

TL-0029 — High Density Polyethylene Long-Term Durability Technical Letter (US Version)

High Density Polyethylene (HDPE) sheet is a major component of the BITUTHENE® and PREPRUFE® Membranes. The functions of the HDPE are to 1) provide a portion of the waterproofing protection for the structure and 2) provide increased resistance of the waterproofing adhesive from environmental exposure and backfill.

HDPE was chosen for this purpose because it has excellent mechanical properties required for this application including high puncture, tear, and tensile strengths as well as good elongation for bridging any post-formed cracks in the structure. The other advantage of HDPE is that it is extremely resistant to attack and degradation from most chemicals. Consequently, it is typically a leading candidate for use in geomembranes including landfills containment systems, pond liners, and holding tanks for waste liquids.

Below grade waterproofing membranes, such as PREPRUFE®, are often exposed to a variety of soil contaminants in addition to water. These could include alkaline and acidic environments, petroleum-based hydrocarbons, and chlorinated hydrocarbons. A number of studies have been conducted on various materials on the long-term durability of HDPE after exposure to contaminants. The general conclusion of various studies is that HDPE is one of the more inert materials used in geomembrane systems. A 1990 publication by the American Society of Testing and Materials [1] based on an extensive survey of case study testing concluded that the service life of base polymers, such as HDPE, in flexible membrane liners (FML) used in geotextiles should last hundreds of years without premature failure. However, the study also stated that inappropriate applications or installations, such as excessive exposure to UV, heat, and ozone, could lead to degradation and shorter life expectancy. In summary, the major component of PREPRUFE®, HDPE, provides the necessary mechanical properties for waterproofing and excellent chemical resistance provided the HDPE is protected from excessive exposure to UV, heat, and ozone.

Reference:

1. Landreth, R. E., Service Life of Geosynthetics in Hazardous Waste Management Facilities, in Geosynthetics: Microstructure and Performance, ASTM ATP 1076, I. D. Peggs, editor, American Society for Testing and Materials, Philadelphia (1990) p. 26.

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