

POCKET PENETROMETER



Pocket Penetrometers are commonly used on split spoon and thin walled tube samples to evaluate consistency and approximate unconfined compressive strength of saturated cohesive soils. They may also be used for the same purpose in freshly excavated trenches for the same purpose.

Pocket Penetrometers have sliding scales marked in kg per square cm and TSF (i.e., $1 \text{ kg/cm}^2 = 1 \text{ TSF}$) and are supplied with a carrying pouch, operating and calibration instruction sheet. There are three models: the S-170 has a Delrin body and laser etched markings on the sliding scale, the S-170A has a Delrin body and machine engraved markings on the sliding scale; and the S-170B has a nickel plated body and laser etched markings on the sliding scale. An optional foot adapter is available for use with all models. This increases the piston area 16 times for use in very soft clays.

S-170 SPECIFICATIONS	
Zero Reading	± 0.25 division
Spring Constant	12 ± 0.25 pounds / inch ($2.142 \pm 0.045 \text{ kg / cm}$)
Load Required to Read 3.0 ton / ft^2 (3 kg / cm^2)	11.25 ± 0.55 pounds ($5.104 \pm 0.249 \text{ kg}$)
Load Required to Read 4.5 ton / ft^2 (4.5 kg / cm^2)	17 ± 0.85 pounds ($7.713 \pm 0.386 \text{ kg}$)
Foot Diameter	0.25 inch (6.35 mm)

The Pocket Penetrometer has a spring constant of 12 pounds / inch. One ton / sq. ft. interval on the scale is equivalent to 8mm. Therefore, a compressive force of 3.78 pounds on the foot is required to read 1 ton / sq. ft. The equivalent of 3.78 pounds on 0.049 sq. inch (1/4 inch diameter foot) is 5.58 tons / sq. ft.

Why does the Penetrometer need this very high force to read 1 ton / sq. ft.? The Penetrometer reading is taken by pushing its foot into the material to a depth of $\frac{1}{4}$ inch. For a depth of $\frac{1}{4}$ inch, the cylindrical surface area of the material to be sheared is 0.196 sq. inches, just four times the area of the foot. This accounts for the large value of compressive force. The Pocket Penetrometer is calibrated by correlation studies relating the effective spring compression to unconfined compressive strength values determined by other methods.

The Pocket Penetrometers are not individually calibrated; therefore, no calibration certificates are supplied with them. An error of up to $\frac{1}{2}$ division on the scale equivalent to 0.125 TSF is possible with the instrument.

The data given above under "specifications" will be useful for users of the instrument to check the calibration of their units. The Pocket Penetrometer can be compressed to any desired readings and the corresponding applied load can be determined using a platform scale or any compression machine having a readability better than 0.5 pounds (0.25 kg).

CEP SERVICES PTE LTD

30B Hillview Terrace Singapore 669248

Tel: 65-67601566 Fax: 65-67605186 Email: sales@cep.com.sg Http: www.cep.com.sg

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S-170 OPERATING INSTRUCTIONS

INSTRUCTION FOR USE

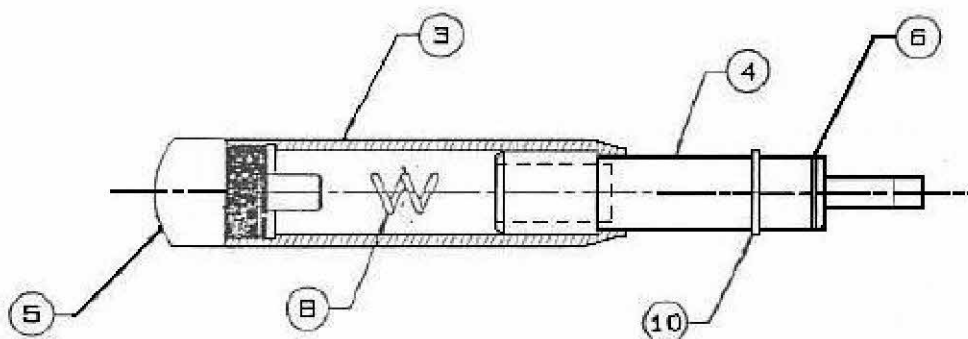
1. Choose your test location with care to avoid gravel or other particles that would influence readings. Avoid obviously disturbed areas. For saturated cohesive soils, it is important that readings be taken in "fresh" samples or cut faces, since rapid drying will greatly influence the reading.
2. Return ring to back position
3. Grip the handle firmly, and insert shaft $\frac{1}{4}$ " in depth with a smooth constant force into the soil mass or sample.
4. Take reading from BACK of ring.

CLEANING

Refer to the drawing below for item numbers.

1. Remove retaining ring (item #6) from inner shaft (item #4)
2. Slide off marker ring (item #10)
3. Unscrew end cap (item #5)
4. The spring (item #8) and inner shaft (item #4) can now be removed
5. Wash all parts in warm, soapy water and let air dry
6. Reassembly is the reverse of the above procedure

NOTE: If on reassembly, you find the spring has begun to collapse from use, you can shim the spring with standard 5/16" flat washers. This is done by placing the required number of washers over the pin extending from the end cap (item #5).



ITEM DESCRIPTION	PART NO.
3 Outer Tube	160801
4 Inner Shaft	160701
5 End Cap	160901
6 Retaining Ring	161006
8 Spring, SS	161008
10 Marker Ring	161010

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