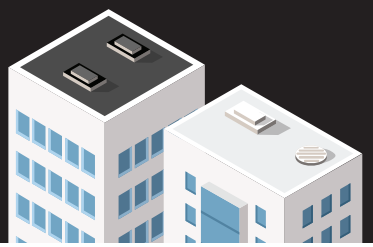


EPDM Single Ply Roof Options

Durability

There are many listings for tested EPDM roof assemblies: RoofNav, DORA, UL for wind uplift pressure resistance and fire classification. This demonstrates that EPDM roof assemblies have been tested by independent organizations and are compliant with recognized standards and typical building code requirements. EPDM is also referenced in the International Building Code as a roof covering option for commercial buildings.

EPDM typically has larger sheets than other single-ply options. Larger sheets equate to fewer seams, less labor, faster installation and less maintenance over time.

EPDM withstands and resists damage from foot traffic, construction loads, and servicing mechanical equipment.

Long Term Service Life

Five major research studies demonstrate the excellent long-term service life of EPDM when properly maintained. One of these, a 2010 study examined five roofs ranging from 28 to 32 years of in-field service and found that all of the samples were performing without issue with some physical characteristic properties above or just below the minimum characteristics of EPDM membrane.

The study measured:

- Elongation (%)
- Thickness XD (Cross Direction) (in)
- Factory Seam Strength (psi)
- Tensile (psi)
- Thickness MD (Machine Direction) (in)

Sustainability & Environmental Impact

Ballasted and Mechanically Fastened EPDM is easily recyclable and can contribute to earning LEED credits in the Materials and Resources category.

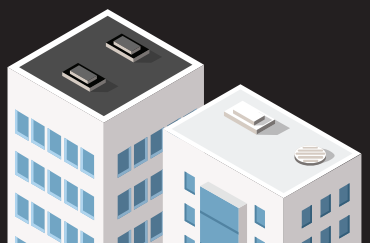
In addition, a Life Cycle Inventory and Assessment study (LCA) showed that black and white EPDM perform better than many other single-ply and bitumen-based membrane materials in key categories such as global warming, acidification, and smog generation. This LCA later was peer reviewed by the American Center for Life Cycle Assessment (ACLCA).

EPDM roofing has a lower environmental impact than PVC, TPO and asphalt-based roof systems.

As an example, for a typical low-slope roof over R-20 insulation and a steel deck, the EcoCalculator found that EPDM offers the lowest Global Warming Potential (GWP):

- EPDM: 6.93 kg CO^2/sq. ft.
- Modified Bitumen: 11.80 kg CO^2/sq. ft.
- PVC: 11.31 kg CO^2/sq. ft.
- BUR: 20.74 kg CO^2/sq. ft.

(continued)



Repairability

EPDM can be repaired without access to power and without the need for specialized tools. This is especially helpful for buildings, such as hospitals, where hot work or tools that use fuel are often not allowed or for roof areas that are difficult to access. EPDM maintains its easy to repair attribute over its entire service life. For example, flashing in a new penetration in an aged membrane works as well as the day it is installed.

EPDM membranes and repair materials are flexible and can accommodate difficult or uneven substrates. They also work well on vertical surfaces such as parapets, penthouse walls, etc.

Mainstream, Established Product

EPDM's performance is a known entity with over 60 years of commercial availability and is a material that is widely trusted and valued by those who have in depth knowledge of the commercial roofing market.

EPDM is manufactured in North America by Carlisle, Elevate (formerly Firestone), and Johns Manville, companies that are established and known to owners, contractors, specifiers, and architects. Each company has technical reps that assist designers with specifying roof systems.

Technical assistance is also available from ERA, NRCA and IIBEC. EPDM is included in the *NRCA Roofing Manual*, the recognized manual of best practices for the roofing industry, and in the *IIBEC Manual of Practice*, the standard for practitioners performing roof, exterior wall, and waterproofing consulting and quality assurance functions.

Selected References

Durability
Vitiello, Ric. ***Comparative Performance of EPDM Rubber Roofing Membrane as Protection Against Hail Damage*** — Benchmark Services, Inc. April 2007

Longevity
Hutchinson, Thomas. ***Designing for Durability: 60 Year EPDM Roof System Service Lives —*** Hutchinson Design Group. April 2011

Sustainability
Tengos Research, Inc. ***Life Cycle Inventory and Assessment of Selected Low Slope Roofing Systems in North America —*** May 2010

Desjarlais, Andre O., Petrie, Thomas W., and Atchley, Jerald A. ***Evaluating the Energy Performance of Ballasted Roof Systems*** — Oak Ridge National Laboratory. April 2008

ERA Technical Committee. ***Cool Roofs in Norther Climates: Energy Efficiency and Moisture Performance Implications*** — January 2017

Additional references are available on the ERA website at ***www.epdmroofs.org****.*