

Capability Statement

Trilab is Australasia's leading independent supplier of specialised soil and rock mechanics testing, to the Asia-Pacific mining, civil construction and infrastructure industries. Two full service laboratories are maintained in Brisbane and Perth as well as a calibration laboratory in Brisbane.

Trilab's accreditations (or licences) comprise:

- ▶ **NATA:** Soil and rock construction materials testing (CMT) with corporate accreditation for both Perth and Brisbane laboratories [Accredited Laboratory No. 9926] performing tests to Australian and the equivalent ASTM methods and International Standards. Calibration laboratory accredited in Brisbane. All laboratories are available for public testing.
- ▶ **Quarantine:** Australian Department of Agriculture, Fisheries and Forestry permits to import, store and destroy soil and rock quarantined material in Brisbane and Perth.
- ▶ **Queensland Department of Transport and Main Roads:** Registered CMT supplier.
- ▶ **Membership:** Association of Geotechnical Testing Authorities (QLD), Australian Geomechanics Society (AGS), International Society of Rock Mechanics (ISRM).

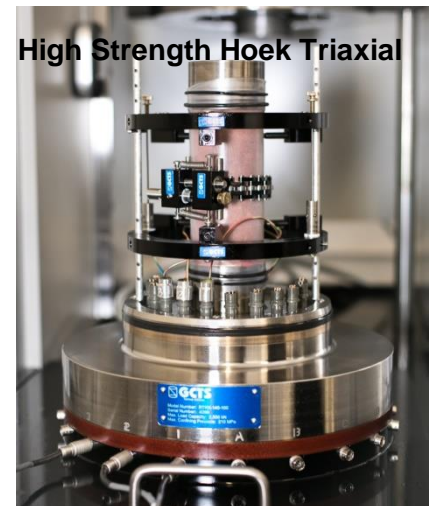
Summary of Testing Capabilities

- ▶ **High Pressure Rock Triaxial Testing:** For specimen diameters from 25mm to 100mm; with automated data acquisition and a state of the art high stiffness 2500kN capacity frame. Servo hydraulic control of load as well as triaxial cell and back pressure control unit of up to 140MPa. Axial and Diametral strain measurements performed within the triaxial cell. Post peak failure analysis also available. See photograph on page 2.
- ▶ **Rock Strength testing, including UCS, Modulus, Hoek-Cell, P and S Wave (Sonic Velocity) testing, Cerchar Abrasivity and Direct Tensile testing:** Over 9 compression machines; 5 sets of extensometers; strain gauge capability; 2 Sonic Velocity units, 1 Direct Tensile unit; 3 advanced end grinders.
- ▶ **Triaxial testing:** Over 30 frames; specimen diameters of 50mm to 100mm; automated data acquisition including pore pressure measurement; to a maximum confining pressure of 3,500 kPa.
- ▶ **Direct Shear testing:** Over 20 of 100mm box units; 2 of 300mm box units able to test up to 30mm particle size with a capacity of 100kN normal force; intact high strength rock core shear box with the ability to orientate core to any angle, constant normal stress control if required; surface profiling.
- ▶ **Consolidation testing:** Over 30 Oedometer units, Extended Height testing; all with automated data acquisition.
- ▶ **Classification, Permeability and index testing:** Including Grading analysis, Hydrometer and Dispersion, Atterberg Limits, Shrink/Swell, Compaction and CBR. Permeabilities on soil and rock by constant-head or falling head methods.
- ▶ **Aggregate Testing: In accordance with AS 1141 and local authority standards:** Including LA Abrasion, Aggregate Soundness, Wet/Dry Strength Variation, Degradation Factor, etc.
- ▶ **Off-site calibration:** Large range of engineering metrology equipment, including weighing, pressure and force measuring devices; test sieves and ancillary testing equipment for CMT.

Schedule of Services

Rock

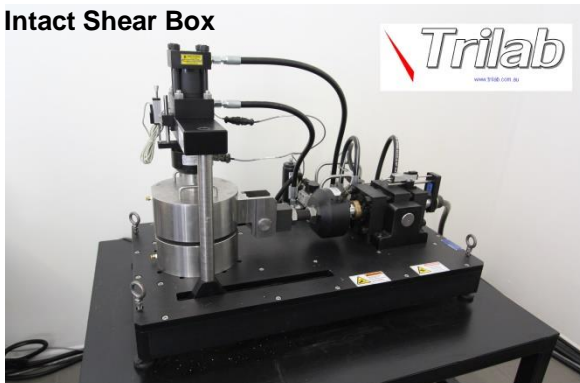
- ▶ Hoek Triaxial (single or multi stages) on 25mm to 100mm diameter core - Effective Pressure up to 140MPa.
- ▶ CU Triaxial with pore water pressure measurements
- ▶ UCS with photograph.
- ▶ UCS with Young's Modulus and Poisson's Ratio.
- ▶ Post Peak failure behaviour.
- ▶ Hydraulic Fracturing (laboratory).
- ▶ Sonic Velocity (P and S Wave).
- ▶ Cerchar Abrasivity.
- ▶ Indirect Tensile Strength (Brazilian).
- ▶ Direct Tensile to ASTM International standards.
- ▶ Point Load Index.
- ▶ Rock Porosity and Density.
- ▶ Slake Durability.
- ▶ Slaking and Dispersion Potentials.
- ▶ Rock Permeability.
- ▶ Rock Swelling Pressure.



