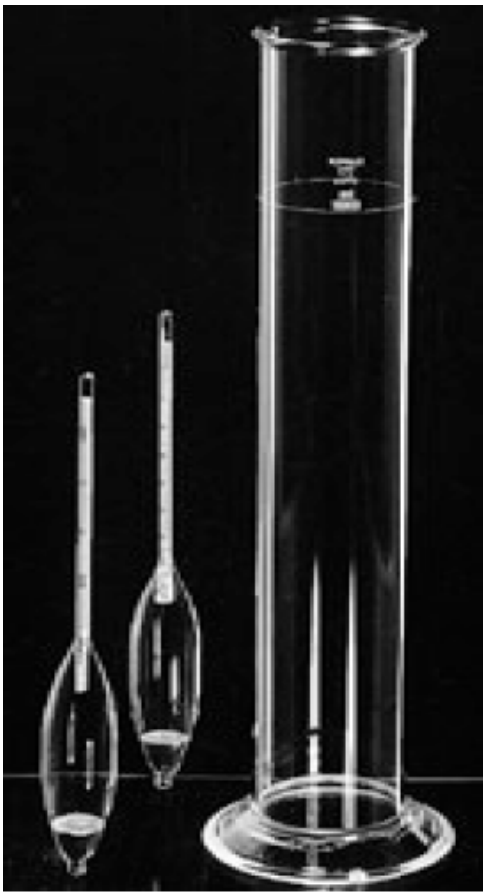
EQUIPOS GEOTÉCNICOS PARA LA REALIZACIÓN DE ENSAYES DE LABORATORIO Y EN CAMPO EXISTENTE EN EL DEPARTAMENTO DE CONTRUCCIÓN DE LA FACULTAD DE TECNOLOGÍA DE LA CONSTRUCCIÓN DE LA UNIVERSIDAD DE INGENIERIA (UNIA, RUPAP, MANAGUA)

En listado que sigue se presenta catalogo de equipos geotécnico para trabajos destinados a la investigación de la Ingeniería del Suelo, cuyo uso es condicionado por su costo económico, alta sofisticación y multi-funcionalidad.

EQUIPO GEOTÉCNICO	PARAMETRO OBTENIDO	COSTO UNITARIO ($)	ESPECIFICACIONES TÉCNICAS
	Resistencia al corte en compresión no confinada con dos ciclos de carga y descarga (ASTM D2166).	≥30,000	A

 	Compresibilidad en prueba de consolidación unidimensional (ASTM D2435).	≥20,000	B
	Clasificación de campo y laboratorio (ASTM D2488)	Malla No 1: $70 Malla No 200: $100 a $120	C

	Contenido de agua natural (ASTM D2216) CASAGRANDE	≥ 250	D
	Límites de consistencia, líquido (ASTM D423) y plástico (ASTM D424).		
	Composición granulométrica por mallas (ASTM D422).	Malla No 1: $70 Malla No 200: $100 a $120	E

	Densidad sólidos. **HIDROMETRO**		F

	Pruebas índice (clasifi-cación, contenido de agua, granulometría, límites de consistencia, % de finos y densidad de sólidos)	≥50,000	G
	Sondeo de penetración est SONDEO DE PERCUSIÓN	≥50,000	

	Resistencia al co en compresión no confinada con dos ciclos de carga y descarga (ASTM D2166).	≥30,000 Modelo improvisado	MAS ADELANTE

Fuente de datos: Departamento de Construcción (UNI, 22 de mayo de 2009)

A

ELE International

CBR-Test 50 Machine

ASTM D-1883; AASHTO T-193.

- ***Two speed machine (ASTM/AASHTO and BS).***
- ***Rapid Platen Adjustment.***
- ***Complete with penetration piston stabilizer bar.***
- ***Compact, bench-top design.***

Designed for performing laboratory CBR tests to ASTM, AASHTO and BS standards, the ELE CBR-Test 50 consists of a twin column frame and a motorized drive system. Two speeds are provided 0.5" (1.27 mm) per minute for ASTM and AASHTO tests and 1.0 mm per minute for BS test applications.

