

GeoTesting Express, Inc. (GTX) provides mechanical and physical properties testing services on soils, rocks, and geosynthetics with the fastest turnaround time available.

GTX can help prevent structural problems on every kind of construction project – from tunnels, bridges, and offshore oil rigs, to skyscrapers and landfills – by carefully testing what’s used beneath the surface. We offer worldwide service and maintain a license with the United States Department of Agriculture, so we can accept samples, regardless of where they originate.



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Drillability Test Suite

Drillability testing aids in choosing the methods and equipment to be used for tunneling and rock blasting projects. Tests included in the drillability test suite are the Sievers’ J-Value, Brittleness Value (S_{20}), Abrasion Value, and Abrasion Value Cutter Steel.

Drillability testing determines the Drilling Rate Index™ (DRI™), Bit Wear Index™ (BWI™), and Cutter Life Index™ (CLI™). These indices help characterize rock by determining its brittleness, surface hardness, and wear capacity.

Drillability results enable predicting project advance rates and costs.

Brittleness Test Apparatus

An impact apparatus is used to determine the Brittleness Value (S_{20}).

Siever’s Miniature Drill Apparatus

The surface hardness is determined using the Sievers’ J-Value determined with a miniature drill apparatus.

Abrasion Testing Apparatus

The wear capacity is determined using an abrasion testing apparatus where tungsten carbide and cutter steel test pieces are abraded by rock powder. Abrasion values are determined for each type of test piece.

The DRI™ is calculated using the Brittleness Value. The BWI™ is calculated using the DRI™ and wear capacity of the tungsten carbide test piece. The CLI™ is calculated using the Sievers’ J-Value and wear capacity of the cutter steel test piece.

Tools for Soft Ground Tunneling - Soil Abrasivity Test

The abrasivity of soil is determined using the same testing apparatus used for rock. The test for soil uses a wider cutter steel test piece. The abrasivity of a soil is classified based on the amount of wear measured.

Reference: GTX’s drillability testing suite is based on NTNU’s 13A-98 DRILLABILITY Test Methods, Dept. of Civil and Transport Engineering & SINTEF’s DRI, BWI, CLI Standards, January 2003.

Reference: GTX’s Soil Abrasivity Test is based on B. Nilsen, F. Dahl, J. Holzhauser, P. Raleigh, new test methodology for estimating the abrasiveness of soils for TBM tunneling, proceedings of RETC Conference 2007: 104-116.

The trademarked acronyms and terms DRI™, Drilling Rate Index™, Bit Wear Index™, BWI™, Soil Abrasion Test™, SAT™, and Cutter Life Index™ are unique for test results and calculated indices originating from NTNU/SINTEF and can only be obtained by testing samples at their reference Laboratory in Trondheim, Norway.

Tunnels

Characterization and Testing

Rock Testing

- Air permeability
- Cerchar abrasivity♦
- Direct♦ and indirect♦-(Brazilian) tensile
- Direct shear/sliding friction♦
- Drillability Test Suite
- Elastic moduli♦
- Freeze/thaw
- Hardness♦
- Hydraulic conductivity
- Petrographic analysis
- Point load index♦
- Pulse velocities and ultrasonic constants♦
- Punch penetration♦
- Slake durability♦
- Triaxial♦
- Unconfined compression♦
- Wet/dry

Soil Testing

- Consolidation (incremental♦, K_o , constant rate of strain♦)
- Soil Abrasivity Test
- Cyclic simple shear
- Direct♦ and residual shear
- Direct simple shear♦
- Index♦
- Permeability♦
- Resilient modulus♦
- Resonant column♦/Torsional shear
- Triaxial (UU♦, CU♦, CD♦, cyclic, extension)

Sample of Tunnel Project Experience

Hudson Tunnel - Surface & Tunnel Alignment, NJ Fan Plant, NY-NJ; The Gateway Trans-Hudson Partnership; 2017-2018	NEIS-GBIS Sewer Tunnel, NEIS2 and NEIS2A, Los Angeles, CA; NATEC, AMEC, and AECOM/URS; 2008-2013
Snowy 2.0 Pumped Hydro Expansion Tunnel, Australia; GHD Engineering; 2018	Baltimore & Potomac Tunnel, MD; PB/P JV; 2015-2016
Second Avenue Subway Phase 2, NY/NJ; Phase 2 Partnership; 2018	South Hartford Conveyance and Storage Tunnel, CT; AECOM; 2013-2014
Atlanta Water Supply Tunnel Rock Testing, GA; ATC & CERM JC & United Consulting; 2014-2015	Baltimore Red Line Cooks Lane and Downtown Tunnels, MD; PB; 2013-2015
Roundout West Branch Bypass Tunnel Phase 2, NY; Jacobs; 2014	The Third Catskill and Delaware Aqueduct, NY Mott MacDonald/Malcolm Pirnie J.V.; 2011-2013

Accredited by:



♦ Tests for which GeoTesting Express is accredited by A2LA