

Important Questions when Selecting a Geomembrane

August 18, 2025

Written by Brian Fraser (Layfield) and Evan Bao (Comanco) - IAGI Board of Directors

Facility owners and engineers regularly seek guidance from geomembrane manufacturers and installers when selecting the most appropriate geomembrane liner for their containment projects. This decision plays a vital role—not only in protecting the environment but also in ensuring long-term project performance and adherence to regulatory requirements.

Geomembranes are advanced synthetic barriers engineered for exceptionally low permeability, designed to contain liquids, gases, or chemicals within a controlled area. They are produced using a range of polymer types and structural configurations, each offering unique performance characteristics tailored to specific site conditions and operational demands.

This article explores the key questions and important factors to consider when selecting geomembrane materials, helping stakeholders make informed, project-aligned decisions.



Installation photo courtesy of Hallaton - USA

Standard Geomembrane Types

- HDPE – High Density Polyethylene
- LLDPE – Linear Low Density Polyethylene
- PVC – Poly Vinyl Chloride
- PVC EIA Reinforced - (PVC with an Ethylene Interpolymer Alloy additive)
- RPE – Reinforced Polyethylene (LLDPE)
- RPP – Reinforced Polypropylene
- WCPE – Reinforced Woven Coated Polyethylene
- CSPE – Reinforced Chlorosulphonated Polyethylene (Former Hypalon)

◆ Key Questions to Guide Your Selection

1. What is the Application – Earth Liner, Soil Cover, AST Tank Liner, Floating Cover

- What liquid is being contained – request a detailed fluid analysis.
- Is this a primary or secondary containment application?
- Confirm with the manufacturer the chemical compatibility with the liner (e.g., **pH levels**, **VOCs**, **brine**, **acids**, metals, disinfectants, total suspended solids (TSS)).
- Consider both ambient and fluid operating temperatures - elevated temperatures can accelerate degradation of important material performance properties.

2. Is it Critical or Non-Critical Containment?

- **Critical applications** (e.g., hydrocarbons, hazardous waste, leachate, PFAS,) require double liners with leak detection.
- **Non-critical applications** (e.g., stormwater containment) may use single liners.
- Is there a leak detection and monitoring system required?
- Are there Federal or State environmental regulations?

3. What Is the Required Geomembrane Service Life?

- Is the geomembrane going to be exposed or backfilled – exposed liners require adequate UV stability. What is the expected geomembrane and project service life?
 - Short-term (<5 years)
 - Medium-term (5–15 years)
 - Longer-term (15–30 years)
 - Over 30 years

4. What are the Site Conditions?

- Is the subgrade completed, properly compacted with a proper anchor trench?
- Does the subgrade require a geotextile cushion fabric or geocomposite to protect the geomembrane?
- Is there sufficient site access and a material/equipment laydown area?
- Are there detailed drawings and specifications available?
 - Pond size, configuration, slopes length and angle, depth, perimeter fencing
 - Pipe penetrations, structures, mechanical connections
- Are there any issues with groundwater, subgrade gases or air?

5. What Geomembrane Performance Characteristics Are Required?

- Consider:
 - **Chemical resistance, UV Stability, Temperature resistance**
 - Flexibility, multiaxial and tensile elongation
 - Tensile & tear strength, and puncture resistance
 - Temperature tolerance (high and low extremes)

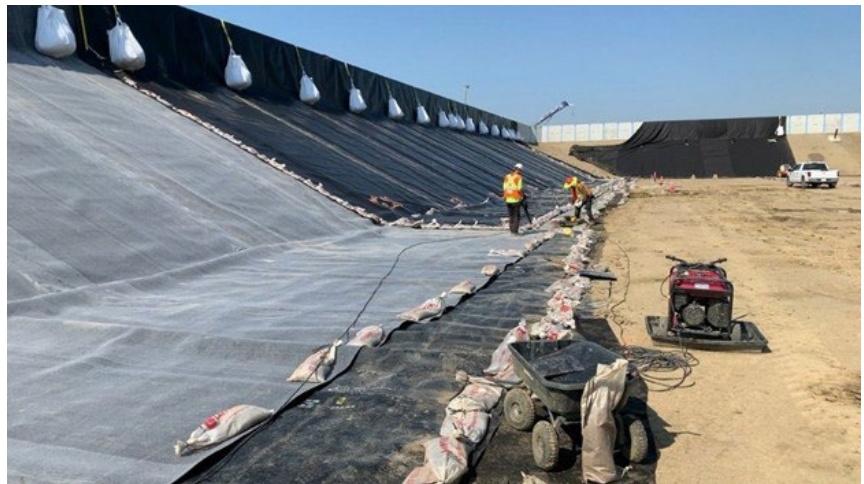
7. Where Is the Project Located and Expected Time of Installation?

- Evaluate location, climate, site accessibility and space, and installation sequencing.
- Seasonal installation impacts dealing with weather and temperatures:
 - **Winter:** Slower progress, increased safety risks, CQA challenges
 - **Summer:** High ambient/sheet temperatures affect welding CQA challenges and technician safety
- Quantity and costs of crew mobilization & demobilization

Final Thoughts

Geomembrane selection must be tailored to the specific application, site conditions, and long-term performance objectives. Collaborate with experienced manufacturers, consulting engineers, and certified geomembrane installers to ensure decisions are grounded in sound engineering and construction experience.

Remember, there is no “silver bullet” solution—no single geomembrane suits every application. The optimal choice depends on a thorough understanding of your project’s unique technical and environmental demands and application.



Installation photo courtesy of Layfield Geosynthetics - Canada