The rapid platen adjustment feature enables the operator to quickly close the daylight opening and to carefully control the application of a seating load.

Specifications

Capacity.	*11,200 lbf. (50 kN).*
Load Speeds.	*Selectable; 0.5" (1.27 mm) or 1.0 mm.*
Horizontal Clearance.	*10" (255 mm).*
Vertical Clearance.	*31.5" (800 mm) maximum.*
Platen.	*5.24" (133 mm) diam.*
Platen Travel.	*4.13" (105 mm).*
Dimensions.	*15.75" w. x 21.65" d. x 48" h. (400 x 550 x 1,220 mm).*
Weight.	*Net 106 lbs. (48 kg).*

Ordering Information

Note: Shown with proving ring, penetration piston assembly and penetration dial indicator; not included, order separately.

EI24-9150/02. 110-120vAC, 50/60 Hz, 1ø.
EI24-9150/01. 220-240vAC, 50/60 Hz, 1ø.

Accessories

EI24-9179. Penetration Piston Assembly.
EI78-0760. Proving Ring. 6,000 lb. (28 kN) capacity.
EI78-0860. Proving Ring. 11,200 lb. (50 kN) capacity.
EI88-4100. Penetration Dial Indicator. 1.0" range x 0.001" divisions.
EI88-4110. Penetration Dial Indicator. 25 mm range x 0.01 mm divisions.
EI88-4194. Dial Indicator Holder.

Special Note:
See Data Acquisition section for electronic load and penetration measurement options.

CBR Loading Press, Hand Operated

- ***Twin-column frame construction.***
- ***10,115 lb. (45 kN) capacity loading jack.***
- ***Stabilizer bar supplied as standard.***

The CBR Loading Press is used to force the penetration piston into the compacted CBR specimen. The load is applied through a mechanical type jack. The gear ratio of the jack was selected to provide a hand wheel speed that can be comfortably maintained, particularly with soils of a high CBR range.

The complete assembly consists of the loading frame, mechanical jack, penetration piston with dial gauge mounting bracket and a stabilizer bar.

Specifications

Jack.	*Mechanical; with quick release device for rapid adjustments.*
Frame.	*Heavy-duty steel construction with two column uprights.*
Dimensions.	*14.5" w. x 10.25" d. x 46" h. (368 x 260 x 1,168 mm).*
Weight.	*Net 145 lbs, (65.7 kg).*

Ordering Information

Note: Shown with proving ring, penetration dial indicator and mold; not included, order separately.

EI24-9345.

Accessories

EI78-0760. Proving Ring. 6,000 lb. (28 kN) capacity.
EI78-0860. Proving Ring. 11,200 lb. (50 kN) capacity.
EI88-4100. Penetration Dial Indicator. 1.0" range x 0.001" divisions.
EI88-4110. Penetration Dial Indicator. 25 mm range x 0.01 mm divisions.

Laboratory CBR Set, Hand-Operated

The hand-operated Laboratory CBR Set consists of a basic selection of items to perform CBR testing, where electrical power is not available.

Ordering Information

Set Includes:
- 1 CBR Loading Press (24-9345).
- 1 Proving Ring, 11,200 lb. (50kN) (78-0860).
- 1 Penetration Dial Indicator (88-4100).
- 4 CBR Molds (24-9229).
- 1 Spacer Disc (24-9238).
- 4 Filter Screens (24-9240).
- 1 Box, Filter Paper (24-9250).
- 2 Swell Plates (24-9260).
- 1 Tripod Attachment (24-9262).
- 1 Dial Indicator (88-4100).
- 4 Surcharge Weights (24-9245).
- 4 Slotted Surcharge Weights (24-9244).
- 1 Compaction Hammer (24-9063).
- 1 Straightedge (24-9010).
- 1 Cutting Edge (24-9236).

EI2420. English.
EI2421. Metric.

