

SilverSchmidt ST and PC – Rebound Hammer



- Low power consumption, high capacity lithium-ion battery
- The Mushroom Head attachment has a larger surface area and is used for early age strength or softer materials

Applications

- Suitable for testing a wide variety of concrete, mortar, rock, paper and plastics
- Ideally suited for on-site testing
- Handy for difficult to access or confined test areas (i.e. working overhead)
- Especially convenient for testing on tunnel linings as measurements are independent of impact direction

Operation

- Simple operation with the "one button" user interface
- Language independent through the use of graphic user interface
- Automatic conversion to the required measurement unit (MPa, kg/cm², psi),
- Various statistics to comply with standards or user specified procedures
- Custom presets of test parameters for various testing scenarios can be stored and later recalled
- Quick review of previous measurements

Ergonomic, lightweight design facilitates reliable measuring



1. Place the unit perpendicular to the test surface



2. Load the unit by pushing it towards the test surface

3. Impact is triggered when the end position is reached

To obtain a reading in units of compressive strength select:

- Desired unit
- Length of series and averaging mode
- Carbonation depth (if applicable)
- Conversion curve for concrete mixture
- Form factor

Perform a test series of specified length. Manual cancellation of obvious outliers is possible. At the end of the series, the instrument will display the average converted to the desired unit.

Traditional Hammers vs SilverSchmidt

The classical hammers suffer from the following insufficiencies:

1. The rebound value is dependent on the impact direction.
2. The rebound value is affected by internal friction.
3. Limited tightness of sealing causes premature loss of accuracy.

The unique design and high quality construction of the SilverSchmidt address all of these issues and makes rebound hammer testing quicker and more accurate than ever before. Conversion curves are provided for a wide range of compressive concrete strength, including low and high strength concrete $f_c < 10$ MPa (5MPa using **Mushroom Head with the Type L**) and up to 100MPa. Conversion curves for different types of modern concrete are preset in the Silver Schmidt, based on tests performed by an independent institution

Dependable Measuring Results

- High accuracy due to differential optical absolute velocity encoder
- Measurement inherently independent of impact direction, meaning no corrections necessary
- Built-in correction for carbonation and form factor gives increased test accuracy and dependability of test results
- Registration of true rebound coefficient yields extended resolution across a wider range
- Silver Schmidt can also display the classic R value

Controlled and Extended Functionality

- Automatic control of functionality by monitoring impact energy



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Measuring True Rebound Coefficient ("Q"-value)

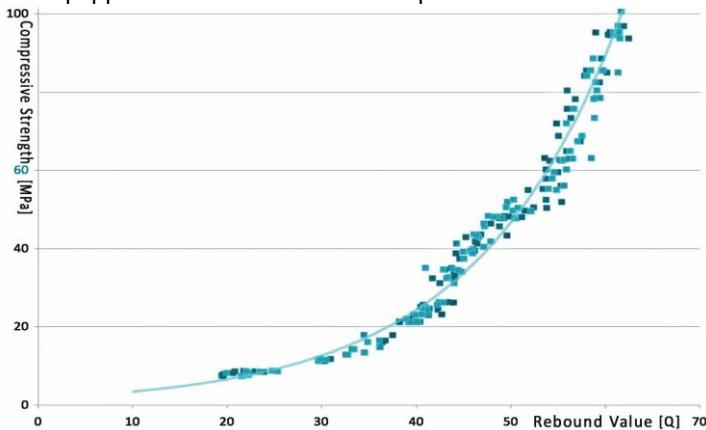
The classic "R"-value is the mechanical travel of the mallet on rebound. It is affected by its friction on the guide rod, the friction of the gauge, gravity, the relative velocity between unit and mechanical parts. This is true for all concrete test hammers currently on the market.

The Silver Schmidt acquires the "Q"-value by measuring the velocity (V) of impact and of rebound immediately before and after the impact. The "Q"-value need not be corrected for impact direction. There is a clear relationship between the "Q" and the "R"-value.

The "Q"-value [=rebound V divided by inbound V] represents the physical rebound coefficient. It is virtually free of all the above error sources. It is thus the indicator of choice to be used as a basis to convert to compressive strength.

