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-100 & PLT-110**

Point Load Test System

- Compact, Light Aluminum Construction
- 100 kN Load Capacity
- Precise Digital Display with Peak Value Memory
- User Selectable display units (PLT-100 only)
- DC Signal Output to a Computer or Datalogger
- Optional A/D Automatic Data Acquisition with USB interface
- Available Ultrasonic Velocity Option
- 110/220 VAC and 12 VDC Operation (PLT-100)
- Internal Battery Powered with Automatic Light-Actuated Battery-Saver Circuit (PLT-110)

**DESCRIPTION**

Point load test is carried out on core rock specimens or irregular rock fragments to obtain the point load strength index and unconfined compressive strength. 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 $P/D^2$. 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 Point Load Tester 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 14 kg. The standard unit can apply loads up to 100 kN (22.5 kips). The introduction of a pressure sensor to measure load provides a better accuracy at any load level eliminating the imprecision of traditional pressure gauges at low load ranges. The system has a digital display that...
continuously monitors applied load. The maximum load is automatically stored and easily obtainable by pressing a button. An optional second display provides specimen size in mm (or inches). The GCTS Point Load Test System is a convenient test system that has been designed for ease of transportation, optimum mass production, and maximum precision.

The optional GCTS Data Acquisition System along with GCTS Point Load Software enables fast and accurate testing in the laboratory and field. The Windows software package interfaces with laptops or desktop computers via USB connections. The software was designed to provide fast, automated testing, and capable of automatic data logging and statistical data analysis. Specimens can be loaded one after another as fast as possible, and the program would measure the specimen diameter and start or stop the test automatically based upon threshold load value. During the test, there is a real time display of parameters (time, load, deformation) and statistical results from all of the previous specimens. If necessary, program is capable of deleting the generated data clicking a button on the screen.

The output results generated during the test are shown on the figure on the left. The program stores the data corresponding to each test performed, and carries out the necessary computations. The output is very easy to follow and includes the values of qu, P, Is, Is50, and the corresponding statistical values such as mean, standard deviation, median, maximum, and minimum. The individual specimen data are also shown on the output. The data can be transferred to Excel or any other similar application for further analysis, if necessary.

An advanced option for GCTS Point Load Tester is the ultrasonic platens for the measurement of P-wave velocity. The P-wave velocity is a more rational method and gives a better correlation to strength than the point load index. The major advantage of the ultrasonic velocity option is that, as for the point load test, it does not require expensive specimen preparation. The P-wave velocity is measured during the point load test. The option from GCTS provides accurate full pledged wave information that can be used for advanced analyses.

Other options include platens, triaxial cells, and frames for performing uniaxial and triaxial tests on small specimens. These options include software that captures the complete stress-strain curve and automatically calculates strength parameters.

GCTS offers two different point load testers, the PLT-100 and the PLT-110. Both models include a digital load display and clear acrylic shield. The main difference is that the PLT-110 does not require external electrical power as it uses an internal battery rated for 8,000 hours operation. All options are available for both units. The PLT-110 is calibrated at the factory to display the load values in kN and can not be modified by the user.

### SPECIFICATIONS

1) **PLT-100 & PLT-110 Digital Point Load Testing System**

Digital Point Load Testing Apparatus to measure the point load strength index (Is).

#### 1.1) Load Frame

Two-column vertical standing assemble with perforated columns for crosshead adjustment and acrylic shield. Made of lightweight high-strength anodized aluminum and alloy steel. Maximum vertical daylight opening: 175 mm. Horizontal daylight opening: 100 mm. Includes hydraulic loading jack 100 kN load capacity and 60 mm stroke, base, and protection goggels.
1.2) PLT-100 Load Signal Conditioning and Display
Full 4-digit display with easy front panel scaling to virtually any engineering units and selectable excitation to work with most transducers and transmitters. Includes a digital tare function, peak measurement memory recall to read maximum load, and 0-10 VDC analog output to interface with data acquisition systems.

1.3) PLT-110 Load Signal Conditioning and Display
Full 4-digit display calibrated and scaled in SI units (kN). Includes 40-segment bar graph around the display in % full scale. Also includes a digital tare function, peak measurement memory recall to read maximum load, and 0-2 VDC analog output to interface with data acquisition systems. Requires 3.6 V C-size lithium battery (included).

