

24 Soil Testing - Soil Index Properties

Soil Index Properties

Soil index properties are used extensively by engineers to discriminate between the different kinds of soil within a broad category, e.g. clay will exhibit a wide range of engineering properties depending upon its composition. Classification tests to determine index properties will provide engineers with valuable information when the results are compared against empirical data relative to the index properties determined.

Determination of Liquid Limit

The condition of a soil can be altered by changing the moisture content. The liquid limit is the empirically established moisture content at which a soil passes from the plastic to the liquid state. A knowledge of the liquid limit allows the engineer to correlate several engineering properties with the soil. Two main types of test are used. The Casagrande type (Cup), which has been used for many years, and the cone penetrometer method, which is now the definitive method specified in BS 1377.

Casagrande Method

- ◆ Satisfies International Standards
- ◆ Motorised version with integral blow counter available

Particular design features of the instrument include a positive action horizontal lead screw, which is rapidly adjustable and rigidly fixes the height of cup in relation to the base during the test procedure. The cam mechanism and cup suspension assembly have been designed to withstand constant use with minimum readjustment.

Ordering Information

CASAGRANDE METHOD BS 1377, EN 1997-2

EL24-0410 Hand operated Liquid Limit Device BS with revolution counter. Complete with metal grooving tool and test gauge. Weight 5 kg.

EL24-0417/01 Motorised Liquid Limit Device complete with revolution counter and motor. Weight 8.5 kg. For 220 – 240 V AC, 50 Hz, 1 ph.

Accessories

EL24-0425 Grooving Tool and Gauge. Weight 145 g.

EL24-0430 Glass Plate 500 mm square x 10 mm thick. Weight 145 g.

CASAGRANDE METHOD ASTM D4318; AASHTO T89

EL24-0434 Liquid Limit Device complete with revolution counter. Supplied less grooving tool. Weight 3.0 kg.

Accessories

EL24-0461 AASHTO Casagrande Grooving Tool. Weight 85 g.

EL24-0453 ASTM Metal Grooving Tool. Weight 100 g.



Liquid Limit Device with accessories

Phases of Soil and the Atterburg Limits

Phase	Solid State	Semi-Solid State	Plastic State	Liquid State	Suspension
Water	← Water Content Decreasing →				
Limits	Dry Soil	Shrinkage Limit SL	Plastic Limit PL Sticky Limit	Liquid Limit LL	
Shrinkage	Volume Constant	← Volume Decreasing →			
Condition	Hard to Stiff	Workable	Sticky	Slurry	Water-Held Suspension
Shear Strength (kN/m ²)	← Shear Strength Increasing →				Negligible to Nil
Moisture Content	0	SL	PL ← PI → LL		