



An ERA Study Proves EPDM Easily Lasts More than 30 Years

MAY 26, 2015 BY THOMAS W. HUTCHINSON, AIA, FRCI, RRC, CSI, RRP 1 COMMENT

More and more building owners are seeing the light: Roof systems based on historical in situ performance for more than 30 years are the best roof system choice to benefit the environment. EPDM roof membrane has been utilized as a roof cover for more than 40 years, and there are numerous examples of ballasted roofs greater than 30-years old still performing. New seaming technologies, thicker membrane and enhanced design are creating roof systems with projected 50-year service lives. EPDM roof covers' physical characteristics have changed little in 30 years, and because potential for 50-year-plus service life is possible, they are a solid choice of design professionals, building owners and school district representatives who truly desire a roof system that benefits the environment.



PHOTO 1: This ballasted 45-mil EPDM roof system has been in service for 32 years.

In 2010, the Washington, D.C.-based EPDM Roofing Association (ERA) was determined to answer the question: "How long can an EPDM roof perform?" Consequently, roof membrane samples from five roof systems with a minimum age of 30 years were obtained for testing of their physical properties. The physical and mechanical properties evaluated (using relevant ASTM standards) were overall thickness, tear resistance, tensile set, tensile strength and elongation, and

water absorption. The results were positive, showing that even after 30 years of infield exposure nearly all the physical characteristics of EPDM membrane meet or exceed ASTM minimums. But the question of how long EPDM roofs could last remained. Thus, a second phase of testing was undertaken.

These properties were studied for "as received" and "after heat-conditioning" for up to 1,500 hours at 240 F. Results showing how these membranes performed before and after heat-conditioning are presented with the intent of defining characteristics for long-term service life of roof membranes.

TESTING PHASE ONE

Ethylene-propylene-diene terpolymer (EPDM) has been used in waterproofing and roof applications for more than 45 years in North America. Introduced into the roofing market in the

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1960s, EPDM grew, especially after the 1970s oil embargo, to be a roofing membrane choice for new construction and roofing replacement projects. EPDM has achieved long-term in situ performance in part because of its chemical structure, mostly carbon black, which resists ozone and material decomposition, as well as degradation caused by UV light, which is the No. 1 degradation element to roofing materials exposed to the sun (see photo 1). The carbon black also provides reinforcement, yielding improved physical and mechanical properties.

Long-term performance of roof-cover material is dependent upon its resistance to the combined effects of ponding water, UV radiation, ozone, heat and thermal cycling. Geographical location can exacerbate or reduce the impact of climatic factors. In ballasted systems, the ballast acts to provide protection from the UV rays and minimizes the effect of climatic influences.

ERA's study had three specific goals:

1. Verify the long-term performance characteristics of EPDM membranes over 30 years. (At the time of the study, the only in situ membranes that were around for 30 years were 45-mil EPDM membranes. Currently 60- and 90-mil are the standard choices. It is assumed that results for the 45-mil material can be prorated for the thicker membrane.)

2. Scientifically validate the empirical sustainability experiences.

3. Create a foundation for specifier-to-owner discussions in regard to long-term service life. Five roofs, four ballasted and one fully adhered, with in situ service lives approaching or over 30 years were identified and samples were taken. All roofs were fully performing without moisture intrusion.

The samples were sent for testing per ASTM D4637 for:

- Elongation
- Tensile strength
- Thickness
- Factory seam strength (psi)

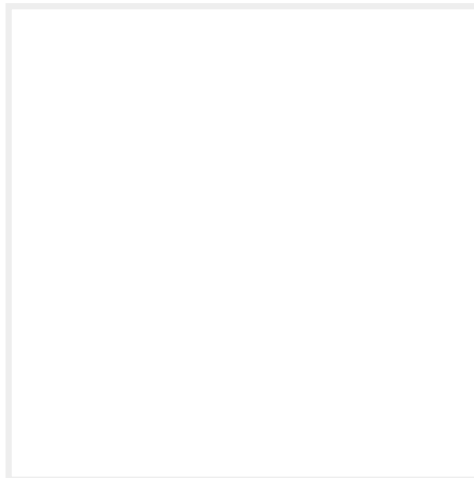


PHOTO 2: This recently installed, ballasted, 90-mil EPDM roof was designed for a 50-year service life.

PHOTOS: HUTCHINSON DESIGN GROUP LTD.

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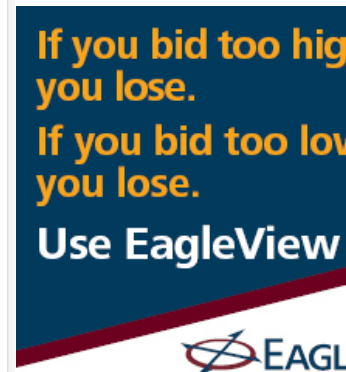


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