



**TITLE:** Self-Adhesive, Modified-Bitumen Roofing Products and Systems

**DESIGNATION:** RCI-TA-008-2015

**OBJECTIVE:** To provide commentary on issues associated with specifying and installing self-adhesive, modified-bitumen roofing products and systems.

## BACKGROUND

The use of self-adhesive, modified-bitumen roofing products for the installation of membranes in low-sloped commercial, institutional, and industrial applications has increased substantially since 2002. There are several good attributes and applications for these self-adhesive products and systems. However, there are also limitations for their use. This technical advisory discusses advantages and disadvantages, including precautions important to the successful application and use of a self-adhesive modified-bitumen product or system. Note that ASTM International's Standard D1079, *Terminology Relating to Roofing and Waterproofing*, includes defined<sup>1</sup> terms applicable to these products:

- Self-adhesive: a term used to describe materials that have the ability to adhere to a variety of surfaces when contact is promoted by application of pressure, but which require no substances to form the bond.
- Self-adhesive membrane: a membrane incorporating a self-adhesive feature that provides the primary means of attachment to the substrate or underlying ply(s).

Currently, the marketplace contains a multitude of self-adhesive, modified-bitumen roofing products and systems produced by several different manufacturers. Manufacturers offer various combinations of products as systems, such as two plies of modified bitumen, with both being self-adhesive; a single, self-adhesive cap sheet over fiberglass felts or approved substrates; a first ply consisting of a modified-bitumen, self-adhesive sheet and a second ply of a torch-applied sheet or one set in adhesive, etc. Individual manufacturers require specific applications for the system to qualify for a warranty program, and those requirements may be imposed regionally. It is important to work closely with manufacturers and to understand product application requirements, limitations, and restrictions.

The proper installation of self-adhesive, modified-bitumen sheets for use in roofing applications is dependent on application pressure and temperature. Both pressure and temperature are important, but proper application temperature is a mandatory component required for adhesion. If the self-adhesive, modified-bitumen sheets and/or the substrate to which they are to be applied are below the low temperature limit for proper installation, they must be sufficiently heated to the required temperature before application. Whether that heat source is solar radiation or physically induced (open flame, torch, hot-air welder, etc.), its presence helps to achieve ply-to-ply adhesion and adhesion to the substrate.

---

<sup>1</sup>The term "self-adhering" has also been used to describe these products and may be encountered in other documents. To alleviate confusion in the industry, ASTM has taken steps to standardize the terminology for describing these products and systems. This RCI Technical Advisory follows ASTM's direction in using the term "self-adhesive."

---

## DISCLAIMER

This Technical Advisory is intended to serve only as a general resource and to identify potential issues for consideration by industry professionals. Each person using this Technical Advisory is solely responsible for the evaluation of the Technical Advisory in light of the unique circumstances of any particular situation, must independently determine the applicability of such information, and assumes all risks in connection with the use of such information. The materials contained in this Technical Advisory do not supersede any code, rule, regulation, or legislation and are not intended to represent the standard of care in any jurisdiction.

## A. TESTING

- ASTM: Most self-adhesive, modified-bitumen sheet materials for use in roofing applications comply with ASTM standards published for conventional modified-bitumen products that are installed using various methods of application.
- Wind: Required uplift resistance should be verified with the roof material manufacturers for the actual system selected and substrates encountered.
- Fire: Most of the modified-bitumen material manufacturers currently offer a self-adhesive, fire-rated, granulated finish ply and suitable systems to meet various fire-resistance classifications.

## B. ADVANTAGES

- Completely self-adhesive systems eliminate or reduce to a minimum the need for adhesives, kettles, pumps, and other such equipment on site.
- Completely self-adhesive systems result in minimal fumes or volatile organic compounds (VOCs) and may reduce or eliminate the use of open-flame torches on the roof.
- When application methods implement alternate methods other than hot asphalt, adhesives, or torching, the finished roof may be more aesthetically pleasing without excessive bleed-out at seams; drips and spills on the roof surface; marks from application carts, propane tanks, and buckets; or scorching the cap sheet by torches.