Field CBR Set

ASTM D-4429.

The Field CBR Set consists of the equipment required to perform CBR testing in accordance with ASTM and AASHTO specifications.

Ordering Information

Set Includes:
- 1 Field CBR Jack (24-9290).
- 1 Ball Seating Attachment (24-9300).
- 1 Proving Ring, 2,250 lb. (10 kN) cap. (78-0460).
- 1 Proving Ring, 6,000 lb. (28 kN) cap. (78-0760).
- 1 Field Penetration Piston (24-9183).
- 1 Extension Rod (24-9308).
- 1 Bracket and Adapter (24-9188).
- 1 Bridge Support (24-9312).
- 1 Penetration Dial Indicator (88-4100 or 88-4110).
- 1 Circular 10 lb. (4.54 kg) Surcharge Weight (24-9247).
- 1 Slotted 10 lb. (4.54 kg) Surcharge Weight (24-9246).
- 1 Slotted 20 lb. (9.07 kg) Surcharge Weight (24-9248).

EI2400. English.
EI2401. Metric.

Filter Paper

ASTM D-1883; AASHTO T-193.

Specifications

Grade.	*Coarse.*
Size.	*15 cm diam. (5.9").*
Weight.	*Net 8 oz. (227 g).*

Ordering Information

EI24-9250. Box of 100.

Filter Screen

The Filter Screen is used by some laboratories as an alternative to our standard Filter Paper. The screen consists of a number 100 brass mesh cut to 5-15/16" (135 mm) in diameter.

Specifications

Mesh.	*Brass; number 100.*
Size.	*5-15/16" diam. (135 mm).*
Weight.	*Net 1 oz. (28 g).*

Ordering Information

EI24-9240.

Spacer Discs

Specifications

Construction.	*Steel; machined on all sides.*
Finish.	*Plated.*
Weights.	*EI24-9237: Net 15 lbs. (6.8 kg).* *EI24-9238: Net 16 lbs. (7.3 kg).*

Ordering Information

EI24-9237. 5-7/8" diam. x 2" h. (47.6 x 50.8 mm).
EI24-9238. 5-15/16" diam. x 2.416" h. (150.8 x 61.3 mm).

Surcharge Weights

Specifications

Construction.	*Machined steel.*
Finish.	*Plated.*

Ordering Information

EI24-9244. 5 lb. (2.27 kg) Slotted. 5-7/8" o.d. x 2-1/16" slot (149.2 x 52.4 mm).
EI24-9245. 5 lb. (2.27 kg) Circular. 5-7/8" o.d. x 2-1/16" slot (149.2 x 52.4 mm).
EI24-9246. 10 lb. (4.54 kg) Slotted. 8-1/2" o.d. (216 mm).
EI24-9247. 10 lb. (4.54 kg) Circular. 10" o.d. (254 mm).
EI24-9248. 20 lb. (9.07 kg) Slotted. 8-1/2" o.d. (216 mm).

A

Soil
TRIAXIAL

ELE International

Digital Pressure Gauge

ASTM D-4767, D-5084; AASHTO T-296, T-297.

- ***250 psi (1,700 kPa) capacity range.***
- ***LCD display with tare, reset and peak hold functions.***
- ***Swivel handle assembly for easy transport and viewing angle adjustment.***
- ***Supplied complete with de-airing block assembly and fittings for use on ELE/Soiltest triaxial or permeability test cells***

The accurate monitoring and measurement of pore water pressures within a test specimen are necessary during effective stress triaxial tests, or for determining the level of saturation ("B" parameter) during the saturation stages of triaxial and permeability testing.

The Digital Pressure Gauge has been specifically designed to meet these accurate measurement requirements.

The readout features a bright LCD display that updates twice every second. Each system is supplied complete with a highly stable pressure gauge with de-airing block assembly for fast connection to any ELE/Soiltest triaxial or permeability test cell.

