Technical Guidance Document

Freeze Thaw Cycle Preventative Measures

Fluctuating temperatures cause freeze-thaw cycles that can lead to ice dams, water intrusion, and structural stress on roofs and building structures. Ice expansion can damage membranes, flashing, and gutters, while pooling water behind ice dams increases the risk of leaks and impacts structural integrity. This Technical Guidance Document outlines best practices for identifying warning signs, maintaining proper insulation, ventilation, and drainage to minimize damage.

Look for These Indicators

Inside:

- Visible signs of leaks – Look for ceiling discoloration, bubbling paint, peeling wallpaper, warped drywall, or dripping water, especially after a thaw. Damp insulation and water stains on ceilings or walls can indicate seepage.
- Hidden indicators – Mold or mildew growth, musty odors, and persistent dampness may suggest concealed moisture intrusion within walls or ceilings.

Outside:

- Loose flashing – Check for gaps in between the metal sheeting that seals the connection between roofing materials and features (e.g., chimney, eaves, vents). Infiltrating moisture freezes causing the flashing to separate from the area it's protecting. These gaps allow further moisture intrusion, which expands the gap, and can cause leaks into the building.
- Gaps between layers of roofing materials, where moisture can enter the roofing system.
- Damaged roofing membrane – Look for separated or damaged seams, gaps between roofing layers, blistering or bubbling from trapped moisture, etc. Sudden freezing and thawing can also weaken and crack rubber membranes, pop blisters, etc., allowing water to migrate into buildings. This issue is critical for roofs that have previously undergone repair work.
- Damaged drainage systems – inspect drains, scuppers, gutters, and downspouts.

Preventative Measures

- Keep the roof's temperature consistent and eliminate cool spots to prevent the snow from melting and refreezing and causing ice dams by:
  - Providing proper ventilation and airflow to allow moisture to escape, which helps prevent condensation and subsequent ice from forming.
  - Ensuring there's adequate insulation to prevent heat from the building from melting roof snow from beneath.
- Regularly clean and maintain gutters, drains, and scuppers to ensure proper water drainage. Remember to mark them on the roof to prevent snow from obscuring their location for maintenance.
- Consider installing heating cables along roof edges to prevent ice from forming in vulnerable locations if these areas cannot be remediated by other means. Consult a professional to determine if this solution is appropriate for your situation. If heating cables are suitable, ensure the system is designed correctly, using UL-certified heat tape specifically designed for flat roofs. It's also important to verify that the materials are compatible with your existing roofing and that the system has a reliable power source.