## C. DISADVANTAGES

- Self-adhesive products preclude the use of liquid, such as mopping asphalt or adhesives, during installation. They also do not utilize torch-activated modified asphalt to fill possible voids at laps and T-joints. This may result in the formation of open water channels through the completed membrane. Therefore, care must be taken during installation. Most manufacturers require treating laps and T-joints in a special manner. Some offer a sealing material or provide heat welding and other installation techniques as options for treating these areas.
- Adhesive and modulus properties (tendency to be deformed elastically) of the self-adhesive compounds change with temperature fluctuations. Most manufacturers identify 10°C (50°F) as the low temperature limit for ambient air, substrate, and rolls during application. A limited number of manufacturers publish slightly lower acceptable temperatures. At low temperatures, the tack properties of the adhesive are reduced and the modulus of the adhesive is high. Therefore, the rolls of roofing material should be kept warm or equipment should be used to warm the rolls before installation during low temperatures.
- The application of self-adhesive products is much more affected by surface roughness of the substrate, since primers may not be applied in sufficient quantities or have suitable consistency to “fill-in” substrate irregularities adequately. Foreign materials on a substrate or on the preceding sheet can be problematic in achieving proper adhesion. For example, a thin layer of dust on the substrate can detrimentally affect adhesion and result in compromised uplift resistance. While primers applied on a substrate can help in enhancing adhesion, they may contain solvents or have odors, thus eliminating some of the overall benefits of self-adhesive systems. Further, primers must be compatible with the self-adhesive materials being installed. A heavy buildup of primer on the substrate may have a negative impact on adhesion.
- Self-adhesive sheets installed over irregular or slightly dirty substrates can visually appear to be adhered. However, the membrane may not be free of underlying voids.
- Self-adhesive sheets for roofing applications must be exposed to particular temperatures to develop full adhesion to a substrate or the underlying sheet. This can be achieved on a warm or hot sunny day without special provisions, or by the application of special provisions to achieve the appropriate temperature. However, until the adhesion-setting process is complete, the system is more vulnerable to damage and displacement. Special protection to avoid damage may be required.

- Self-adhesive sheets may undergo viscous flow or creep when exposed to solar heating and temperature conditions that may be experienced in high-temperature regions, particularly if the conditions persist for long periods of time. This phenomenon can result in flattening of the product roll (or similar deformation) or sticking of the self-adhesive to the packaging or other shipping material. Under conditions that may lead to such viscous flow or creep, it is imperative that the product be handled and stored in conformance with the manufacturer’s instructions.

#### D. RECOMMENDATIONS

- Designers who specify self-adhesive modified-bitumen products and systems should pay particular attention to manufacturers’ requirements. These may include, but are not limited to, substrate conditions, temperature limitations, and the cleanness of the substrate surface for the specific system that meets the design intent.
- Due to the plethora of systems and combinations available, designers who specify the use of self-adhesive, modified-bitumen products and systems should research the offerings of the respective manufacturers to determine what systems best meet the requirements for the given project. For example, is use of a primer required or advisable for the project? If the project requirements include the use of a completely self-adhesive system without primers due to fume and VOC concerns, then this specific criterion must be specified, which will likely limit the number of systems available. However, some manufacturers offer water-based and low-VOC solvent alternatives.
- Designers who specify self-adhesive, modified-bitumen products and systems should include acceptable methods for heating of the sheet, laps, and seams if raising the temperature becomes necessary. The specification should include the requirement and call-out the options available, such as (but not limited to) electric hot-air welders, manufacturer-supplied sealing material, or the use of concealed or open-flame torch equipment.
- Designers who specify self-adhesive, modified-bitumen products and systems should be cognizant of specific attention required at T-joints and be aware of manufacturers’ explicit installation recommendations for these locations.

#### E. SUMMARY

Self-adhesive, modified-bitumen products and systems were developed to provide alternate systems to meet project-specific requirements and have gained popularity in recent years. They reduce odors and open flames during installation and can offer other environmental benefits. However, the systems have some unique design and installation requirements that must be considered and addressed to ensure successful project results. Those specifying the use of self-adhesive, modified-bitumen products, membranes, and systems, as well as building owners and installers, should understand the additional attention and effort required to achieve a successful installation.