Specifications

Capacity.	250 psi (1,700 kPa).
Display.	LCD.
Display Units.	PSI, kPa, MPa.
Accuracy.	Better than 1% of indicated pressure.
Read Rate.	Two samples per second.
Power Supply.	3 volt battery, CR 2340 type.
Battery Life.	1400 hours continuous operation.
Dimensions.	2.30" w.x 1.25" d.x 3.75" h. (59 x 32 x 95 mm.
Weight.	Net 1/4 lb. (125g).

Ordering Information

EI27-1620. For ELE Triaxial Cells.
EI27-1621. For Tri-Flex 2 Triaxial and Permeability Cells.

Digital Load and Displacement Readout Set

ASTM D-2850, D-4767; AASHTO T-296, T-297.

- ***Easy to install on the Tritest 50 series load frame.***
- ***Accurately displays both load and axial strain values.***
- ***Bright, 4-digit LED displays with tare, reset and peak hold functions.***
- ***Swivel handle assembly for easy transport and viewing angle adjustment.***
- ***Available in either English or Metric display models.***

Accurate monitoring and recording of load and axial displacement of the specimen are easily accomplished by means of the Digital Load and Displacement Readout.

Available in either English or Metric models, the series features a two channel digital readout unit with bright 4-digit LED display that updates three times every second. Each system is supplied complete with a 2,000 lb. (8.9 kN) capacity S-type load cell, 2" (50 mm) range axial strain transducer and mounting hardware for use on the Tritest 50 series load frame.

Specifications

Displays.	Two, 4-digit red 14 segment LED displays.
Display Units.	English models in lbf and inches; Metric models in kN and mm.
Read Rate.	Three samples per second; automatic polarity.
Warm-Up Time.	30 minutes for rated accuracy.
Operating Temp.	32°F - 120°F (0°C - 50°C).
Load Cell.	2,000 lb. (8.9 kN) capacity; S-type.
Strain Transducer.	2" (50 mm) range.
Dimensions.	9.3" w.x 9.3" d.x 3.2" h. (236 x 236 x 81.3 mm).
Weight.	Net 8 lbs. (3.6 kg).

Ordering Information

EI27-1115/02. English display. 110vAC, 50/60 Hz, 1ø.
EI27-1115/01. English display. 220vAC, 50/60 Hz, 1ø.
EI27-1116/02. Metric display. 110vAC, 50/60 Hz, 1ø.
EI27-1116/01. Metric display. 220vAC, 50/60 Hz, 1ø.

B

Soil
CONSOLIDATION

ELE International

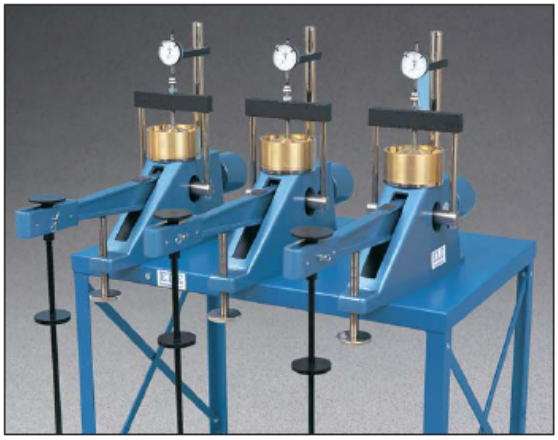


Table Top Consolidation Apparatus
ASTM D-2435, D-4546; AASHTO T-216.

- ***Loading Pressures on 2.5" (63 mm) diameter samples of up to 48 tons per sq. ft. (5,148 kPa) using 11:1 beam ratio.***
- ***Triple beam ratios of 9:1, 10:1 and 11:1 minimize loading weight requirements.***
- ***Rigid frame construction ensures accuracy, repeatability and reliability of test results.***
- ***Integral beam support jack eliminates possible shock to sample during load application procedures.***
- ***Compact, table top design for maximum space savings in the laboratory.***
- ***Cast aluminum and plated steel construction for rust resistance and long life.***

Consolidation tests are performed in the laboratory to determine the settlement characteristics of soil over a period of time. The data obtained from tests on a small sample in the laboratory can be used to predict the settlement of a foundation under a building, dam, bridge, or similar structure.