New Improved Plunger

The lightweight hybrid design of the impact plunger is made from aerospace alloy, matched to the elastic properties of the concrete and equipped with a hardened steel cap.



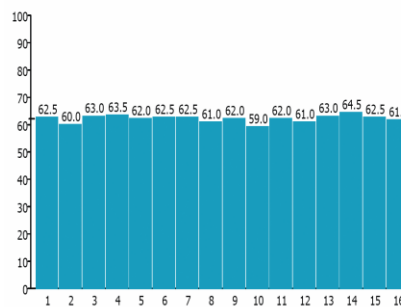
Independent validation testing by BAM in Berlin has shown the SilverSchmidt to have less dispersion than the classical hammer over the entire range.

Hammerlink

The ST Model Silver Schmidt only has the capacity to display the last 20 results. The PC Model Silver Schmidt on the other hand is the extended data logging model, it can log 1300 single impacts or over 465 measurement series, each with 10 readings. The data is then downloaded to PC using the Hammerlink application and a USB cable.

- Extended memory usage
- Rapid uniformity assessment with the summary view
- Sorting of data
- User-defined conversion curves
- User-defined statistical methods
- Highlighting of mean, median and outliers

Q-Values diagram [measurement order]



| Q-Values | Statistics |
|----------|---|
| 62.5 | Measurements N = 15 |
| 60.0 | Invalid measurements N = 0 (0%) |
| 63.0 | Mean value $f = 74.5 \text{ N/mm}^2 (62.0 \text{ Q})$ |
| 63.5 | Standard deviation $s = 1.5 \text{ N/mm}^2 (1.3 \text{ Q})$ |
| 62.0 | |
| 62.5 | |
| 61.0 | |
| 62.0 | |
| 59.0 | |
| 62.0 | |
| 61.0 | |
| 63.0 | |
| 64.5 | |
| 62.5 | |
| 61.5 | |

| Settings | |
|-------------------|-------------------|
| Averaging mode | Mean |
| Conversion curve | REF N |
| Form factor | 1.00 |
| Carbonation depth | 0.0 mm |
| Unit | N/mm ² |
| Serial number | SH01-001-0115 |
| Spring type | SilverSchmidt N |

| Comment |
|---------|
| [Add] |

- Carbonation correction
- Export to third party software

Compliance with Industry Standards

Data collection and processing of test results comply with major industry standards: EN 12504-2, ENV 206 ASTM C805, ASTM D5873 (Rock), BS 1881, part 202

Technical Information

| Mechanical data | Type N | Type L |
|-------------------------|--|-----------|
| Impact energy | 2.207 Nm | 0.735 Nm |
| Hammer mass | 135g | 135g |
| Spring constant | 0.79 N/mm | 0.26 N/mm |
| Spring extension | 75 mm | 75 mm |
| Housing dimensions | 55 x 55 x 255 mm (340 mm inc plunger) | |
| Dimensions (plunger) | 105 x ϕ 15 mm | |
| Weight | 570 g | |
| Electrical data Display | 17 x 71 pixels; graphic | |
| Power consumption | ~13mA measuring, ~4 mA setup and review, ~0.02 mA idle | |
| Accumulator duty | >5000 impacts (before recharging) | |
| Charger connection | USB type B (5V, 100 mA) | |
| Range Comp strength | 5 MPa to 170 MPa (with Mushroom Head) | |
| Operating temperature | 0 to 50 °C | |
| Storage temperature | -10 to 70 °C | |

About PCTE

PCTE have over 30years experience in the measurement and testing of concrete. With experience in research, consulting and construction they are able to assist you in reviewing the issues and developing solutions. PCTE can provide more than just the equipment. They can provide leading technical support for your business.

Other Equipment

The full Proceq range of equipment is available for insitu non destructive concrete measurement, including Schmidt Hammers, Covermeters, Half Potentials, Resistivity, Ultrasonics and Permeability. The Olson Instrument range also includes the CTG, Freedom Data PC and DAS as well as the resonance tester. We also supply Intelli-Rock maturity, temp and humidity logging systems, corrosion rate monitoring equipment, GPR.