

TECHNICAL BULLETIN - PVC vs HDPE

PVC (Polyvinyl Chloride) geomembranes prioritize high flexibility and factory prefabrication, while HDPE (High-Density Polyethylene) geomembranes excel in chemical resistance and UV durability.

PVC Geomembranes (Polyvinyl Chloride)

PVC is heavily plasticized to create an incredibly pliable liner tailored for intricate layouts and easier site deployment.

- Pros:
 - Extreme Flexibility: Easily stretches and conforms to rough, rocky subgrades and complex geometric structures.
 - Large Prefabrication: Panels can be pre-welded in a controlled factory environment up to 10–15 times larger than HDPE sheets, minimizing risky field welding.
 - Puncture Cushioning: Its soft, elastic behavior provides great resistance against immediate impact punctures from sharp aggregates.
- Cons:
 - Plasticizer Migration: Over time, UV light or chemical exposure can strip the plasticizers out, causing the sheet to turn brittle and crack.
 - Chemical Limitations: Readily broken down or softened by organic solvents, oils, diesel, and highly chlorinated liquids.
 - Cover Requirement: Usually requires a mandatory soil or geotextile protective cover to prevent premature weathering.

HDPE Geomembranes (High-Density Polyethylene)

HDPE is the heavy-duty industry standard for aggressive chemical containment and exposed environments.

- Pros:
 - Chemical Resistance: Highly immune to strong acids, bases, hydrocarbons, and harsh chemical amalgams.
 - UV Longevity: Excellent carbon black composition ensures decades of structural integrity when fully exposed to the sun.
 - Seam Integrity: Fusion-welded seams are structurally stronger than the surrounding base material itself.
- Cons:
 - Poor Flexibility: Extremely stiff, making it difficult to manipulate around tight corners or irregular contours.
 - Thermal Movement: High thermal expansion coefficient causes substantial wrinkling and contracting with temperature changes.
 - Stress Cracking: Susceptible to environmental stress cracking under concentrated mechanical loads.



Direct Technical Comparison

Feature	HDPE Geomembranes	PVC Geomembranes
Primary Strength	Chemical immunity & open UV life	Flexibility & fast factory prefabrication
Material Behavior	Rigid; high thermal wrinkling	Pliable; molds tightly to subgrade contours
Chemical Tolerance	Outstanding (solvents, fuels, bases)	Moderate (weak against oils and solvents)
Installation Speed	Slower; strictly field-welded seams	Faster; large pre-made factory panels
Ideal Use Cases	Landfill liners, mining heap leach pads	Decorative ponds, buried tanks, wastewater