

# proceq

# schmidt

CONCRETE TEST HAMMERS



CONSTRUCTION

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# CONCRETE TEST HAMMERS

**The concrete test hammers are the most widely used portable NDT measuring instruments for a rapid assessment of the condition of a concrete structure. Proceq's Schmidt Hammer portfolio is the most comprehensive available.**




The concrete test hammer was developed by Ernst O. Schmidt and introduced by Proceq at the beginning of the 1950's. Since then, Proceq has continuously developed its Schmidt Family to cover the entire range of compressive strength classes.

## Rebound Hammer Standards

The SilverSchmidt is fully compliant with EN 12504-2 and EN 13791. The following standards have been applied in SilverSchmidt for the procedure to determine the rebound number: ASTM C805, JGJ/T23-2011.

The Original Schmidt is fully compliant with all major standards.

Each rebound hammer is built for a different purpose in order to meet the specific needs of the customer. The following table gives an overview of the specifications and applications for each instrument.

		Concrete Compressive Strength Range					
		1 - 5 MPa 145 - 725 psi	5 - 10 MPa 725 - 1,450 psi	10 - 30 MPa 1,450 - 4,351 psi	30 - 70 MPa 4,351 - 10,153 psi	70 - 100 MPa 10,153 - 14,504 psi	> 100 MPa > 14,504 psi
		Fresh Concrete Very Low Strength Concrete		Normal Concrete		High Strength Concrete	Ultra High Performance Concrete
<b>SilverSchmidt</b> 				SilverSchmidt ST/PC Type N			Only with user defined custom curves
				SilverSchmidt ST/PC Type L			
<b>Original Schmidt Digi-Schmidt</b> 			SilverSchmidt PC Type L with Mushroom Plunger				
				Original Schmidt Type N/ND/NR			
<b>Schmidt OS-120</b> 		Schmidt OS-120PT					
				Original Schmidt Type L/LD/LR			

- Type N** Standard impact energy. Test object should have a minimum thickness of 100 mm (3.9") and be firmly fixed in the structure.
- Type L** Low impact energy. Suitable for brittle objects or structures less than 100 mm (3.9") thick.

**ST Model:** Standard model. Hammerlink software provided for performing firmware upgrades and selecting statistics presets only. Useful memory limited to the last 20 series.  
**PC Model:** Full Hammerlink software functionality. Extended memory usage. Download to PC. User defined custom curves.

## CONCRETE TEST HAMMERS

### SilverSchmidt



**ST/PC Type N/L:** The world's most advanced rebound hammer, with unmatched dispersion characteristics, durability and measuring range.

Independent validation testing by BAM Germany has shown that the SilverSchmidt's **patented measuring** principle has less dispersion than the classical hammers over the entire range.

Its **inherent impact angle** independence removes one possible source of user error completely. Automatic evaluation according to pre-defined statistical criteria and software analysis tools, greatly enhance the uniformity assessment application.

All major standards recommend to create mixtures specific curves. Such **user defined correlation curves** can be downloaded via the powerful Hammerlink software (PC version only) onto the hammer. This, together with on board correction for form factor and carbonation allows the best possible assessment of compressive strength.

In combination with the SilverSchmidt PC Type L hammer, the **mushroom plunger** extends the lower measuring range down to approximately 5 MPa (725 psi). This, coupled with the SilverSchmidt's inherent angle independency makes it the perfect tool for applications such as determining when to remove formwork in tunnel linings.



### Original Schmidt / Digi-Schmidt



**Type N/L:** The benchmark against which all rebound hammers are compared and the basis of every international rebound hammer standard. Available with different impact energies allowing customers to test a wide variety of materials and types of structure.

**Type NR/LR:** Ever popular version with impact values recorded as a bar chart on registration paper for ease of control. Greatly simplifies the calculation of the rebound value and in checking the uniformity of the object under test. One roll of paper can record up to 4'000 impacts.

**Type ND/LD (Digi-Schmidt):** The world's first digital rebound hammer with data storage, impact angle correction and direct display of compressive strength. The Digi-Schmidt allows correction for form factor and carbonation. It comes with a number of pre-programmed correlation curves, allowing the user to select the most suitable for the mixture under test. All data and parameters may be transferred to a PC for further evaluation with the ProVista software.

### Schmidt OS-120



**Type PT:** Equipped with a larger plunger surface, it is especially designed to test on softer material such as light weight concrete, gypsum boards and on fresh concrete. It is often used to determine the right time to remove formwork.

**Type PM:** Designed to test the mortar joints in brickwork. It has a specially developed plunger whose shape ensures the impacts are applied to the surface of the joint. Based on the rebound values the mortar quality can be classified.

