

## RockSchmidt – Rebound Hammer for Rock



### Introduction

For many years Proceq's Original Schmidt hammers originally designed for non-destructive testing of concrete structures have been used for rock testing. With the release of the new RockSchmidt test hammers, Proceq presents the first rebound hammers adapted specifically to the extremely varied rock testing application.

The RockSchmidt incorporates statistical methods based on ASTM and ISRM recommendations and also provides the user with the freedom to define his own statistical process for determining a rebound number.

All data is stored on the instrument and may be downloaded to a PC later. The world's most advanced rebound hammer, with unmatched dispersion characteristics, durability and measuring range has now been fully adapted for rock testing.

Two models are available. RockSchmidt Type N with standard impact energy is most suited to field testing and RockSchmidt Type L with low impact energy as specified by ASTM for testing cores.

### Applications

- Geomorphological applications which investigate the bulk hardness properties of a rock outcrop
- Prediction of weathering grades
- Correlation to Unconfined (or Uniaxial) Compressive Strength (UCS)
- Correlation to Young's Modulus
- Prediction of penetration rates for tunnel boring machines and rotary drum cutters
- Testing on cores and blocks

### Features

The following features of the hammer make it ideal for rock testing applications:

#### Impact Angle Independence

- The rebound value is independent of the impact direction.

#### Optimized for Field Work

- Tighter sealing against dirt and dust intrusion for longer life.
- Significantly lighter and more ergonomic than the classic Schmidt hammer.
- A large number of readings can be saved and downloaded later to a PC.

#### Preset Statistics

- Statistics methods recommended by ISRM and ASTM are implemented into the hammer for automatic calculation of the rebound number.
- The option is also there to define a user specific statistics method.

#### Unconfined Compressive Strength

- ISRM recommends a correlation between UCS and the rebound value based on the formula  $UCS = ae^{bR}$  (where R is the rebound value).
- A correlation in this format may be defined in the PC software and downloaded onto the RockSchmidt.

#### Young's (E-) Modulus

- ISRM recommends a correlation between elastic modulus and the rebound value based on the formula  $E_t = cedR$  (where R is the rebound value).
- A correlation in this format may be defined in the software and downloaded onto the RockSchmidt.

#### Weathering Grade

- Impacting on the same location twice can be used to correlate to weathering grade.
- The ISRM recommended method has been included in the device.



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## Technical Specifications

|                         |                                   |
|-------------------------|-----------------------------------|
| Impact energy           | (N) 2.207 Nm<br>(L) 0.735 Nm      |
| Dimensions of housing   | 55 x 55 x 250 mm                  |
| Weight                  | 570 g                             |
| Max. impacts per series | 99                                |
| Memory capacity         | Example: 400 series of 10 impacts |
| Display                 | 17 x 71 pixel, graphic            |
| Battery lifetime        | > 5000 impacts                    |
| Operating temperature   | 0 to 50°C                         |
| IP Classification       | IP54                              |



## Other Equipment

The full Proceq range of equipment is available for insitu non-destructive concrete measurement, including Schmidt Hammers, Cover Meters, Half Potentials, Ultrasonic Pulse Velocity, Resistivity and Permeability measurement.

The Olson Instrument range includes the NDE360, CTG, Freedom Data PC and DAS as well as the resonance tester.

The Geosense range of Geotechnical equipment includes VW Strain Gauge, Crack Meter, Load Cell, Piezometer and various readouts.

## About PCTE

PCTE have over 30 years experience in the measurement and testing of concrete. PCTE can provide more than just the equipment, they can provide expert training. PCTE have a service centre in Sydney in which they can provide calibration, repairs and warranty repairs.

## Application Overview

Recommended Instruments

|  | Hardness Testing |             |                  |        | Ultrasonic Pulse Velocity      |
|--|------------------|-------------|------------------|--------|--------------------------------|
|  | RockSchmidt      |             | Original Schmidt |        | Pundit PL-200 /<br>Pundit Lab+ |
|  | Type N           | Type L      | Type N           | Type L |                                |
| Geomorphological applications which investigate the bulk hardness properties of a rock outcrop   | •                |             | •                | •      |                                |
| Prediction of weathering grades  | •                |             | •                | •      |                                |
| Relative dating of landforms such as moraines and rock glaciers  | •                |             | •                | •      |                                |
| Correlation to Unconfined (or Uniaxial) Compressive Strength (UCS)   | •                | •           |                  |        | •                              |
| Correlation to Young's Modulus   | •                | •           |                  |        |                                |
| Prediction of penetration rates for tunnel boring machines and rotary drum cutters   | •                |             | •                | •      | •                              |
| Testing on weak rocks, porous rocks and those with thin weathering crusts  |                  | •           |                  | •      |                                |
| Testing on cores   | ≥ 84 mm Ø        | ≥ 54.7 mm Ø |                  | •      |                                |
| Testing on rectangular blocks  | > 100 mm thick   | •           | > 100 mm thick   | •      |                                |
| Investigation of hardness near to edges  |                  |             |                  | •      |                                |
| Determination of the pulse velocities of compression (P) waves and shear (S) waves in rock from which the dynamic elastic constants are calculated |                  |             |                  |        | •                              |
| Assessing the state of preservation of historical stone buildings  |                  |             |                  |        | •                              |
| Quality classification of building stone   |                  |             |                  |        | •                              |