

proceq

SCHMIDT OS-120 CONCRETE TEST HAMMER

OPERATING INSTRUCTIONS



Made in Switzerland
www.proceq.com

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1. Safety and Liability

1.1 Safety and Usage Precautions

This manual contains important information on the safety, use and maintenance of the OS-120PT/PM. Read through the manual carefully before the first use of the instrument. Keep the manual in a safe place for future reference.

1.2 Liability

Our “General Terms and Conditions of Sale and Delivery” apply in all cases. Warranty and liability claims arising from personal injury and damage to property cannot be upheld if they are due to one or more of the following causes:

- Failure to use the instrument in accordance with its designated use as described in this manual.
- Incorrect performance check for operation and maintenance of the instrument and its components.
- Failure to adhere to the sections of the manual dealing with the performance check, operation and maintenance of the instrument and its components.
- Unauthorized structural modifications to the instrument and its components.
- Serious damage resulting from the effects of foreign bodies, accidents, vandalism and force majeure.

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.

1.3 Safety Instructions

The instrument is not allowed to be operated by children or anyone under the influence of alcohol, drugs or pharmaceutical preparations. Anyone who is not familiar with this manual must be supervised when using the instrument.

1.4 Designated Use

- The instrument is only for its designated purpose as described in these operating instructions.
- Replace faulty components only with original replacement parts from Proceq.
- Accessories should only be installed or connected to the instrument if they are expressly authorized by Proceq. If other accessories are installed or connected to the instrument then Proceq will accept no liability and the product guarantee is forfeit.

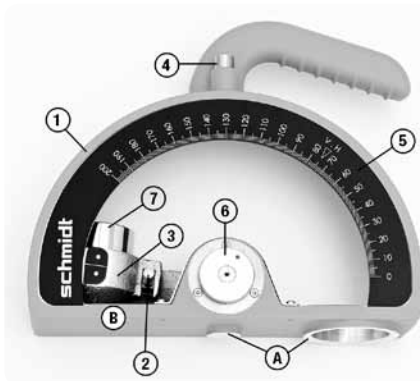
2. Instrument Selection

2.1 Schmidt OS-120 models

There are two models available.

- OS-120PT for testing concrete in the very low compressive strength range. Typically from 1 N/mm² to 5.0 N/mm² (145 psi – 725 psi). This makes the instrument very suitable for testing fresh concrete to determine the time for formwork removal.
- OS-120PM for testing the mortar joints in brick constructions.

3. Schmidt OS-120 Layout



- 1 Housing with handle
- 2 Reset lever
- 3 Hammer complete (PM/PT)
- 4 Trigger button
- 5 Scale (Rebound value)
- 6 Control knob
- 7 Hammer head (PM/PT)
- A Contact surface
- B Loading position



Hammer head Schmidt OS-120PT (7)



Hammer head Schmidt OS-120PM (7)

4. Measuring and evaluation with the Schmidt OS-120PT

The OS-120PT is primarily used to measure the early compressive strength of concrete non-destructively. Measurements can also be made on lightweight concrete, plasterboard and similar products.

4.1 Functional check

A test anvil is necessary for the functional check of the rebound hammer (see chapter 8.2).



Checking the Schmidt OS-120PT on the test anvil

The functional check should ideally be performed before and after each usage of the hammer. As a minimum it should be carried out after 1'000 impacts or once every three months.

- Place the test anvil on a hard, smooth surface (e.g. stone floor).
- Clean the contact surfaces of the anvil and the hammer head.
- Carry out a few impacts on the anvil.
- Perform 10 test impacts on the test anvil.



NOTE! The mean of the rebound values must lie within the tolerance given on the anvil. If this is not the case, e.g following an impact, the hammer mass is not held at the maximum rebound position, then the brake strip must be cleaned.

- Clean the brake strip on the under side of the semi-circular housing (1) using a clean cloth soaked in Acetone or a similar product.



- Repeat the functional check.

If the mean value is still out of tolerance, the instrument must be taken to an authorized service centre for re-calibration.

4.2 Preparations

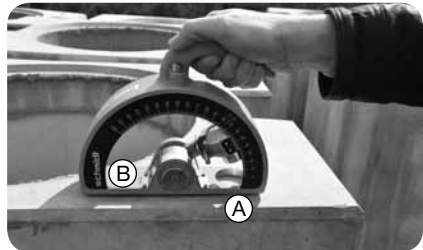
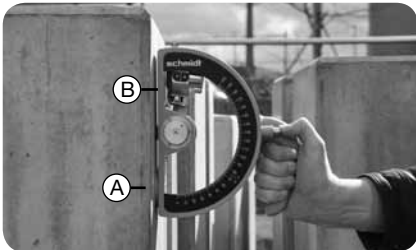
- If necessary, use the grinding stone to remove cement residues from the test surface.



