

Potential Effects of Contaminants on Modified Bitumen Sheet Materials

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Introduction

Roof membrane systems are intended to provide protection from natural elements, such as rain, snow, hail, and sleet. Systems that are properly designed, installed, and maintained should provide the user with long-term satisfactory protection from these elements. Some roof membrane systems, such as those installed on certain factories, restaurants, and other buildings with a high probability for unusual levels of contamination, require special care in design. The presence of greases, oils, bacteria, and/or other agents on the roof surface that may adversely affect the integrity of the roof membrane should be taken into consideration. The specifier should select the type of roof membrane system that will best satisfy the performance requirements based upon the number, type, and expected quantity of contaminants present. This document is intended to aid the specifier by highlighting the effects that various contaminants, if not considered in the design phase, may have on polymer modified bitumen membranes.

Effects of Oils and Greases

Modified bitumen roof membranes may be adversely affected by exposure to cooking oils (animal or vegetable) and greases. Unprotected membrane may experience degradation around exhaust vents, where the roof membrane has repeated contact with these contaminants. The organic substances contained within oils and greases may weaken and eventually break down the polymer-bitumen network, causing premature failure of the roof.

Petroleum-derived products, such as greases that leak from rooftop equipment, or hydrocarbons such as gasoline, paint thinners and kerosene spilled during maintenance operations, may likewise cause degradation of the roof. Due to the relatively fast evaporation rate of many hydrocarbon materials, any detrimental effects caused by a one-time contamination may be shorter term and less severe in nature than those caused by greases or recurring spills. Always report such contamination incidents to the membrane manufacturer for guidance.

Effects of Bacteria and Fungi

Factories producing foods such as potato pulp and dry milk have reported cases of modified bitumen membrane deterioration due to bacteria and/or other causes. These conditions may result in “mud cracking,” which may ultimately lead to damage of the modified bitumen membrane. Excessive bird droppings may also cause degradation of the roof membrane due to a combination of solids build-up and subsequent “mud cracking,” bacteria, and the acidity of the droppings. The degree of degradation is dependent upon the type of microorganism, temperature and other conditions. While certain roof coatings can alleviate the effects of surface contaminants, the type and quality best suited for the specific rooftop conditions, should be addressed with the membrane manufacturer.

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Fungus growth, which typically occurs in hot, humid regions, does not cause the same detrimental effects as “mud cracking” and bacterial attack and usually poses only aesthetic concerns.

Effects of Other Chemicals

Other chemicals, such as solvents, acids, bases and oxidizing agents, may cause varying degrees of harm to polymer-modified bitumen roof membranes, such as swelling, softening (reducing resistance to foot traffic), and slumping of the bitumen compound of the membrane. Many modified bitumen sheet materials may be applied using solvent-based cold process adhesives, and care should be taken to ensure that the adhesive is approved for use by the membrane manufacturer and that the application guidelines for adhesive quantity and flash-off (curing) are followed. Contact the roof membrane manufacturer to obtain additional information regarding the effects of adhesives, chemicals, and contaminants on modified bitumen sheet materials.

Recommendations

- Wherever possible, reduce or eliminate exposure of roofing components to contaminants.
- Determine the types and concentrations of contaminants that may be present on the roof. When re-roofing, investigate what effects, if any, contaminants have had on the existing roof before specifying and applying a new roofing system.
- Use commercially available traps and/or filters designed to capture contaminants exhausted from rooftop equipment.
- Establish a roof maintenance program to monitor affected roof sections and to properly maintain traps or filters.
- Provide positive drainage (at least 1/4” per foot roof slope) to prevent ponding in the affected area.
- If contaminant effects are minor, increase the number of plies and/or add resistant coatings to provide adequate protection.
- Consider the use of properly specified roof coatings on roof areas where the roof membrane will be exposed to contaminants.
- Investigate alternate venting designs that minimize or eliminate contamination of the roofing membrane.

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