

## SUMMARY COMPARISON BETWEEN GEOMEMBRANE AND GCL

Geosynthetic Clay Liners (GCLs) and geomembranes (GMs) are frequently used in various lining applications, and many times are used together in a composite liner system. If evaluated independently, however, there are some important differences as identified briefly below:

Item	Membrane-Laminated GCL	Geomembrane (GM)
Ease of installation	<ul style="list-style-type: none"> <li>• Can be installed by unskilled labor; minimal training required.</li> <li>• Installation can proceed in small phases as dictated by site conditions.</li> <li>• Seams are simply overlapped, providing same hydraulic performance as the mat itself.</li> <li>• Details such as penetrations and attachments are handled without mechanical fasteners.</li> <li>• Does not expand and contract due to temperature fluctuations.</li> </ul>	<ul style="list-style-type: none"> <li>• Requires specially trained, skilled installation team.</li> <li>• Installation typically performed all at once in order to minimize mobilization of labor.</li> <li>• Seams must be welded together, which is time-consuming, labor-intensive, and expensive.</li> <li>• Details are difficult to seal properly; mechanical fastening to attachments is required.</li> <li>• Expands and contracts with temperature fluctuations, causing tensile stresses and wrinkles.</li> </ul>
Quality assurance requirements	<ul style="list-style-type: none"> <li>• Minimal on-site QA required because seams are overlapped.</li> <li>• Minor punctures and other flaws are self-sealing.</li> <li>• Any damage is easily repaired with a simple overlapping patch.</li> </ul>	<ul style="list-style-type: none"> <li>• Extensive QA required because seams are welded.</li> <li>• Minor punctures can cause major performance problems.</li> <li>• Damaged areas must be patched, welded, inspected, and tested.</li> </ul>
Installed cost	<ul style="list-style-type: none"> <li>• Usually lower than GM.</li> <li>• Provides superior cost/performance ratio.</li> <li>• Rapid installation allows landfill operations to begin sooner.</li> </ul>	<ul style="list-style-type: none"> <li>• Usually higher than GCL.</li> <li>• Poorer cost/performance ratio than a membrane-laminated GCL.</li> <li>• Slower installation and QA delays operational start-up.</li> </ul>