- The hammer (3) must be fixed at position 75 on the scale (5) and the control knob (6) turned to the desired position V (for testing on vertical surfaces) or H (for testing on horizontal surfaces).

4.3 Measuring

- Grip the OS-120PT by the handle on the housing (1). Exert a light pressure against the test surface towards the side where the contact surfaces (A) of the housing (1) are located. This ensures that the contact surfaces (A) lie flush against the surface (see the pictures below).



- Depress the reset lever (2) to bring the hammer (3) to the loading position (B).
- Trigger the impact by pressing the trigger button (4).
- Read the rebound value from the scale (5).

Repeat the procedure as many times as the standard you are working to requires. For example, EN 12504-2 requires a minimum of 9 rebound values for calculating the median.

The rebound value determined in this way can be converted to a compressive strength estimate using the conversion curves (See chapter 4.4.) However, we recommend the creation of a user defined curve specifically for the concrete under test. An EXCEL Macro is available with the product documentation and also on the Proceq website to assist with this.

When the measurement is completed:

- Check the Schmidt OS-120PT on the anvil.
- Put the Schmidt OS-120PT into the neutral position. i.e. set the Schmidt OS-120PT on a horizontal surface (e.g. leave it on the anvil after the control check), set the control knob (6) to position V, depress the reset lever (2) to bring the hammer to position (B) and lock it in place by pushing the lever (2) upwards. The OS-120PT may now be stored in the case.

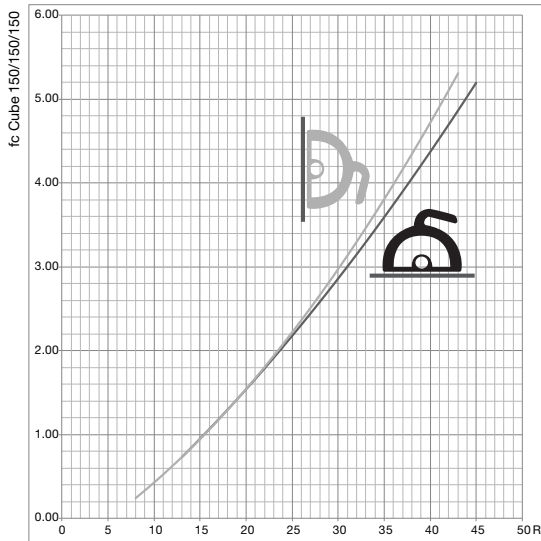
4.4 Conversion curves for Schmidt OS-120PT

The typical measuring range, respectively the compressive strength range of the concrete under test lies between 1 N/mm² (145 psi) and 5 N/mm² (725 psi). Typical curves are presented for this range.

OS-120 PT Conversion Curve Cube 150/150/150

Horizontal impact direction $N/mm^2 \quad y = 1.05 * (0.0015x^2 + 0.0615x - 0.3585)$
 Vertical impact direction $N/mm^2 \quad y = 1.05 * (0.0009x^2 + 0.0808x - 0.5081)$

fc [N/mm²]



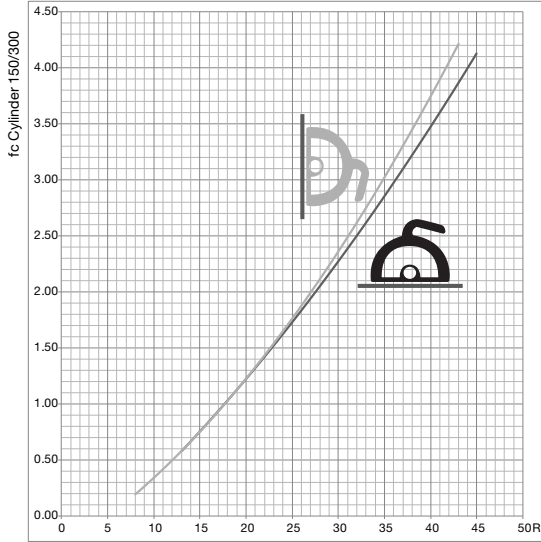
OS-120 PT

Conversion Curve Cylinder 150/300

Horizontal impact direction N/mm^2 $y = 0.8337 * (0.0015x^2 + 0.0615x - 0.3585)$

Vertical impact direction N/mm^2 $y = 0.8337 * (0.0009x^2 + 0.0808x - 0.5081)$

fc [N/mm²]