## CONCRETE TEST HAMMERS

### Applications

The Schmidt concrete test hammers can be applied on all concrete structures such as **bridges, buildings, retaining walls, barrages** and many more. But they are also the perfect instruments to test in **tunnels** (e.g. the formwork stripping strength which is the concrete compressive strength  $f_c$  to be achieved before removal of the formwork).

### Spotlight: Tunnel Testing (1/2)

	Test Surfaces and Compressive Strength $f_c$ Range		
	1	2	3
	On all vertical and horizontal surfaces (including overhead)	On arched tunnel linings	On vertical front face and on vertical side of arched Tunnel linings
<b>Tunnel Types</b>	<b>BDB*, CC*</b>	<b>BDB*</b>	<b>BDB*</b>
<b>Original Schmidt Digi-Schmidt</b>	> 10 MPa (1'450 psi)	N/A	N/A
<b>SilverSchmidt</b>	> 10 MPa (1'450 psi)	> 10 MPa (1'450 psi)	N/A
<b>SilverSchmidt with Mushroom plunger</b>	5 to 10 MPa (725 to 1'450 psi)	5 to 10 MPa (725 to 1'450 psi)	N/A
<b>Schmidt OS-120PT Pendulum Hammer</b>	1 to 10 MPa (145 to 1'450 psi) <i>On intermediate walls, if designer approved it.</i>	N/A	1 to 10 MPa (145 to 1'450 psi)
<b>Information about the Austrian Guideline "Innenschalenbeton" (Inner Concrete Linings of Tunnels)</b>	Article 9.4.4 mentions the P-Type Pendulum Hammer to test on top of intermediate roofs. But as this particular Pendulum Hammer type is not produced anymore, we recommend using the Original-, Digi- or SilverSchmidt instead.	Article 3.5.3.1 mentions the Schmidt OS-120PT Pendulum Hammer and the SilverSchmidt to test the formwork stripping strength. The article also states that tests must be conducted on the top of the front face and on the vertical side surfaces which is only applicable for the PT Pendulum Hammer while the SilverSchmidt can be used over the entire arch without the need to correct the impact direction.  Article 3.1.2 mentions for $f_c = 2$ to 3 MPa (290 to 435 psi).	

\*BDB Tunnels: Bored / Drilled and Blast Tunnels (Arch lining)

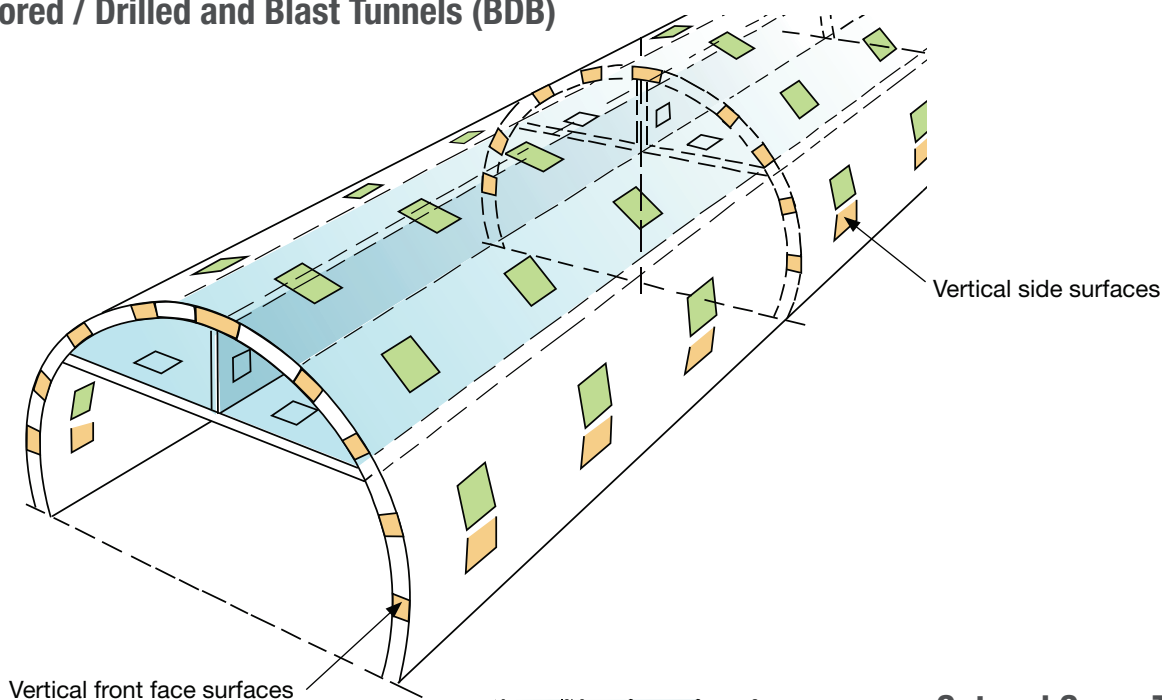
\*CC Tunnels: Cut and Cover Tunnels (Rectangular Cross Section)