The Table Top Consolidation Apparatus is a compact machine designed to provide reliable, accurate and reproducible results. The apparatus features a rigid loading mechanism, capable of applying loads for long durations. Load pressures of up to 48 tons per sq. ft. (5,148 kPa) can be generated on 2.5" (63 mm) diameter samples.

The unit incorporates an integral beam support jack that eliminates the possibility of shock to the sample during load application procedures.

Specifications

Load Capacity.	*48 tons/sq. ft. (5,148 kPa) on 2.5" (63 mm) diam. samples.*
Loading Beam.	*Cast aluminum; counterbalanced; 9:1, 10:1 and 11:1 ratios.*
Frame.	*Cast aluminum; integral beam support jack; plated steel and platform.*
Dimensions.	*8" w. x 28" d. x 20" h. (203 x 711 x 508 mm), excluding weight hanger.*
Weight.	*Net 30 lbs. (13.6 kg); Shpg. 40 lbs. (18.1 kg).*

Ordering Information

Note: Shown with consolidometer, dial indicator loading weights and floor mounting stand; not included, order separately.

EI25-0402.

Accessories

EI25-0429.	Floor Mounting Stand.
EI25-0479.	2.5" Fixed Ring Consolidometer. With cutting (specimen) ring.
EI25-0455.	50 mm Fixed Ring Consolidometer. With cutting (specimen) ring.
EI25-0503.	75 mm Fixed Ring Consolidometer. With cutting (specimen) ring.
EI25-0530.	2.5" Floating Ring Consolidometer.
EI88-4070.	Dial Indicator. 0.4" range x 0.0001" graduations.
EI88-4080.	Dial Indicator. 10 mm range x 0.0025 mm graduations.
EI88-4120.	Dial Indicator. 1.0" range x 0.001" graduations.
EI88-4130.	Dial Indicator. 25 mm range x 0.010 mm graduations.
EI25-0535.	Weight Set A. Includes: four 1 kg, five 4 kg, and four 16 kg weights.
EI25-0537.	Weight Set B. Includes: four 1 kg, three 4 kg and one 16 kg weights.
EI25-0544.	16 Ton Weight Set. Includes: two 1/16 ton, one 1/8 ton, one 1/4 ton, one 1/2 ton, one 1 ton and seven 2 ton weights.

Table Top Consolidation Set
ASTM D-2435, D-4546; AASHTO T-216.

The Consolidation Test Set consists of a basic selection of equipment needed to perform consolidation testing of soils.

Ordering Information

Set includes:
- 1 Table Top Consolidation Apparatus (25-0402).
- 1 Fixed Ring Consolidometer, 2.5" (25-0479).
- 1 Dial Indicator (88-4070) or 88-4080).
- 1 Weight Set (25-0535 or 25-0544).

EI2200.	With English dial indicator and kilogram weight set.
EI2210.	With English dial indicator and tsf weight set.
EI2220.	With Metric dial indicator and kilogram weight set.

DataSystem Consolidation Test Set
ASTM D-2435, D-4546; AASHTO T-216.

The DataSystem Consolidation Test Set is designed for performing consolidation tests on soils to ASTM and AASTHO standards including options for automated data logging, analysis, and reporting.

Ordering Information

Set includes:
- 1 Table Top Consolidation Apparatus (25-0402).
- 1 Fixed Ring Consolidometer, 2.5" (25-0479).
- 1 Weight Set (25-0535).
- 1 Floor Mounting Stand (25-0429).
- 1 ADU 8-Channel Data Acquisition Unit (27-1495/0x).
- 1 Consolidation Displacement Transducer (27-1649).
- 1 One Dimensional Consolidation Program (27-1770).

EI2230/02.	110vAC, 50/60Hz, 1ø.
EI2230/01.	220vAC, 50/60Hz, 1ø.

