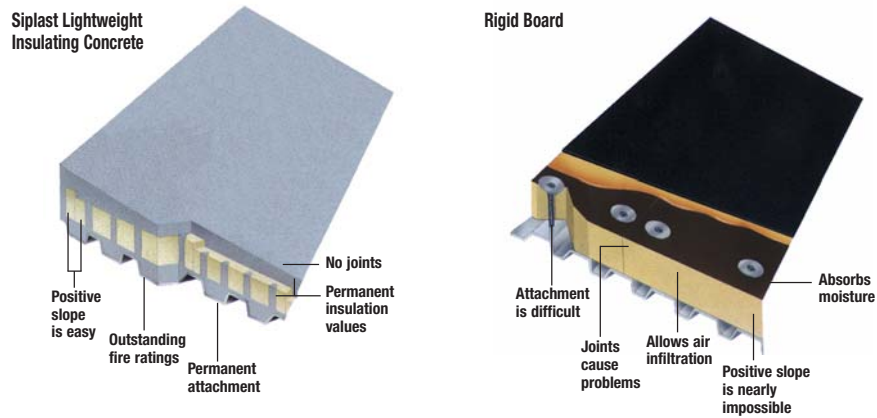
▲ A top layer of insulating concrete is placed over the Insulperm, filling the holes in the Insulperm and locking it into the system without the use of fasteners.



▲ Siplast Lightweight Insulating Concrete is screeded to a smooth, durable, monolithic surface ideal for roofing application.

Siplast Lightweight Insulating Concrete vs. Ordinary Rigid Board

Fire resistance, durability, high compressive strength, and excellent resistance to moisture and heat flow are important characteristics of quality roof insulations. In addition to these characteristics, Siplast Lightweight Insulating Concrete Systems offer many advantages that make them superior to ordinary rigid board roof insulation.



Performance Comparison

	Siplast Lightweight Insulating Concrete	Ordinary Rigid Board
Hourly Fire Ratings	Siplast Lightweight Insulating Concrete Systems provide a fire resistant thermal barrier. Numerous UL hourly assembly fire ratings are available for the complete roof insulation system.	Most rigid board assemblies have few UL hourly ratings without the costly addition of a separate thermal barrier to the underside of the metal decking.
Slope	Slope is attained by stair-stepping Insulperm. Substrate irregularities or “low spots” are easily corrected with a layer of lightweight insulating concrete, ensuring positive slope. No special pieces are required for crickets and saddles.	Specially tapered boards are necessary to achieve slope. This application requires a complex system of numbered, color-coded shapes and sizes to properly match up pieces. Prompt and complete drainage may be difficult to achieve, as these systems do not compensate for deflection in existing substrates.
Attachment	Permanent attachment of Insulperm to the substrate is achieved without the use of fasteners. Attachment results from the interaction of Siplast concretes with the substrate. This attachment method achieves FM 1-90 or higher wind uplift resistance.	Hot asphalt, special adhesives or mechanical fasteners are typically used to affix boards. Boards are not encapsulated and locked to the substrate.
Mechanical Stresses	The encapsulated insulation design provides a stable monolithic surface to accept the roof membrane system.	A pattern of continuous joints is inherent in rigid board insulation applications. These joints impart mechanical stress to the roof membrane when the insulation board moves.
Thermal Stresses	Because of its relatively high density, Siplast Lightweight Insulating Concrete acts as a heat sink, i.e. it is slow to release heat. This “thermal inertia,” or mass effect, reduces extreme temperature fluctuations and the resulting thermal stresses which cause membrane fatigue failure.	Because of the very low thermal conductivity and low density of most rigid board insulation, rooftop temperature fluctuations are greater, causing thermally induced stress on the roof membrane.
Reroofability	Properly applied Siplast Lightweight Insulating Concrete is highly resistant to damage from moisture, and therefore is reroofable in most circumstances.	Many rigid boards are permanently damaged when exposed to water, requiring costly replacement.
Stable Insulation Value	Siplast Lightweight Insulating Concrete Systems do not contain any HCFCs to dissipate with time. Therefore, the R-value does not reduce from the time of placement.	Some rigid board insulations contain HCFCs that provide high R-values initially. Over time, HCFCs can dissipate, reducing R-values (thermal drift).
Environmentally Safe	At the time of reroofing, the insulation system remains in place, thus not contributing to solid waste disposal problems. Siplast Lightweight Insulating Concrete does not contain components harmful to the Ozone layer.	At the time of reroofing, rigid boards are usually removed and disposed of in solid waste sites.



Siplast

1000 E. Rochelle Blvd.
Irving, Texas 75062
469-995-2200
Facsimile: 469-995-2205

In Canada:

201 Bewicke Ave., Suite 210
North Vancouver, BC, Canada V7M 3M7
604-929-7687

Customer Service in North America:

Toll Free 1-800-922-8800

www.siplast.com

www.siplastgreen.com



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Cover Photo:

**The Insulcel-RT Lightweight Insulating Concrete
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