



# EPDM Continues to Perform

EPDM Attributes Technical Bulletin No. 1

**EPDM** (ethylene propylene diene terpolymer) rubber roofing membrane has been an appealing choice of the low-slope commercial roofing industry for over **40 years**, with more than 500,000 warranted roof installations using **20 billion-plus square feet**. Annually, EPDM accounts for over 1 billion square feet of new roof coverings in the United States, and is the most frequently used roofing material in the marketplace. *Building Design and Construction* magazine and the National Roofing Contractors Association (NRCA) confirmed in their **2002-2003 market surveys** that EPDM continues to be the **number one roofing choice** of architects, roof consultants and contractors for both new construction and replacement roofing projects.

## Physical Properties

EPDM is an elastomeric polymer synthesized from ethylene, propylene and a small amount of diene monomer,

compounded with carbon black, processing oils and various cross-linking and stabilizing agents. As a thermoset membrane that recaptures its shape after stretching, EPDM maintains its physical properties for decades. EPDM is manufactured in large sheets varying in width from 10 feet to 50 feet, and features lengths up to 200 feet. The membrane can be reinforced and comes in thicknesses of 45, 60, 75 and 90 mils (thousandths of an inch).

*Architects for Rosecliff Mansion specified EPDM systems for all restoration work.*



## Superior Performance

The greatest test of any construction material is how it performs under actual field conditions. Forty years of empirical experience in field applications has shown EPDM to have the roofing industry's longest average service life. Characteristics



*A fully adhered EPDM roofing system installed on Shaler High School in Pittsburgh, Penn., utilized a 60-mil membrane to provide the durability and system longevity required by project specifications.*

that contribute to this superior overall system performance include:

- Cyclical membrane fatigue resistance,
- Proven hail resistance,
- High resistance to ozone, weathering and abrasion,
- Flexibility in low temperatures,
- Superior resistance to extreme heat and fire,
- Thermal shock durability,
- Ultraviolet radiation resistance.

EPDM's high resistance to wind damage has also proven to be an increasingly desirable attribute. These roof systems can be designed to meet a

variety of wind uplift criteria from Factory Mutual, including 1-60, 1-90, and 1-120 ratings and greater, and the stringent code of Dade County, Florida.

Architects, roof consultants and contractors have come to depend on EPDM's time tested, long-term performance.

## Applicability and Ease of Installation

EPDM's application methods (ballasted, fully adhered and mechanically attached)

allow the membrane to be installed on slopes with positive drainage up to and including vertical applications for fully adhered systems. Good roofing practice always includes provisions for proper drainage for any type of roof system and in most

cases, is dictated by local building codes. Because EPDM remains stable over a wide range of temperatures, it allows for year-round installation in all climates.

Many roofing contractors have crews with extensive experience installing EPDM. In an effort to ease installa-

tion, EPDM manufacturers continue to implement ergonomic solutions, such as the creation of adhesive application equipment.

## Repair and Restoration

One of the unique attributes of EPDM is its ability to be easily repaired and restored—an attribute never seen before in the roofing industry. Even after years of in-field service and exposure to the elements, repairs or modifications involving the installation of a new roof curb into an aged roof can be accomplished easily, with the expectation of long-term performance.

Unlike other roof systems that may degrade and become brittle over time from ultraviolet exposure, EPDM maintains its integrity and flexibility. Because of this, EPDM allows for modifications as easy as washing the membrane, preparing the surface and applying the repair material, including coatings.

*"Because we receive very few call backs with EPDM-related projects, EPDM clearly outperforms other roofing materials. And when EPDM makes our projects look good, our whole company looks good."*

*—Hans Philippo, President, Holland Roofing*

Another unique attribute of EPDM is its ability to be restored. Aged and damaged EPDM roof systems are now being restored to original installation quality without major costs or disruption to business. In some situations, when system enhancements are incorporated, the aged roof system is restored to a condition that exceeds that of the original installation.

## Environmental Responsiveness

EPDM is one of the most sustainable and environmentally responsible roofing materials used today in the construction industry. Its successful track record of superior overall system performance results in low life cycle costs. Less frequent replacement results in decreased building disruptions and reduced impact on the environment. The initial production of the membrane has a low-embodied energy number (the amount of energy required to produce and implement a product from material extraction, manufacturing and installation).