Note: Computer hardware and peripherals required for system operation; not included. Contact factory for system requirements.

Special Note: See Data Acquisition section for specifications of electronic displacement and logging equipment.

B

ELE International

Soil
CBR

CBR Mold
ASTM D-1883; AASHTO T-193.

The CBR Mold has an internal diameter of 6" (152.4 mm) and is 7" (177.8 mm) in height. It is supplied complete with a perforated type base plate and extension collar. The base plate and collar fit both ends of the mold and consequently can be clamped on either end.

Specifications	
Mold.	6" i.d. x 7" h. (152.4 x 177.8 mm).
Collar.	2" h. (50.8 mm); fits both ends of mold.
Base Plate.	Perforated; fits both ends of mold.
Construction.	All steel; plated.
Weight.	Net 20 lbs. (9 kg).

Ordering Information
EI24-9229.

Cutting Edge

Machined from seamless steel tubing, the Cutting Edge has an inside diameter of 6" (152.4 mm) and is approximately 1-1/2" (38 mm) high. A recess in the upper section makes it possible to mount the Cutting Edge at either end of the CBR Mold to facilitate the taking of undisturbed samples in the field.

Specifications	
Dimensions.	6" i.d. x 1-1/2" h. (152.4 x 38 mm).
Construction.	Machined seamless steel tubing; recessed for mounting on CBR Mold.
Finish.	Plated.
Weight.	Net 1-1/2 lbs. (0.7 kg).

Ordering Information
EI24-9236.

Swell Plate
ASTM D-1883; AASHTO T-193.

Specifications	
Base Plate.	5-7/8" diam. (149.2 mm); perforated.
Contact Head.	Adjustable; locks on stem with knurled nut.
Construction.	All brass.
Weight.	Net 2-1/2 lbs. (1.1 kg).

Ordering Information
EI24-9260.

Tripod Attachment
ASTM D-1883; AASHTO T-193.

Specifications	
Construction.	Machined, one-piece cast aluminum.
Clamp.	Integral part of assembly; holds dial indicator.
Extension Point.	2" l. (50.8 mm) included.
Weight.	Net 1 lb. (0.4 kg).

Ordering Information
Note: Requires dial indicator; not included, order separately.

EI24-9262.

Accessories
EI88-4100. Dial Indicator. 1.0" range x 0.001" divisions.
EI88-4110. Dial Indicator. 25 mm range x 0.01 mm divisions.

D

ELE International

Soil
LIQUID LIMIT

Motorized Liquid Limit Device

ASTM D-4318; AASHTO T-89.

- ***Motorized for greater uniformity of test procedure.***
- ***Mechanical counter automatically records number of cup drops.***
- ***Totally enclosed drive system protects parts from dust and provides added safety to operator.***
- ***Includes ten precision molded Plastic ASTM Grooving Tools.***
- ***Optional Grooving Tool available for testing to AASHTO standards.***

The Motorized Liquid Limit Device eliminates many human variables in classification testing. It allows the operator to more closely duplicate test results on the same soil.

The unit incorporates a totally enclosed gear motor system which drives the liquid limit device and mechanical counter assembly.

Supplied complete with Grooving Tools, the Motorized Liquid Limit Device is ideal for use in any soils laboratory.

Specifications

Gear Motor.	*Attached to metal base; enclosed in housing with on-off switch.*
Counter.	*Mechanical; records number of cup drops.*
Cup.	*Spun brass; pin and slot mounting.*
Base.	*Molded hard rubber.*
Cam.	*Molded, self-lubricating plastic.*
Housing.	*Aluminum; holds cup and drop adjustment parts.*
Grooving Tools.	*ASTM type; plastic; pkg. of 10 (included).*
Overall Dimensions.	*8-1/2" w. x 15" d. x 7-1/2" h. (216 x 381 x 191 mm).*
Weight.	*Net 14-1/2 lbs. (6.6 kg).*

Ordering Information

Note: Optional Grooving Tool (EI24-0461) required to meet AASHTO specifications; not included, order separately.

