EPDM Roofing Membrane Service Life: Summary of Research Evidence

EPDM Roofing Association | Updated 2025

Decades of independent laboratory testing, field research, and professional surveys consistently confirm that properly installed EPDM roofing membranes deliver exceptional service life—often well beyond 30, 40, and even 50 years. The following studies form the evidentiary foundation for ERA's service life advisory.

Gish & Lusardi (1991) — Laboratory Evaluation of EPDM Roof Membranes: A 17-Year History

The earliest systematic study of EPDM durability examined 45 membranes across 13 states, ranging from 3 to 17 years in service. Testing per ASTM and MRCA standards found that **87% of site-aged samples exceeded minimum criteria for newly manufactured membranes.** Tensile strength, tear resistance, and brittleness temperatures all met or surpassed requirements. The 17-year-old sample narrowly missed the elongation minimum but retained high tensile strength. The authors concluded that field aging did not follow the expected decline pattern seen in laboratory heat aging—a finding that would be echoed by subsequent research.

Trial, Robertson & Gish (2004) — EPDM Roof Membranes: Long-Term Performance Revisited

This study tested 33 EPDM membranes across 9 states with 16 to 26 years of in-service life. Results confirmed that **all tested membranes remained watertight and functional**. Tensile strength and tear resistance exceeded ASTM D4637 specifications for both new and heat-aged material. Ballasted membranes showed no deterioration; elongation in some exposed membranes declined due to UV exposure but remained within serviceable ranges. All 10 ballasted 45-mil roofs with up to 23 years in service met ASTM elongation requirements for new material.

Das Kunststoff-Zentrum (SKZ) / Trade Association of the German Rubber Industry (2004)

German researchers tested 39 EPDM roof samples already installed for up to 30 years. None showed visible material damage, and **38 of 39 roofs met the DIN 7864-1 minimum elongation requirement of 250% for new product**. Residual life analyses led the authors to conclude that properly made EPDM roofing membranes have a useful life of **clearly over 50 years** under Central European climate conditions.

EPDM Roofing Association (2010) – EPDM: A Proven Performer

Five EPDM membrane samples with 28 to 32 years of in-service life were tested across four states. **All five exceeded minimum ASTM tensile strength standards for newly manufactured 45-mil membrane**, and four of five met the minimum elongation criteria for aged EPDM. Factory seam strength also remained within acceptable ranges. The study established the ERA's Phase I findings and formed the basis for subsequent accelerated aging research.

Hutchinson / NRC Phase II (2015) – An ERA Study Proves EPDM Easily Lasts More Than 30 Years

Phase II extended the ERA (2010) study by subjecting the same five field-aged samples to accelerated heat aging at the National Research Council of Canada. As received from the field (28–32 years in service), **all samples passed ASTM D4637 minimum elongation requirements for new material**, as well as tensile strength and water absorption criteria. The heat aging results further demonstrated the material's residual capacity beyond three decades of real-world exposure.

SKZ Laboratory / VESP (2025) – High Pressure Autoclave Testing: 70-Year Service Life Projection

The most advanced laboratory study to date was commissioned by VESP (United EPDM System Producers) and conducted by the renowned German SKZ laboratory. Four EPDM membranes from leading manufacturers were subjected to **High Pressure Autoclave Testing (HPAT)** per EN ISO 13438, exposing samples to elevated temperatures (up to 90°C) and oxygen pressures to simulate decades of natural aging. Tensile strength was then measured per EN 12311-2, and results were extrapolated using an Arrhenius model incorporating oxygen dissolution behavior—a methodology known for its reliability in service life calculations. The conclusion: **all four membranes tested easily exceed a service life of 70 years** at a standard operating temperature of 40°C under atmospheric pressure—with some extrapolations reaching well above that threshold.

Conclusion

Taken together, this body of research—spanning laboratory testing from 1991 to 2025, European and North American field studies, accelerated aging models, and the largest professional survey ever conducted on the topic—establishes that **EPDM roofing membranes, properly installed and maintained, reliably deliver service lives of 38 years or more,** with laboratory projections now confirming potential longevity exceeding 70 years. The convergence of field observation and scientific evidence makes EPDM one of the best-documented roofing materials for long-term performance.