For designs requiring a colored surface, an ENERGY STAR® approved coating can be applied. The EPDM surface allows for a robust bond with the coating that results in long-term performance. EPDM also has high emissivity (the percentage of absorbed energy a material can radiate away from itself). This high emissivity allows the heat energy to be reflected back into the atmosphere instead of being absorbed by the building. As a result, a building can “cool off” faster at night, rather than hold the heat.

Low VOC and VOC free products are also available. VOC (Volatile Organic Compounds) are a factor in creating air pollution.



Numerous manufacturing facilities, locally experienced installation crews and systems that perform well in conditions of high thermal value all allow for Leadership in Energy and Environmental Design (LEED) point possibilities. In fact, the *Green Building Digest's* Issue

No.14 lists EPDM as a ‘Best Buy’ for low-slope roofing. For those systems that have reached the end of their service lives, EPDM membranes are recycled to become walkway pads or used for other purposes.

## Unbeatable Economic Value

Although installation costs vary from system to system, and building to building, EPDM roofing systems offer the greatest economic value in the low-slope commercial roofing industry.

*The 90 mil EPDM offers the thickest layer of monolithic waterproof protection in the roofing industry.*

*For contractors, EPDM remains a user-friendly and safe roofing product. Installation is performed without any heat, dangerous fumes or heavy machinery.*





## Continuous Product Innovations

Historically, ballasted EPDM has the lowest installed cost per square foot, followed by mechanically fastened and fully adhered systems. For more information on EPDM's unbeatable economic value, please contact your local roofing consultant.

Ease of repair and modification contributes to the strong dollar value of EPDM roofs, an attribute that appeals to building owners. This particular attribute cannot be overlooked in these times of business decision accountability measures, and current federal tax regulation that depreciates roofs with life spans exceeding 39 years.

## Warranties

Numerous warranty options, from 5 to 30 years, are available to accommodate almost any budget and building owner requirement. Puncture, high wind and hail coverage are also options, making



*The U.S. Federal Courthouse Building in Minneapolis, Minn. features a fully-adhered EPDM.*

EPDM membrane formulations have remained relatively constant for the past 30 years, with roof systems installed in the 1970s still performing well. Even so, EPDM manufacturers remain committed to continuous product innovations. In response to technological advancements, membrane research and contractor requests for more ergonomic products, EPDM accessory products continue to evolve in order to meet the demands of the industry.

The innovation of seam tapes in the 1980s to replace liquid adhesives has resulted in reduced reliability on contractor workmanship, greater productivity for the contractor and enhanced performance for the roof system and building user. Self-adhering components (components that have factory-applied adhesive tape) have increased roof system quality, especially in more problematic areas such as flashing installations.

Installation equipment has evolved as well. Ergonomic innovations have reduced crew force fatigue and have enhanced roof system installation and performance.

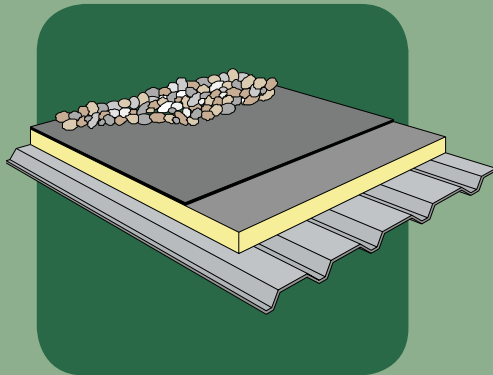
The highly puncture resistant and tough 90 mil EPDM membrane offers the thickest layer of monolithic waterproof protection in the roofing industry.

The 90 mil EPDM roof systems are redefining the roofing industry and the expectations of architects, roof consultants and building owners. Thirty-year warranties are now available on roofing systems that utilize 90 mil EPDM membrane. This is the only long-term performance guarantee in the roofing industry, and can include warranty coverage for punctures, hail and wind speeds up to 100 mph.