EI24-0441/02. 110vAC, 60 Hz, 1ø.
EI24-0441/01. 220vAC, 50 Hz, 1ø.

Accessories

EI24-0461. AASHTO Grooving Tool.

Replacement Parts

EI24-0451. ASTM Plastic Grooving Tools. Pkg. of 10.
EI24-0435/10. Brass Cup. With mounting holes.
EI24-0435/12. ASTM Slider and Pin Cup Holder Assembly.

Hand-Operated Liquid Limit Devices

ASTM D-4318; AASHTO T-89.

- ***Precision molded base and cam components.***
- ***Precision manufactured brass cup assembly.***
- ***Removable pin cup assembly for easy cleaning and inspection.***
- ***Includes ten precision molded Plastic ASTM Grooving Tools.***
- ***Optional Grooving Tool available for testing to AASHTO standards.***
- ***Optional model available with counter.***

The Hand-Operated Liquid Limit Device is a hand operated unit, designed to determine the liquid limit of soils. The hard rubber base is formed in a mold to maintain the uniformity of hardness, size and density of all devices. Precision molded cam control parts and nylon bearings provide accurate cup drop and smooth operation. These manufacturing techniques result in a better correlation of test results performed in laboratories around the world.

Specifications

Cup.	*Spun brass; pin and slot mounting.*
Base.	*Molded hard rubber.*
Cam.	*Molded, self-lubricating plastic.*
Housing.	*Aluminum; holds cup, drop adjustment parts and hand crank.*
Hand Crank.	*Aluminum.*
Counter.	*Records number of cup drops. (Model EI24-0437 only).*
Grooving Tool.	*ASTM type; plastic; pkg. of 10 (included).*
Weight.	*Net 5-1/4 lbs. (3.6 kg).*

Ordering Information

Note: Model EI24-0437 shown. Optional Grooving Tool (EI24-0461) required to meet AASHTO specifications; not included, order separately.

EI24-0435. Liquid Limit Device.
EI24-0437. Liquid Limit Device with counter.

Replacement Parts

EI24-0451. ASTM Plastic Grooving Tools. Pkg. of 10.
EI24-0435/10. Brass Cup. With mounting holes.
EI24-0435/12. ASTM Slider and Pin Cup Holder Assembly.

D

ELE International

Soil
PLASTIC & SHRINKAGE LIMIT

Plastic Limit Set
ASTM D-4318; AASHTO T-90.

The Plastic Limit Set consists of a selection of equipment required to perform the plastic limit test in accordance with ASTM and AASHTO specifications.

Ordering Information

Set Includes:
- Plastic Limit Plate (24-0810).
- 25 ml Graduated Cylinder (88-6002A).
- Mixing Dish (88-6710).
- Doz. Aluminum Moisture Cans (88-7002).
- Flexible Spatula (88-7500).
- Rod Comparator (24-0811).

EI2810.

Rod Comparator
ASTM D-4318; AASHTO T-90; BS-1377.

The Rod Comparator is a 3 mm diameter rod used in the Plastic Limit test as a reference standard to compare against the soil sample during testing.

Ordering Information
EI24-0811.

Shrinkage Limit Set
ASTM D-427; AASHTO T-92.

The Shrinkage Limit Set consists of a selection of items needed to perform shrinkage limit testing per ASTM and AASHTO testing standards.

Ordering Information

Set Includes:
- Monel Shrinkage Dish (24-1550).
- Crystallizing Dish (24-1600).
- Shrinkage Prong Plate (24-1500).
- 25 ml Graduated Cylinder (88-6002A).
- Evaporating Dish (88-6714).

EI2820.

Special Note:
Three pounds of mercury and other accessories required for shrinkage limit test; not included, order separately.

Shrinkage Prong Plate
ASTM D-2850, D-4767; AASHTO T-296, T-297.

