

## Effects of Ponding Water on Low-Slope Asphalt Roof Systems

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Ponding water is defined as water that remains on a roof for 48 hours or longer. It may result from rain, melting snow/ice, or runoff from rooftop equipment. The Asphalt Roofing Manufacturers Association is joined by other reputable organizations, such as the National Roofing Contractors Association and the International Institute of Building Enclosure Consultants, in recommending that roof designs provide adequate slope (usually min. ¼" per foot) to ensure that the roof drains freely throughout the life of the building, thereby lessening the potential for ponding water and its adverse effects. The relevant ICC model building codes establish minimum slope requirements for both modified bitumen and built up (BUR) roof systems.

If not addressed, ponding water may result in significant consequences including but not limited to:

- **Deflection/Deformation:** As water accumulates in ponding areas, the load on the roof increases, which may result in deck deflection. The potential for deck deflection increases with the capacity of the area to hold water, thereby increasing the potential risk to the structural integrity of the deck.
- **Dirt/Debris Accumulation:** Accumulation of dirt and debris may support biological growth. If a ponding area dries, the accumulated dirt and debris may contract during dehydration (resulting possibly in dry dirt cracks resembling alligator skin ("alligator cracking")) and pull at the surface of the membrane. This accelerated dirt accumulation may affect roof membrane reflectivity.
- **Ice Damage:** Ice formations develop and move constantly with changes in temperature. This movement may "scrub" the roof membrane to an extent that physical damage to the membrane may occur.
- **Biological Growth:** When water stands for long periods of time, it promotes biological growth, such as algae and vegetation. Damage to the roof membrane may occur from chemical and physical attack by the bio-growth, as well as the expansion and contraction of the bio-growth during wet and dry cycles. Additionally, vegetation and other debris may clog drains and cause additional ponding.
- **Water Infiltration:** If roof membrane integrity is compromised, the risk of water infiltration into the building and subsequent interior damage is amplified.

Best practices to avoid ponding water are as follows:

- A roof's structural frame or deck should be sloped, and drainage components such as roof drains and scuppers should be included at properly designed low points in the roof system.

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- If a deck does not provide the necessary slope to drain, a tapered insulation system may be used to create positive roof drainage.
- Regular inspection and maintenance should be performed to ensure that drains remain unobstructed and that ponding water does not result from clogged drainage systems.
- Crickets installed upslope of rooftop equipment and saddles positioned along a low point between drains, in conjunction with a tapered insulation system, may help minimize localized ponding.
- Rooftop HVAC condensate lines should be connected to proper drains to prevent condensate from draining onto the roof.

If ponding water does occur, efforts should be taken to eliminate or reduce the accumulation and persistence of water on the roof surface. Failing to address ponding water may shorten the effective life of the roof membrane system.

To obtain specific information regarding the effects of ponding water on particular products and systems, contact the individual roofing material manufacturer.

NOTE- An exception to these recommendations: “Blue Roofs” are roofs that are specifically designed to temporarily collect and retard rooftop drainage, for example, in facilities where the water may be diverted for use within the facility. These roof systems may be particularly useful in areas where stormwater discharge needs to be managed. Consult the design professional and membrane manufacturer for specific installation recommendations.

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