



Tech Corner



Adhesive Fastening of Insulation Boards to Decks

Traditionally, insulation has been attached to structural roof decks with either hot asphalt or mechanical fasteners. Multi-layer insulation systems have also been bonded together with asphalt. In the majority of cases, this is still true; however, a number of special circumstances may dictate that an alternate attachment method be used. One such option, being addressed here, is the use of urethane foam adhesives.

Urethane foam products can be modified for many different applications. Depending on the amount of rise, the foam can be used as insulation as well as an adhesive. Generally speaking, for adhesive applications, a low-rise foam product will be used.

Two-part adhesives, as the name implies, utilize two components that are pumped through a spray rig or other pumping device and mixed in a specially designed spray gun or mixing tip. When the two parts are combined, a chemical reaction is initiated. The amount of rise and the speed of cure can be controlled by modifying the catalyst.

The inherent advantages of using two-component urethane foam adhesive over bonding adhesives or cold-applied asphaltic products include:

- *The fast cure time provides high bond strength within minutes.*
- *The expanding nature of the foam will compensate for irregular bonding surfaces.*
- *There is very little odor, if any, when compared with asphalt or solvent-based adhesives, thus allowing for use in sensitive areas, such as schools, hospitals, and other medical care.*
- *The process reduces construction noise. Many facilities are sensitive to noise and are unable to suspend business while roofing projects are being performed. The use of mechanical fasteners, especially when pre-drilling is required, such as with concrete and gypsum decks, can create very noisy conditions. Urethane foam adhesives have been used on many such projects to avoid interruption of business.*
- *The ability to adhere directly to built-up roof systems with certain types of foam adhesives allows for the installation of a new roof without disruption of the old roof. This further reduces the noise levels, eliminating disposal expenses and avoiding potential asbestos issues.*

While not suggesting that structurally unsafe roof decks be left in place, there are instances where a roof deck may not be capable of holding a mechanical fastener, but may still be structurally sound. Under these circumstances, urethane foam adhesive can be very cost effective and a high-performance solution. Factory Mutual approves adhering to all approved substrates except steel and wood. For multilayer insulation over steel deck, the

Factory Mutual approved application is to mechanically attach the first layer of insulation and to bond subsequent layers. This is especially effective with tapered insulation systems and also eliminates thermal bridges. Again, approvals and compatibility is product specific, but most types of rigid insulations can be used with urethane foam adhesive. Systems using urethane foam adhesive have achieved very high wind ratings when following specific construction assemblies.

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There are further safety issues to consider with urethane foam adhesives vs. asphalt. The most obvious is the fact that the urethane foam adhesive is not hot and will not cause burns. Some city ordinances prohibit the use of hot asphalt, and the Department of Transportation (DOT) regulations are making the transportation of kettles more difficult. Getting the product to the roof is also easier with urethane foam adhesive. Even products that use spray equipment are much easier to use, especially as building height increases. However these days typically there are a variety of application methods used. A few factors such as job size, new or reroof, or the contractor's typical business activities should be considered when choosing and application method for your job.

The following are a few questions to ask when you consider using urethane foam adhesives on one of your next projects.

- **Is the product and dispensing equipment easy to use? A choice of dispensing equipment?**
- **Is there local support for training and job start-ups available?**
- **Are there system approvals in place? FM approvals?**
- **Will the manufacturer back up their product with an adhesion warranty if needed?**
- **What are the deck, substrate and insulation compatibilities?**
- **Is the product available locally? Stocked and easy to get?**
- **Is there someone available and willing to perform pull tests if needed?**
- **Can the product be used below freezing temperatures?**

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