GCTS is committed to designing accurate testing systems by integrating innovative software engineering with advanced hardware. GCTS systems perform at the highest levels of reliability, providing efficient systems that satisfy customer needs and expectations.

PLT-2W
Wireless Point Load Test System

SPECIFICATIONS

- 100 kN Load Capacity
- Compact, Light Weight (< 16 kg)
- Ergonomic Shield Protection
- High Precision (better than 0.05%)
- Point Load Test App for Mobile Devices (iOS, Android, Windows)
- Automatic Specimen Gauging
- Internal Battery Operation
- Optional Ultrasonic Velocity Measurements
- Available Platen and Apps for:
  - Unconfined Compression Test
  - Indirect Tension (Brazilian) Test
  - Brinell Hardness Test

DESCRIPTION

The Point Load Test is performed on rock core specimens or irregular rock fragments to obtain the point load strength index and unconfined compressive strength of the rock. This test does not require costly specimen preparation and is a quick, simple test. The failure load P and the distance between platens D are measured to obtain the uncorrected point load strength \( \frac{P}{D^2} \). A correction is applied to account for the specimen size and shape, and the unconfined compressive strength is obtained from a correlation equation. Depending on the specimen geometry, three types of tests can be performed: diametral, axial, and irregular lump.

The GCTS Wireless Point Load Testing System is a convenient test system that has been designed for ease of transportation, increased productivity, and maximum precision.
The GCTS PLT-2W is an apparatus made of high-strength anodized aluminum that incorporates digital technology to increase precision and ease of use while reducing its size and weight. The apparatus weighs less than 16 kg and the standard unit can apply loads up to 100 kN (22.5 kips). The GCTS PLT-2W is an apparatus made of high-strength anodized aluminum that incorporates digital technology to increase precision and ease of use while reducing its size and weight. The apparatus weighs less than 16 kg and the standard unit can apply loads up to 100 kN (22.5 kips). At the end of the test, the App allows the user to take a picture of the failed specimen which is automatically saved with the test data.

The GCTS PLT App displays and graphs in real time the current load as well as the load rate and other calculated parameters to aid in the performance of the test as recommended by the applicable test standard. With the optional ultrasonic platen, the compressional (P) wave velocity is also automatically measured and displayed on the mobile device before reaching the failure load. The average P wave velocity is automatically saved along with the average point load index to provide an additional correlation with the sample unconfined compressive strength and modulus.

The application can be set to use custom polynomial equations for the calculation of the unconfined compressive strength as a function of the Point Load Index. During and after testing, the application will automatically calculate and display the average Point Load Strength Index, Peak Load, and Unconfined Compressive Strength for the sample. After the specimen fails, all data is recorded, and a new test will automatically begin.

The data acquisition electronics are safely located inside a metal housing and uses Bluetooth to wirelessly connect to a mobile device (iOS, Android, or Windows). An iPod Touch and the GCTS Point Load Test Application software are included with the PLT-2W.

Three different specimen shapes can be tested – diametral, axial, and irregular. The application can be set to perform tests with each specimen type and shows the user exactly which dimensions must be measured. All dimensions can be measured using the application by placing the specimen in the cell in the direction specified by the application and applying a small load. The application will automatically read the specimen dimension and record it. Once all measurements have been made, the point load test will automatically begin.

Specimen Geometries

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Typical Results Display Point Load Test

Test results are automatically averaged and can be easily retrieved within the same App as each individual specimen or in a combined bar graph. Abnormal results can be directly deleted from this bar graph or from the individual specimen result display. All collected data can be e-mailed directly from the GCTS PLT App to your desktop to be filed, printed or exported to Microsoft™ Word or Excel.

Optional fixtures and application programs are available to perform unconfined compression and indirect tension (Brazilian) tests on rock specimens. These applications also allow for automatic data acquisition and report generation.

Unconfined Compression Typical Results Display

The Unconfined Compression App measures the rock strength and calculates the tangent modulus at 50% of the peak stress ($E_{50}$) as well as the secant modulus. In order to obtain the correct strain data, the ULT App automatically corrects the data to account for the frame deformation (virtual infinite stiffness) and will graph the stress-strain curve in real-time. If fitted with the ultrasonic platen, p-wave velocity is also recorded automatically for each test. At the end of the test, the App allows the user to take a picture of the failed specimen which is saved with the test data.
Another option for the GCTS Wireless Point Load Testing System is a set of ultrasonic platens for the measurement of P-wave velocity. This gives a more accurate correlation between the point load index and the unconfined compressive strength.

The standard PLT-2W also includes a Quick-Connect port to use an external pressure source to automatically apply test loads at more constant rates, eliminating the need to manually stroke the system hand pump.