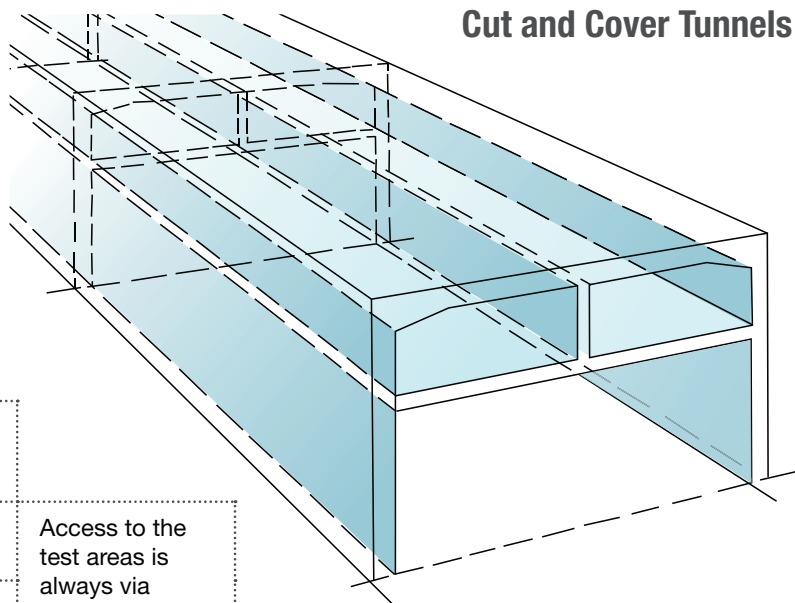
# CONCRETE TEST HAMMERS

## Spotlight: Tunnel Testing (2/2)

### Bored / Drilled and Blast Tunnels (BDB)



### Cut and Cover Tunnels (CC)



1	<b>On all vertical and horizontal surfaces (including overhead)</b>	Access to the test areas is always via openings in the formwork
2	<b>On arched tunnel linings</b>	
3	<b>On vertical front face and on vertical side of arched tunnel linings</b>	

## CONCRETE TEST HAMMERS

### Ordering Information

#### SilverSchmidt Units

PART NO.	DESCRIPTION
341 30 000	SilverSchmidt ST Type N
341 40 000	SilverSchmidt ST Type L
341 31 000	SilverSchmidt PC Type N
341 41 000	SilverSchmidt PC Type L

#### Original Schmidt / Digi-Schmidt Units

PART NO.	DESCRIPTION
310 01 001	Original Schmidt Type N
310 01 002	Original Schmidt Type N (PSI)
310 02 000	Original Schmidt Type NR
310 03 002	Original Schmidt Type L
310 04 000	Original Schmidt Type LR
340 00 202	Digi-Schmidt ND
340 00 211	Digi-Schmidt LD

#### Schmidt OS-120 Units

PART NO.	DESCRIPTION
310 06 001	Schmidt OS-120PT
310 06 002	Schmidt OS-120PM

#### Accessories

PART NO.	DESCRIPTION
341 90 002	Mushroom plunger*
341 10 400	SilverSchmidt anvil
342 10 400	Low range anvil
310 09 040	Testing anvil Euro „N/NR/ND/L/LR/LD“
310 10 000	Testing anvil „P/PT/PM“
341 89 001	SilverSchmidt Anvil Premium Calibration Certificate
310 89 002	Euro Anvil Premium Calibration Certificate
341 89 000	SilverSchmidt Premium Calibration Certificate
310 89 000	Original Schmidt Premium Calibration Certificate
310 99 072	Registration paper (5 rolls/pack), item 31 (NR/LR)

\*only with SilverSchmidt PC Type L

### Service and Warranty Information

Proceq is committed to providing complete support for its Concrete Test Hammers by means of our global service and support facilities. Furthermore, each instrument is backed by the standard Proceq warranty and extended warranty options.

#### Standard warranty

- Electronic portion of the instrument: 24 months
- Mechanical portion of the instrument: 6 months

Subject to change without notice. All information contained in this documentation is presented in good faith and believed to be correct. Proceq SA makes no warranties and excludes all liability as to the completeness and/or accuracy of the information. For the use and application of any product manufactured and/or sold by Proceq SA explicit reference is made to the particular applicable operating instructions.

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