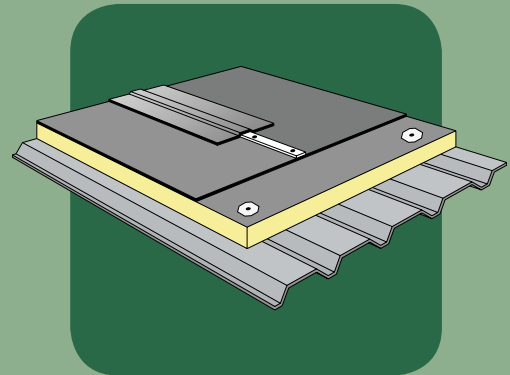
*The Pixar Animation Studios building in Emeryville, Calif. features 110,100 square feet of fully adhered EPDM.*

## System Versatility



### The Ballasted System

Ballasted systems, the workhorse of the three EPDM roofing systems, account for approximately 35 percent of EPDM installations today. Using large panels measuring up to 50 feet by 200 feet, the ballasted system provides fast coverage at a relatively low cost. The EPDM panels are loose-laid over the insulation and held in place by smooth, river-washed stone or concrete pavers. Ballasted systems are primarily used for large new construction projects, but can also be used on roof replacement or recovery projects where the existing structure can support the additional weight. Ballasted systems are traditionally the easiest of all systems to install and have earned the Underwriters Laboratories Class A rating.



### The Mechanically Attached System

Mechanically attached systems can be installed using large panels and attached through the membrane, or using narrow panels attached in the side laps. Non-reinforced or scrim reinforced membranes can be used, depending on the needs of the building owner. The membrane is then attached using either round plates or batten strips to the underlying deck. Mechanically attached systems are lightweight and are ideal for all building sizes and configurations.

EPDM an even more appealing roofing membrane. The 30-year warranty options that are now available are based on historical performance, not research projections.

In the past, long-term EPDM membrane warranties required manufacturers to address the issue of EPDM roof systems that were exceeding their warranty period. EPDM roof systems that exceed their warranty period can now have the warranty period extended. The warranty extension programs involve inspection of the roof and the completion of recommended repairs, maintenance and/or system enhancements.

*Numerous warranty options, from 5 to 30 years, are available to accommodate almost any budget and building owner requirement.*

## Conclusion

EPDM continues to be the roof system of choice for architects, engineers, roof consultants, contractors and building owners. EPDM offers versatility, product varieties and availability, envi-

ronmental benefits, contractor knowledge and familiarity and cost effectiveness. In short, EPDM's popularity is growing because "EPDM Continues to Perform." From the arctic reaches of northern Alaska to the humid climates of Central America, from the deserts of the Middle East to the continuous wet seasons of the Pacific Northwestern U.S., EPDM's performance is living proof that quality roof system design and installation continue to stand the test of time.

## EPDM Roofing Association

The EPDM Roofing Association (ERA) is the first trade association solely representing the manufacturers of EPDM single-ply roofing products and their leading suppliers. ERA provides technical and research support to the public and the construction industry, and communicates the longstanding attributes, consistency and the value proposition of EPDM rubber membrane roofing materials.

For more information, please contact:



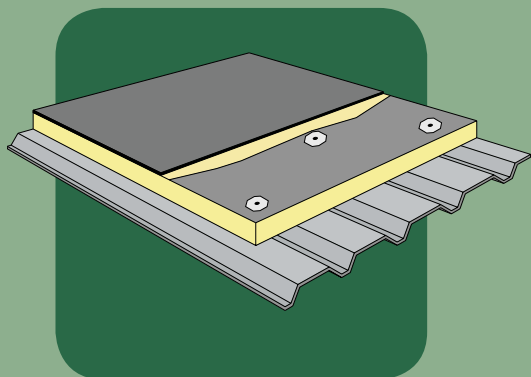
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### The Fully Adhered System

Fully adhered systems use panels measuring up to 30 feet by 100 feet. The membrane is bonded to the insulation, which has been physically attached, utilizing mechanical fasteners, stress plates and/or adhesives. Either non-reinforced or scrim reinforced membrane can be used, with the non-reinforced membrane making up most adhered installations. Fully adhered systems are lightweight and ideal for a wide range of building sizes and geometric configurations, including high-slope applications. Because of recent technological advances in application, the fully adhered system is becoming the system of choice for roof replacement applications in many areas of the country.

## Members



Carlisle SynTec Incorporated



**BUILDING PRODUCTS COMPANY**

For a list of ERA's associate members, go to  
[www.epdmroofs.org/members.html](http://www.epdmroofs.org/members.html).

# What's Inside



A **comprehensive guide** and primer to EPDM's long list of **attributes** and overall system **performance** information.

*This Bristol-Myers Squibb Company building features a 75 mil, fully adhered EPDM roofing system*



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