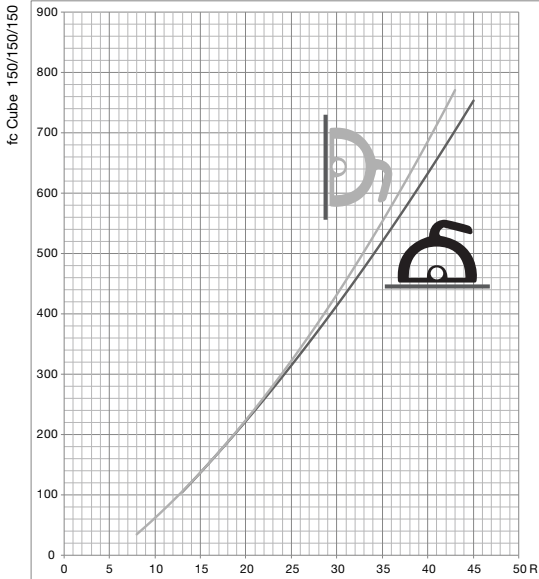
OS-120 PT

Conversion Curve Cube 150/150/150

Horizontal impact direction psi $y = 152.2899 * (0.0015x^2 + 0.0615x - 0.3585)$

Vertical impact direction psi $y = 152.2899 * (0.0009x^2 + 0.0808x - 0.5081)$

fc [psi]



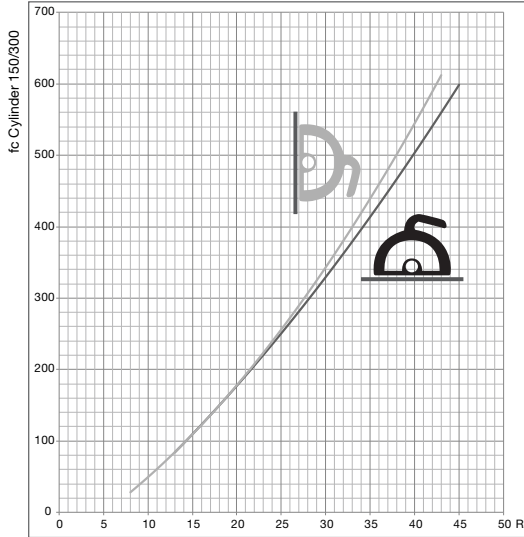
OS-120 PT

Conversion Curve Cylinder 150/300

Horizontal impact direction $\text{psi} = 0.8337 * 145.038 * (0.0015x^2 + 0.0615x - 0.3585)$

Vertical impact direction $\text{psi} = 0.8337 * 145.038 * (0.0009x^2 + 0.0806x - 0.5081)$

f_c [psi]



A form factor must be used to correct the conversion estimate in cases where the compressive strength is not to be used as either as standard cube compressive strength (150/150/150 cube) or a standard cylinder compressive strength (150/300 cylinder). (See the corresponding information in the document delivered with the instrument, or on the Proceq website.)

5. Measuring and evaluation with the Schmidt OS-120PM

The OS-120PM is used to test the mortar of joints in masonry constructions non-destructively. The mortar can then be classified based on the rebound value. The classification is only valid for measurements on vertical walls.

5.1 Functional check

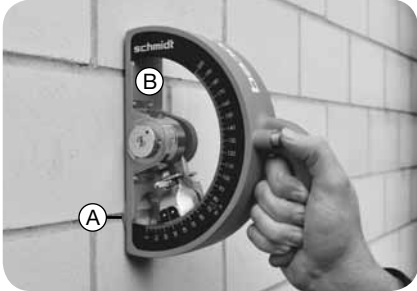
The functional check of the Schmidt OS-120PM is carried out in the same way as for the Schmidt OS-102PT (see chapter 4.1).

5.2 Preparations

- Identify a suitable location on the mortar joint. If necessary, remove any dirt or moss, etc.
- The hammer (3) must be fixed at position 75 on the scale (5) and the control knob (6) turned to position V (for testing on vertical surfaces). See respective picture in chapter 4.2.

5.3 Measuring

- Grip the Schmidt OS-120PM by the handle on the housing (1). Exert a light pressure against the test surface towards the side where the contact surfaces (A) of the housing (1) are located. This ensures that the contact surfaces (A) lie flush against the surface. Additionally make certain that the joint to be tested is precisely in the middle of the circular opening of the housing (1) in position A. This will ensure that the hammer head (7) impacts on the surface of the joint. (See the picture below.)
- Using the reset lever (2), bring the hammer (3) to position B.



