

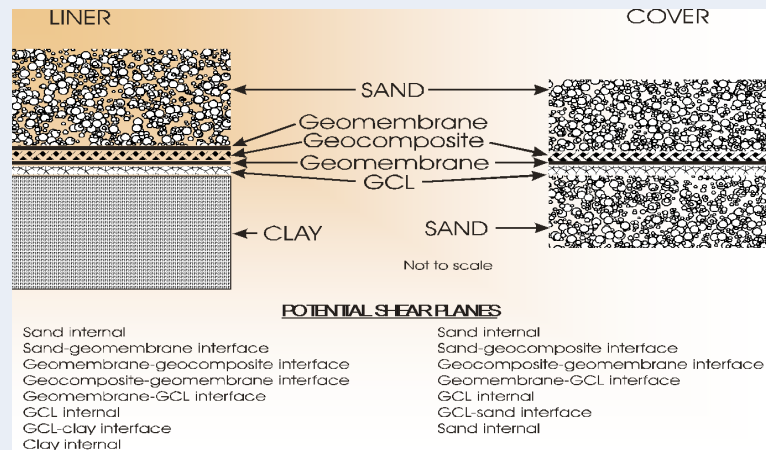
# Interface & Internal Shear Testing

## Capabilities of GeoTesting Express' Interface & Internal Shear Testing

GeoTesting Express, Inc. (GTX), provides comprehensive service by offering in-plant sampling of geosynthetics at any geosynthetic manufacturing plant in the world. Our full service soil testing laboratory can provide moisture-density curves (Proctor) and grain size analysis testing of soils, which are often required in conjunction with interface shear tests involving soils.

GeoTesting Express (GTX) is fully equipped to perform interface and internal shear tests of geosynthetics and soil-geosynthetic interfaces. Interface and internal shear testing of geosynthetics is usually required when geosynthetic materials are used on sloping ground. The test measures peak and post-peak shear strength which allows the determination of peak and post-peak friction angles. Our fully automated interface shear test devices run tests twenty-four hours a day, seven days a week. These devices give us complete control of testing parameters such as normal load, consolidation/hydration time, shear rate and drainage conditions. We have equipment to apply normal loads as low as 0.5 psi (72 psf) to as high as 250 psi (36,000 psf). This flexibility and control allow us to replicate field conditions and perform the test to your exact requirements. We provide you with accurate test results and the quickest turnaround possible.

GTX provides comprehensive service by offering in-plant sampling of geosynthetics at any geosynthetic manufacturing plant in the world. Our full service soil testing laboratory can provide moisture-density curves (Proctor) and grain size analysis testing of soils, which are often required in conjunction with interface shear tests involving soils.



Typical Interfaces in Landfill Liner and Cover Systems



# Interface & Internal Shear Testing

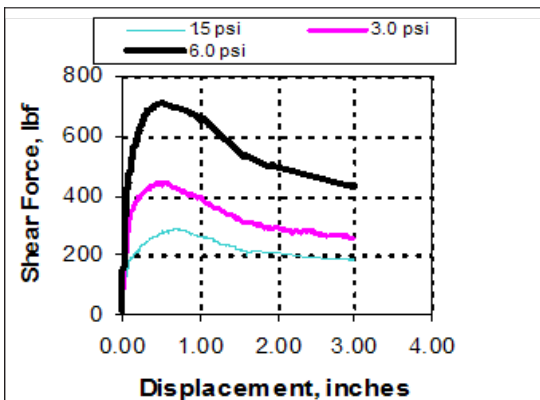
## Full Service Laboratory and Field Testing of Soil, Rock and Geosynthetics

Our professional staff has been performing and evaluating interface shear tests for over thirty years. Our engineers actively participate in the American Society for Testing and Materials (ASTM) and, in fact, have led the development of the interface shear testing standards (ASTM D5321 and D6243). We are accredited by the Geosynthetics Accreditation Institute - Laboratory Accreditation Program (GAI-LAP) and validated by the United States Army Corps of Engineers (USACE). Also, our soils laboratory is accredited by the American Association of State and Highway Transportation Officials (AASHTO) and the American Association for Laboratory Accreditation (A2LA). From our many years of experience on thousands of projects we have developed "best practices" for testing all types of geomaterials. For instance, while working with clay materials and geosynthetic clay liners (GCLs) the effects of pore pressure can greatly effect interface and internal shear test results. Our experience and background in soils testing helps us to understand and minimize these effects.



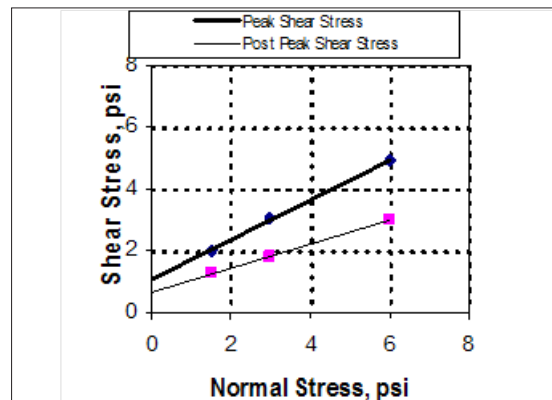
High Pressure Interface Shear Test Frame

Common Shear Test Components	ASTM Test	Test Variables That Depend on Site Conditions
Soil vs. Geosynthetic	D5321	Density and moisture condition of soil, drained or undrained, shear displacement rate, normal load, geosynthetic orientation
Geosynthetic vs. Geosynthetic	D5321	Drained or undrained, shear displacement rate, normal load, geosynthetic orientation
GCL vs. Geosynthetic	D6243 or D5321	Hydration/consolidation of GCL, drained or undrained, shear displacement rate, normal load, geosynthetic orientation
GCL vs. Soil	D6243 or D5321	Density and moisture condition of soil, hydration/consolidation of GCL, drained or undrained, shear displacement rate, normal load, geosynthetic orientation
GCL Internal	D6243	Hydration/consolidation of GCL, drained or undrained, shear displacement rate, normal load, geosynthetic orientation



Typical Shear Force vs.

Displacement Curves for Three Normal Stresses



Typical Peak and Post Peak Strength Envelopes

Validated by the U.S. Army Corps of Engineers

Accredited by:

**GAI-LAP**