- ***Rust-resistant construction.***
- ***Three rust-resistant, metal prongs for immersing soil pat.***

The Shrinkage Prong Plate is used to immerse the soil pat in the mercury bath for accurate and reproducible determinations of the soil volume.

Specifications	
Construction.	*Acrylic plastic with 3 metal prongs.*
Dimensions.	*3" square x 1/8" thick (76 x 3.2 mm).*
Weight.	*Net 1 oz. (28 g).*

Ordering Information
EI24-1500.

Accessories
EI24-1550. Shrinkage Dish.
EI24-1600. Crystallizing Dish.

E

ELE International

Soil
CLASSIFICATION

Pocket Penetrometer

- ***Direct-reading scale in tons/sq. ft. and kg/sq. cm.***
- ***Ground and polished stainless steel loading piston.***
- ***Calibrated spring and penetrometer body plated for rust resistance and long life.***
- ***Convenient belt-loop style carrying case.***
- ***Optional Adapter Foot for testing very soft materials.***

The Pocket Penetrometer was originally developed for use by field personnel in checking visual classification of soils. Data was compiled on several thousand unconfined compressive strength tests of silty clays and clayey soils against the penetrometer readings to develop the scale. A close relationship exists between the penetrometer's scale reading and soil type.

Specifications

Range.	*0.25 to 4.5 tons/sq. ft. (kg/sq. cm).*
Scale Divisions.	*0.25 tons/sq. ft. (kg/sq. cm).*
Load Piston.	*1/4" (6 mm) diam.; stainless steel.*
Carrying Case.	*Canvas; belt-loop style.*
Dimensions.	*3/4" diam. x 6-3/8" L (19 x 162 mm).*
Weight.	*Net 7 oz. (198 g).*

Ordering Information

Note: Shown with Adapter Foot; not included, order separately.

EI29-3729.

Accessories

EI29-3729/10. Adapter Foot. 1" (25.4 mm) diam. Increases piston area 16 times for testing on soft materials.

Special Note:
The Pocket Penetrometer does not replace field and laboratory testing analysis.

Torvane Shear Device

- ***Determines shear strength of cohesive soils in the laboratory or in the field.***
- ***Lightweight, rust resistant construction.***
- ***Includes three interchangeable vanes.***
- ***Lightweight plastic carrying case for easy transport to the field.***

The Torvane Shear Device enables the operator to rapidly determine the shear strengths of cohesive soils, in the laboratory or in the field.

The Torvane is simple to use and needs no extensive specimen preparation. All that is required is a flat sample area of at least 2" (50 mm) in diameter.

The Torvane is supplied complete with three interchangeable vanes for testing various types of soils.

Specifications

Vane Driver.	*1.6" (41 mm) diam. x 3.2" (81 mm) l. with vane attached.*
Dial Scale.	*1 kg/sq. cm (tons/sq. ft.) x 0.05 subdivisions.*
Sensitive Vane.	*0-0.2 kg/sq. cm (tons/sq. ft.); 1.875" (47.6 mm) diam.*
Standard Vane.	*0-1.0 kg/sq. cm (tons/sq. ft.); 1" (25.4 mm) diam.*
High-Capacity Vane.	*0-2.5 kg/sq. cm (tons/sq. ft.); 0.75" (19 mm) diam.*
Carrying Case.	*Plastic; 6" w. x 4" d. x 2" h. (152 x 102 x 51 mm).*
Weight.	*Net 10.5 oz. (300 g).*

Ordering Information

EI26-2261. Includes driver, three interchangeable vanes and carrying case.

Replacement Parts

EI26-2261/10. Sensitive Vane. 0-0.2 kg/sq. cm (tons/sq. ft.).
EI26-2261/12. Standard Vane. 0-1.0 kg/sq. cm (tons/sq. ft.).
EI26-2261/14. High-Capacity Vane. 0-2.5 kg/sq. cm (tons/sq. ft.).

Special Note:
The Torvane Shear Device does not replace field and laboratory testing analysis.