The best quality of the PLT-2W is that it costs the same as previous models but with all the instrumentation and data acquisition options included in the base price.

To see a demonstration video of the PLT-2W operation please visit our web page at www.gcts.com and go to the Rock / Point Load Test menu.

**OPTIONS**

**PLT-2W-CASE Carrying Case**
Watertight, airtight, dustproof and crushproof case. Equipped with integral rubber wheels, retractable extension handle, comfort grip, atmospheric pressure purge valve, and foam for total equipment protection.

**PLT-PSET Point Load Platens**
Extra set of (upper and lower) hardened steel point load platens.

**PLT-UHQ Unconfined Compression Load Platens and Software**
Set of upper and lower platens HQ for unconfined compression tests with 63 mm (2.5 inch) diameter. Accommodates HQ or smaller specimens inside point load tester. Made of hardened stainless steel. Other sizes available.

App for UCS determination available separately at the App Store.

**ULT-PLT-10 Point Load Platens with Ultrasonic Transducers**
Set of (upper and lower) hardened steel point load platens with 1 MHz frequency compression (P) mode wave transducer crystals for GCTS Point Load Test.

**ULT-PLT-UXB-10 Unconfined Platens with Ultrasonic Transducers**
Set of (upper and lower) hardened steel unconfined compression platens with 42 mm diameter and 1 MHz frequency compression (P) mode wave transducer crystals for GCTS Point Load Test Apparatus. Accommodate BX or smaller specimens. Other sizes available.

**ULT-2 Ultrasonic Velocity Measurement System**
Ultrasonic Velocity test system for automatic measurements of P-wave velocities through rock specimens. Digitally controlled pulser and receiver with 10 MHz Bandwidth and 40 MHz high speed acquisition board with 24-bit resolution digitizing board. Includes system cables.

**RIT-B-NX Indirect Tension Testing Apparatus for Rocks**
Apparatus for determining indirect tensile strength by the Brazil test, according to the International Society for Rock Mechanics standard. Loading jaws for testing 54-mm (NX) diameter and 27-mm thick samples by the Brazil test. Top and bottom jaws 30 mm wide with 39-mm radius and guide pins to allow rotation of one jaw relative to the other. Top jaw includes spherical seating with HRC 45 hardness. Spherical platen formed by a 25-mm half ball bearing. Meets ISRM suggested method for Determining Tensile Strength by the Brazil test.

**PLT-BRINELL Brinell Hardness Test Platens**
Brinell testing apparatus to measure the hardness of rock cores with diameters up to 100-mm. Includes the following: Bottom hardened steel platen with 70 mm diameter. Top hardened steel platen designed to fit different diameter hardness testing balls. Set of hardened steel Brinell balls including one each with 1/16", 1/8", and 1/4" diameter balls.

**PLT-FOOT-PUMP Automatic Pneumatic Pump**
Foot pump for smooth application of loads during point load test with GCTS PLT-2W. Allows for maximum control of the loading rate eliminating stroke pauses produced with the hand pump. Includes 10 ft hydraulic hose with Quick connect fitting for easy connection to PLT-2W. Requires 800 kPa compressed air source.

**RELEVANT STANDARDS**

ASTM D5731 Standard Test Method for Determination of the Point Load Strength Index of Rock and Application to Rock Strength Classifications

ASTM D7012 Standard Test Methods for Compressive Strength and Elastic Moduli of Intact Rock

ASTM D3967 Standard Test Method for Splitting Tensile Strength of Intact Rock Core Specimens

ASTM E10 Standard Test Method for Brinell Hardness of Metallic Materials

ISRM Suggested Method for Determining Point Load Strength

ISRM Suggested Method for Determination of the Uniaxial Compressive Strength of Rock Materials

ISRM Suggested Method for Determining Indirect Tensile Strength by the Brazil Test

**SPECIFICATIONS**

Max. Daylight Opening: 125 mm (5 inch)

Vertical: 100 mm (4 inch)

Load Capacity: 100 kN (22.5 kips)

Displacement Stroke: 50 mm (2 inch)

Precision: 0.05%

Interface: iOS, Android, Windows Mobile

Power: 5 VDC (USB 2.0 Micro-AB connector) @ 500mA

Dimensions: 48 x 23 x 41 cm (19 x 9 x 16 inch)

Net Weight: 16 kg (36 lbs.)

Operating Temperature: 0 - 54°C (32 – 130°F)

Warranty: One (1) year parts and labor.
**Unconfined Compression Load Platens**

**RIT-B-NX Indirect Tension Testing**

**Carrying Case**

**GCTS Point Load Tester: PLT-2W**