1.4) Transducer and Signal Conditioning
Pressure sensor 69 MPa (10,000 psi) range to measure load.

1.5) Instrumentation Case and Instruction Manual (PLT-100 only)
Lightweight hard plastic case with O-ring gasket for environmental protection. Includes operating instruction manual.

1.6) Point Load Platens
Set of (upper and lower) hardened steel point load platens.

1.6) Power Supply
Operates with 12 VDC or 120-240 VAC. Includes car cigarette lighter adaptor.

OPTIONS

2) PLT-CASE Carrying Case
Wattertight, 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.

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

4) PLT-DEF Automatic Size Gauging Transducer Option
Digital deformation sensor for Automatic specimen size gauging to increase productivity and minimize errors.

4.1) Deformation Signal Conditioning and Display
14-segment 4-digit display with easy front panel scaling to virtually any engineering units and selectable excitation to work with most transducers. Includes a digital tare function, peak measurement memory recall, and 0-10 VDC analog output to interface with data acquisition systems. Included only with PLT-100-DEF. Requires PLT-DAQ option with PLT-110.

4.2) Automatic Size Gauging Transducer
Deformation sensor 50 mm range for automatic specimen size display or deformation.

5) PLT-DAQ Automatic Data Acquisition System Option

5.1) Data Acquisition
12 bit A/D interface, 8-channel A/D data acquisition board and shielded cables (40 kHz sampling rate).

5.2) Software
Point Load and General data acquisition Windows software modules for real time graphing of test data and automatic report generation. Easy to use software with graphical user interface to enter specimen geometry and to calculate the specimen Is and the equivalent compressive strength. Please specify Laptop (PCMCIA) or Desktop (PCI) requirement.

5) PLT-UBX Unconfined Compression Load Platens
Set of upper and lower BX (42 mm) diameter platens for unconfined compression tests. Includes frame modification to accommodate BX specimens inside point load tester. Stainless steel construction.

7) PLT-UNIX Unconfined Compression Load Platens
Set of upper and lower NX (54.7 mm) diameter platens for unconfined compression tests. Includes frame modification to accommodate NX specimens inside point load tester. Stainless steel construction.

8) PLT-UHQ Unconfined Compression Load Platens
Set of upper and lower HQ (2.5 inch) diameter platens for unconfined compression tests. Includes frame modification to accommodate HQ specimens inside point load tester. Stainless steel construction.

9) PLT-ULT Ultrasonic Velocity Measurement System
Ultrasonic Velocity test system for automatic measurements of P wave velocities through rock specimens.

9.1) Signal Conditioning and Pulse Generation
Digitally controlled pulser and receiver including anti-aliasing filter. 10 MHz Bandwidth receiver. User selectable pulse energy amplitude from 100 to 400 Joules. Pulse rise time less than 5 nano-seconds.

9.2) Data Acquisition board
20 MHz acquisition rate with 12 bit resolution digitizing board. Includes system cables.

9.3) Ultrasonic Velocity Software Module
Digital signal processing and signal enhancement software for automatic ultrasonic velocity measurements.

9.4) P Wave Platen for Point Load Test Apparatus
Set of compression mode wave transducer platens with 200 kHz frequency crystals for GCTS Point Load Test.

10) 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. Both platens are made out of hardened steel. Set of hardened steel Brinell balls including one each with 1/16", 1/8", and 1/4" diameter balls.

11) 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, requires suitable compression frame. 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. Half ball bearing. Spherical platen formed by a 25-mm half ball bearing. Meets ISRM suggested method for Determining Tensile Strength by the Brazil test. Available apparatuses for testing specimens with other radii. Note that ISRM recommends that the diameter shall not be less than NX core - 54-mm diameter.

WARRANTY
One (1) year parts and labor.

SHIPPING
Standard shipping weight: 27 kg (60 lb)
Standard shipping volume: 63cm x 49cm x 35cm
GCTS Point Load Tester: PLT-110

RIT-B-NX Indirect Tension Testing

Unconfined Compression Load Platens

Carrying Case