

# INDUSTRY INFORMATION BULLETIN



**To: Roofing stakeholders, including designers, property owners, roofing contractors, and roofing manufacturers**

**Topic: Moisture Concerns in Roofing Systems Applied Over Lightweight Structural Concrete Roof Decks**

**Date: 07/31/2013**

**No: 2-13**

## *Industry Alert*

**SPRI, RCI, and PIMA would like you to be aware that:**

- The roofing industry is increasingly experiencing roof system performance issues when roof systems are installed over lightweight structural concrete roof decks.
- The potential for high moisture content in this type of deck, coupled with the need for extended drying times, can pose significant risk to long-term performance and possible premature roof failure.
- This risk can be significantly increased by the standard practice of installing these decks over non-removable, form deck or other non-permeable substrates.
- These moisture issues are not unique to the roofing industry. The flooring industry has experienced parallel moisture issues with lightweight structural concrete, and those slabs are not subject to periodic rewetting from being exposed to weather, as roof decks are.
- Roofing stakeholders, including designers, property owners, roofing contractors, and roofing manufacturers can be at significant risk when installing roofing systems over lightweight structural concrete roof decks with elevated moisture levels.

## *Determining when a deck is ready for roofing*

**Test methods include (but are not limited to):**

- The spot application of hot bitumen;
- Electrical impedance;
- ASTM D4263 (Plastic Sheet);
- ASTM F1869 (calcium chloride); and
- ASTM F2170 (relative humidity probes).

## *Latent moisture*

**However, latent moisture in the deck material may still be present:**

- Latent moisture may not be measured by the tests noted above and can affect the long term performance of roofing systems placed over lightweight structural concrete decks.
- There is no industry agreement concerning methods to detect this latent moisture or level of moisture that may be tolerable.

## *Loss of adhesion*

**Experience has shown that high moisture content can lead to compromised adhesion:**

- Adhesive applied or self-adhering products may show acceptable adhesion, but can be compromised due to high/elevated moisture content and upward vapor drive.
- Exposed to high/elevated levels of moisture, insulation facers can delimitate from the substrate or the insulation core and membranes that appear to be initially adhered can lose adhesion due to moisture migration.



### *Loss of R Value*

#### **Upward vapor drive that results in entrapped moisture in insulation can:**

- Result in significant loss of insulation value; and
- Possibly increase a buildings energy use.

### *Mold growth potential*

#### **Mold growth can occur:**

- High/elevated moisture levels can create conditions consistent with mold growth within the roof system.

### *Water-based adhesive curing issues*

#### **Elevated moisture in these roof decks:**

- Could compromise the cure time of adhesive; or
- Cause rewetting of water-based (low-VOC) adhesives.

### *Corrosion of roof fasteners and other ferrous-containing roof components*

#### **Mechanical fasteners used to attach roof insulation and membranes to lightweight structural concrete roof decks.**

- There is the potential for the occurrence of fastener and steel plate corrosion due to the presence of elevated moisture levels.

### *FM Global*

#### **FM Global has not specifically addressed the moisture in lightweight structural concrete issues:**

- It is important to note the lightweight structural concrete does not meet FM's definition of "structural concrete".
- In the June 2012 version of the FM 4470 standard, FM's defines structural concrete as having a "density of approximately 150 lbs/ft<sup>3</sup>".
- Lightweight structural concrete has a density of 90 – 120 lbs/ft<sup>3</sup>.

### *Conclusion*

Because of these performance issues and the potential risk for roof system failure, SPRI, RCI, and PIMA urge building designers to select roofing components and system with great care. Our organizations are continuing to study possible roofing solutions which mitigate the risks associated with the use of lightweight structural concrete. We hope to provide further guidance for proper roof design in the future.