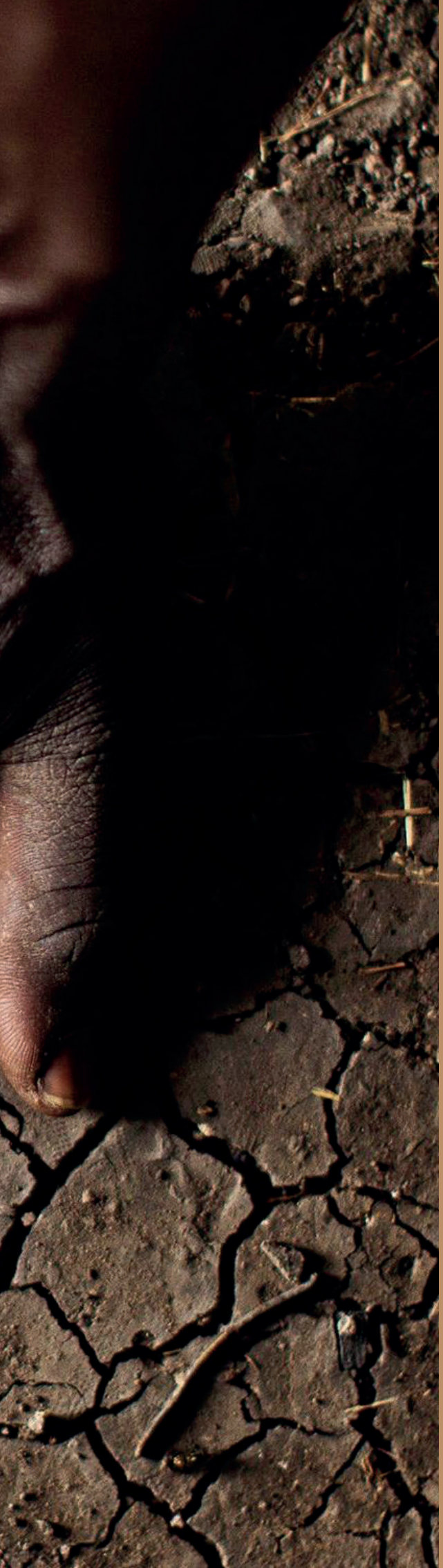
SOIL

For the realization of civil engineering structures, the engineer during the design stage must base his calculations according to the soil properties where the structure will have to integrate.

This section studies and analyses a soil sample to evaluate and to know its characteristics, by proposing a complete range of testing equipment for: sampling, preparation, classification, consolidation, shear strength, triaxial, compaction, penetration, bearing capacity, permeability, density, geotechnical and chemical tests.

When highway or railway earthworks, bases, subbases and dams are constructed and subgrades are prepared, it is necessary to determine the compactability properties of the material.



CONTENTS

POCKET SHEAR VANE DEVICE

STANDARDS: ASTM D6951

Pocket Shear Vane Device is practical equipment for determining the shear strength of cohesive soils.

It is widely used to perform onsite measurements of excavations covering trenches and test pits, thin-wall or split core samples, by providing a quick and efficient method for shear strength measurements and it is also suitable for laboratory usage.

Pocket Shear Vane Device is supplied in a plastic carrying case.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S4000	Pocket Shear Vane Device	24x21x5	1,5

Spare Parts & Accessories:

Vane Type	Range (N/cm²)
Standard Ø 25 mm Vane	0-10
Sensitive Vane Adaptor	0-2
High Capacity Vane Adaptor	0-25

HR-S4000

FIELD INSPECTION VANE TESTER

STANDARDS: ASTM D2573

Used to determine the shear strength of undrained (CU) cohesive soft soils, to firm non-fissured soils on site.

The vane is inserted into the soil for 60 mm approx., and the max. torque value is measured on a collar attached to the shaft.

Field Inspection Vane Tester is supplied complete T-handle cylindrical body where a torsional spring is housed, three vanes (16 x 32, 20 x 40 and 25.4 x 50.8 mm), used depending to the expected strength of the soil to be tested, 500 mm long extension rod, tools and carrying case.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S4010	Field Inspection Vane Tester	50x30x10	4

Field Inspection Pocket Vane Tester	
Vane Dimensions (height x dia.)	32x16; 40x20, 50.8x25.4 mm
Measuring Range	0 to 240 kPa (0-24 N/cm²)
Torque Value	5 N - m
Extension Rod	500 mm depth
Overall Dimensions (assembled)	310x105 mm
Weight	1.3 kg

HR-S4010

Spare Parts & Accessories:

Product Code	Product Name
HR-S4010/1	Extension Rod, 500 mm

LABORATORY VANE APPARATUS

STANDARDS: BS 1377:7, ASTM D4648

Laboratory Vane Apparatus is based on a original concept of the Transport and Road Research Laboratory of the United Kingdom.

Laboratory Vane Apparatus is Lightweight, compact and portable, ideal for site or main laboratory, Convenient and rapid method of determining shear strength of soft soils, Easy to use: many hundreds in operation today.

It can be provided with a wide range of vane sizes, although as standard, it is sold with the 12.7 mm square vane and a set of four calibrated springs. The test can be performed directly on the sample or in the sample contained in the sampling tube. In this case Attachment for Ø38 and Ø100 mm sampling tubes, should be used.

HR-S4015

A motorizing unit is also available. Two alternatives are available according to standards.

BS Model is including driving belt, pulley set and fixing studs. Testing speed is 6 to 12°/min.