- Trigger the impact by pressing the trigger button (4).
- Read the rebound value from the scale (5).

Repeat the procedure as many times as the standard you are working to requires. For example, EN 12504-2 requires a minimum of 9 rebound values for calculating the median.

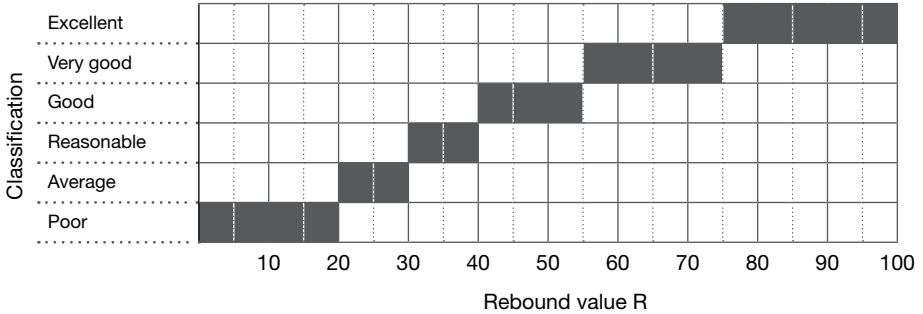
The rebound value determined in this way can be used to give a classification by means of the evaluation table. (See chapter 5.4).

When the measurement is completed:

- Check the Schmidt OS-120PM on the anvil (see chapter 4.1)
- Put the Schmidt OS-120PM into the neutral position. i.e. set the OS-120PM on a horizontal surface (e.g. leave it on the anvil after the control check), set the control knob (6) to position V, depress the reset lever (2) to bring the hammer (3) to position (B) and lock it in place by pushing the lever (2) upwards. The Schmidt OS-120PM may now be stored in the case.

5.4 Rating table for Schmidt OS-120PM

The mortar joints can be classified using the rating table below.



The customer is free to create his own mortar specific rating table.

6. Technical data

	Schmidt OS-120PT	Schmidt OS-120PM
Measuring range	See chapter 4.4	See chapter 5.4
Impact energy	0.833 Nm (0.614 ft lbf)	
Hammer mass	720 g (1.59 lb)	665 g (1.47 lb)
Hammer head diameter	40 mm (1.57")	8.0 mm (0.315")
Weight	3.45 kg (7.60 lb)	
Dimensions of housing	230 x 60 x 200 mm (9.06" x 2.36" x 7.87")	
Operating temperature	-10 bis 50°C (32 bis 122°F)	
Storage temperature	-10 bis 70°C (14 bis 158°F)	

7. Standards and Guidelines

7.1 Standards

The rebound number is determined on the basis of the following standards: EN12504-2 (Europe), ASTM C 805 (North America), JGJ/T 23-2011 (China). Applies to Schmidt OS-120PT only.

For the creation of user defined conversion curves, we recommend the procedures described in EN 13791 (Europe), ASTM C805, ACI 228.1R (North America), JGJ T23-2011 (China), see chapter 4.4. Applies to Schmidt OS-120PT only.



7.2 Guidelines

Austrian Guideline for tunnel lining, published December 2012. Austrian Construction Association. (To determine the time for formwork removal during tunnel construction). Applies to Schmidt OS-120PT.

TNO Report BI -88-009/61.8.2060-VOE from IBBC Delft Netherlands (Mortar joint testing). Applies to Schmidt OS-120PM.

8. Part numbers and accessories

8.1 Units

PART NUMBER	DESCRIPTION	
310 06 001	OS-120PT Concrete test hammer including, operating instructions, calibration certificate, CD with documentation, grinding stone and carrying case	
310 06 002	OS-120PM Mortar test hammer including operating instructions, calibration certificate, CD with documentation and carrying case	

8.2 Accessories

PART NUMBER	DESCRIPTION
310 99 037	Grinding stone (only required for OS-120-PT)
310 06 058	Carrying case
310 10 000	Test anvil

9. Maintenance and Support

9.1 Maintenance

Maintenance includes a regular check of the instrument and cleaning of the breaking strip as described in chapter 4.1.

To guarantee consistent, reliable and accurate measurements, the instrument should be calibrated on a yearly basis. The customer may however, determine the service interval based on his own experience and usage.

9.2 Support Concept

Proceq is committed to providing a complete support service for this instrument by means of our global service and support facilities. It is recommended that the user register the product on www.proceq.com to obtain the latest on available updates and other valuable information.

9.3 Standard Warranty and Extended Warranty

The standard warranty covers the mechanical portion of the instrument for 6 months.

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