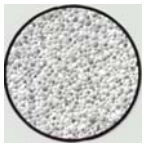

Lightweight Insulating Concrete Systems

A Sustainable Insulation

Lightweight Insulating Concrete (LWIC) Roof Deck Systems are a logical choice for a proven, high performance building roof enclosure for new steel and concrete construction as well as reroofing applications. The LWIC System is typically composed of LWIC and expanded polystyrene insulation embedded within the concrete.

The Ideal Insulation

Over the past 30 years, various groups have detailed the characteristics for an ideal roof insulation. These characteristics are included in the National Roofing Contractors Association (NRCA) Roofing Manual—4th Edition. Let's review the characteristics of LWIC Systems in light of these criteria.

- **Compatibility with Bitumen and Other Adhesives:** It is able to withstand the effects of being in contact with adhesives, solvents, and hot bitumen at the application temperatures required for installation of the roof membrane.

LWIC is an inert material that protects the embedded expanded polystyrene (EPS) insulation board from adhesives, solvents, and hot bitumen with a minimum 2" thick cover.

- **Impact Resistance:** LWIC has the strength, rigidity, and a density great enough to resist impact damage.

LWIC is stronger than insulation board and resists impact damage during construction and the service life of the membrane. This difference between LWIC Systems and rigid insulation board is readily apparent from just walking on the system.

- **Fire Resistance:** LWIC is non-combustible and the system provides hourly fire resistance ratings that comply with the requirements of insurance underwriters and building codes.

LWIC provides a Factory Mutual Class I and UL Class A Fire Rating with many systems listed in the UL Fire Resistance Directory. Furthermore, since LWIC fills the flutes on steel deck systems, fireproofing the underside of the steel decking is not necessary. Rigid insulation board roof decks require underside fireproofing of the steel deck for many building code classifications.

- **Moisture Resistance:** LWIC Systems resist the effects of moisture vapor and free water without degradation over the life of the building.

LWIC Systems provide positive slope-to-drain that is cast-in-place during construction. As a result, water will not pond on the deck and become a source of membrane degradation. LWIC with its discrete cell system does not become soft and mushy if exposed to water as does some rigid insulation board.

- **Thermal Resistance**: LWIC Systems have a low thermal conductivity (k-value) so that the highest possible thermal resistance (R-value) can be achieved.

EPS insulation board is embedded within the LWIC providing most of the insulation for the roof deck system. The LWIC acts as insulation protection and a heat sink to moderate membrane temperatures. This reduces thermal shock to the roofing membrane that may occur with the high R-value rigid insulation board systems.

- **Stable k-Value:** The k-value for LWIC Systems will remain constant and will not drift with age. The insulation will not lose thermal resistance over time.

Both LWIC and the embedded EPS insulation board have stable k-values. Some rigid insulation board materials have a decreasing k-value over time.

- **Attachment Capability:** LWIC System has a surface that accommodates secure attachment. Also, its resistance to moisture absorption does not impair its physical properties and attachment capabilities.

The base sheet of mechanically-attached roofing membranes can be nailed directly into the LWIC with the built-up or modified bitumen membranes applied in a normal fashion to this base sheet. Fully-adhered systems may be installed a few days after the LWIC is cast. These systems do not have the numerous joints that occur with rigid insulation board systems.

- **Dimensional Stability:** LWIC Systems are dimensionally stable under varying temperature and moisture conditions.

Monolithic LWIC and embedded EPS insulation board is a dimensionally stable system in the presence of varying temperature and moisture conditions. Rigid insulation board systems have joints that may open under changing environmental conditions.

- **Component Capability:** LWIC Systems can be formulated to be compatible with the other components of the roof assembly.

LWIC Systems are cast-in-place such that roof deck penetrations and mechanical equipment barriers that occur on every deck can be easily accommodated. Positive slope-to-drain is created during installation along with the casting of monolithic saddles and cants that direct the water toward the drains as designed.

Wind Uplift Resistance

The monolithic nature of LWIC Systems block air movement from inside the building during wind uplift conditions, as a result, air barriers are not needed as part of a roofing system for high wind uplift ratings.

Life Cycle Cost

LWIC Systems typically provide the lowest life-cycle costs, even on roof deck projects with simple drainage patterns and few penetrations. In most cases when the roof membrane is replaced, the LWIC System is left in place eliminating removal cost and replacement cost to the owner and providing many more years of service. When your goal is to provide improved low slope roof assembly performance over the life of a structure, the long-term cost and environmental benefits of LWIC Systems are evident.

Sustainable Option

LWIC Systems have proven to be valuable elements of sustainable building design. The two primary components of LWIC Systems, Portland cement and expanded polystyrene, combine to create a reroofable deck. Because it is reroofable, LWIC Systems are consistent with sustainable building design philosophies. Additionally by increasing long-term thermal efficiency, LWIC Systems help reduce energy resource requirements.

LEED Credits

- **Materials & Resource Credits**
  - **MR Credits 1.1 and 1.2:** Consider reuse of existing, previously occupied buildings, including structure, envelope, and elements. Maintain 75% of existing walls, floors & roof (Maintain 95% for MR Credit 1.2). *[1 or 2 points possible]*
  - **MR Credits 3.1 and 3.2:** Use salvaged, refurbished, or reused material, products, and furnishings for at least 5% (10% for Credit 3.2) of building materials. *[1 or 2 points possible]*
  - **MR Credits 4.1 and 4.2**: Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (for MR Credit 4.1, 20% for MR Credit 4.2) of the total value of materials on the project (based on cost). *[1 or 2 points possible]*
  - **MR Credits 5.1 and 5.2:** Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured within 500 miles of the project site for a minimum of 10% (for MR Credit 5.1, 20% for MR Credit 5.2) of the total materials value (based on cost). *[1 or 2 points possible]*

- **Energy & Atmosphere Credits**
  - **EA Prerequisite 2:** Design the building to comply with ASHRAE/IESNA Standard 90.1-1999 (without amendments) or the local energy code, whichever is more stringent. *[Required]*
  - **EA Credit 1*:*** Reduce design energy cost compared to the energy cost budget for energy systems regulated by ASHRAE/IESNA Standard 90.1-1999 (without amendment), as demonstrated by a whole building simulation using the Energy Cost Budge Method. *[1-10 points possible, depending on improvement in proposed building performance rating over baseline building performance rating.]*

In summary LWIC Systems meet all the criteria of an ideal roof deck insulating material.