Direct Shear (Soil and Rock)

- ▶ Direct Shear on cohesive material / rock core on defects or intact (single or multi stages).
- ▶ Direct Shear on cohesionless material (single or multi stages).
- ▶ Torsional Ring Shear on cohesive materials (single or multi stages).
- ▶ 300mm Shear Box: Particle size up to 30mm.

Intact Shear Box



300mm Shear Box



Triaxial Strength and Consolidation (Soils)



- ▶ CU - Saturated, Consolidated, Undrained with Pore Water Pressure Measurement - 50mm, 63mm, 75mm, 86mm, 100mm (single or multi stage); 3,500kPa Confining Pressure.
- ▶ CU - Saturated, Consolidated, Undrained with Pore Water Pressure Measurement - extra strain (single or three stage).
- ▶ CD - Consolidated Drained with Pore Water Pressure Measurement - 50mm, 63mm, 75mm, 86mm, 100mm (single or multi stage); 3,200kPa Effective Cell Pressure.
- ▶ QU - Unconfined Quick Undrained Compression Test - Up to 100mm.
- ▶ QU - Unconfined Quick Undrained Compression Test - Up to 100mm with Young's Modulus.
- ▶ UU - Confined, Unconsolidated, Undrained - 50mm to 100mm (single or multi stage).
- ▶ Oedometer - Up to eight stages (including Particle Density); additional stages upon request.
- ▶ Collapse Potential.
- ▶ Extended Height Oedometer (up to 500mm) / Consolidation / Settlement. Drained and Undrained for fine grained soils and ash.

Aggregates

- ▶ Wet / Dry Strength Variation.
- ▶ Los Angeles value.
- ▶ Aggregate Soundness - Evaluation by exposure to sodium sulphate solution.
- ▶ Modified Texas Triaxial Test for pavement materials.
- ▶ Flakiness Index.
- ▶ Degradation Factor.
- ▶ Crushed Particles.
- ▶ Average Least Dimension Direct measurement and by Calculation (nomograph).
- ▶ Aggregate Crushing Value.
- ▶ Particle Size Distribution: Sieving Method.
- ▶ Materials finer than 75 Microns.
- ▶ Particle Shape by Proportional Calliper.
- ▶ Weak Particles.
- ▶ Clay and Fine Silt (settling method).
- ▶ Organic Impurities other than sugar.
- ▶ Particle Density and Water Absorption - Fine Aggregate and Coarse Aggregate.
- ▶ Bulk Density of Aggregate (Unit Mass).
- ▶ Crushing - Core / Rock Spalls.

Permeability

- ▶ Falling Head.
- ▶ Constant Head: Triaxial and cohesionless material
- ▶ Rock Permeability.

Playing Field Material Assessment

- ▶ Water Holding Capacity.
- ▶ Saturated Hydraulic Conductivity.
- ▶ Porosity Computations

Brisbane Laboratory



Perth Laboratory



CBR and Compaction

- ▶ Maximum Dry Density - Standard or Modified.
- ▶ Soaked CBR.
- ▶ Soaked CBR (10 day soak).
- ▶ 4 Point CBR (Main Roads).
- ▶ Unsoaked CBR.
- ▶ Maximum/Minimum Dry Density.

Dispersion and Chemical

- ▶ Percentage Dispersion (Double Hydrometer).
- ▶ Emerson Class Number.
- ▶ Pinhole Dispersion.
- ▶ pH / Conductivity / Salinity.
- ▶ pH Lime Demand (eight points).

Classification

- ▶ Visual Classification.
- ▶ Moisture Content.
- ▶ Atterberg Limits (including Linear Shrinkage).
- ▶ Percentage Fines.
- ▶ Particle Size Distribution - 4.75mm to 0.075mm, 75mm to 0.075mm.
- ▶ Particle Size Distribution with Hydrometer (including Particle Density).
- ▶ Shrink / Swell Index and Shrink / Swell Index with Swell Pressure (single stage).
- ▶ Apparent Particle Density (Specific Gravity).
- ▶ Unit Weight.

Calibration and Instrumentation Services

NATA calibration of:

- ▶ Test Sieves with apertures ranging from 16mm down to 30µm.
- ▶ Rubber hardness.
- ▶ Dial Gauge to NATA Construction Materials Testing, and AS2103 - 1978 *Dial Gauges and Dial Test Indicators (Metric Series)* requirements.
- ▶ Electronic Balances.
- ▶ Load Cell / Proving Ring.
- ▶ Electronic and vernier callipers - Up to 300mm.
- ▶ Extensometer.
- ▶ Concrete Testing & Materials Testing Machines - Compression to 3MN or Tension to 100kN.
- ▶ Pressure Gauge / Transducer.

If you have any questions or need assistance, please do not hesitate to contact:

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