ASTM Model is including driving belt, pulley set and fixing studs. Testing speed is 60 to 90°/min.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S4015	Laboratory Vane Apparatus	20x40x65	11

Spare Parts & Accessories:

Product Code	Product Name	Power Supply	Testing Speed
HR-S4015/1	Vane, 25.4x25.4 mm	---	---
HR-S4015/2	Vane, 12.7x25.4 mm	---	---
HR-S4015/3	Vane, 12.7x19 mm	---	---
HR-S4015/4	Attachment to hold sample tubes of Ø38 and Ø100 mm	---	---
HR-S4015/5	Spare Vane, 12.7x12.7 mm	---	---
HR-S4015/6	Spare set of four calibrating springs	---	---
HR-S4020	Motorizing attachment, BS 1377:7	220 V, 50 Hz, 1 ph	6 to 12°/min.
HR-S4025	Motorizing attachment, BS 1377:7	220 V, 60 Hz, 1 ph	6 to 12°/min.
HR-S4030	Motorizing attachment, ASTM D4648	220 V, 50 Hz, 1 ph	60 to 90°/min.
HR-S4035	Motorizing attachment, ASTM D4648	220 V, 60 Hz, 1 ph	60 to 90°/min.

SOIL POCKET PENETROMETER

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.

Technical Specifications:

Product Code	HR-S6225
Product Name	Soil Pocket Penetrometer
Range (kg/cm²)	0,25 to 4,5
Scale divisions (kg/cm²)	0,25
Load piston (mm)	Ø 6
Dimensions (cm)	2x17
Weight (kg)	0,2

- 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.

HR-S6225

DYNAMIC CONE PENETROMETER

STANDARDS: ASTM D6951

This portable hand operated apparatus is used for the rapid in-situ measurement of the structural properties of existing road pavements constructed with unbound materials.

The DCP Penetrometer results can be compared and interpreted with CBR (California Bearing Ratio) as per sperimental Kleyn 1982 studies.

Continuous measurements can be made down to a depth of approximately 800 mm or, when extension shafts are used, to a recommended maximum depth of 2 m.

Dynamic cone penetrometer, consists of;

Drop sliding hammer 8 kg weight dropping mass trough a height of 575 mm,
Penetration rod,
2 pcs. 60° cone,
Anvil with driving rod,
Metal plate coupling for ruler,
Lower extension rod,
Upper extension rod,
Adaptor for extension rods,
Spanners, 13 mm and 17 mm,
A bottle of adhesive,
Steel Ruler,
All contained in a wooden carrying case.

HR-S6000

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S6000	Dynamic Cone Penetrometer	120x35x20	30

Spare Parts & Accessories:

Product Code	Product Name
HR-S6000/1	Drop sliding hammer 8 kg
HR-S6000/2	Spare 60° cone
HR-S6000/3	Anvil with driving rod
HR-S6000/4	Segmented lower extension rod
HR-S6000/5	Segmented upper extension rod
HR-S6000/6	Segmented adaptor for extension rods

HR-S6000

SURFACE SOIL SAMPLERS

STANDARDS: ASTM D2937; CNR No.22; BS 1377:9

Used to take field samples of compacted fill or undisturbed soils and to evaluate density of compaction samples as the ground surface.

Steel made, galvanized against corrosion.

HR-S6130

The ASTM/CNR version, two models are available.

Both of Surface Soil Sampler (Core Cutter) Sets (Ø 3" and Ø 4") consists of a drive head, 5 kg drive hammer and a thin wall sampling tube. 5 kg sliding weight drop hammer makes a free-fall on to the driving head which is placed on top of the sampling tube.

The BS version, two models are available.

100 mm Surface Soil Sampler (Core Cutter) Set consists of a driving dolly, 13,5 kg driving rammer and Ø 100 mm x 130 mm high core cutter.

150 mm Surface Soil Sampler (Core Cutter) Set consists of a driving dolly, 16 kg driving rammer and Ø 150 mm x 180 mm high core cutter.

Technical Specifications:

Product Code	Product Name	Driving Rammer (kg)
HR-S6110	Surface Soil Sampler Set, Ø 100 mm, BS	10
HR-S6120	Surface Soil Sampler Set, Ø 150 mm, BS	16
HR-S6130	Surface Soil Sampler Set, Ø 3", ASTM/CNR	5
HR-S6140	Surface Soil Sampler Set, Ø 4", ASTM/CNR	5

Spare Parts & Accessories:

Product Code	Product Name
HR-S6110/1	Sampling Tube Ø 100 mm x 130 mm, BS
HR-S6120/1	Sampling Tube Ø 150 mm x 180 mm, BS
HR-S6130/1	Sampling Tube Ø 3" x 70 mm, ASTM/CNR
HR-S6140/1	Sampling Tube Ø 4" x 127 mm, ASTM/CNR

HR-S6110

SOIL PROCTOR PENETROMETER

STANDARDS: ASTM D1558

Used to determine in field the moisture-penetration resistance relationship of fine grained soils. Spring load scale 0-55 Kg, in 1 kg subdivisions, with direct maximum value reading in Kg. on the sliding rod.

Complete with 9 interchangeable stainless steel needles Ø 4,52 - 5,23 - 6,40 - 9,07 - 12,83 - 16,54 - 20, 22 - 24,79 - 28,55 mm, accessories, carrying case.

Technical Specifications:

Product Code	Product Name	Dimensions (mm)	Weight (kg)
HR-S6200	Soil Proctor Penetrometer Set	550X250X80	8

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (mm)
HR-S6200/1	Interchangeable stainless steel needle	Ø 4,52
HR-S6200/2	Interchangeable stainless steel needle	Ø 5,23
HR-S6200/3	Interchangeable stainless steel needle	Ø 6,40
HR-S6200/4	Interchangeable stainless steel needle	Ø 9,07
HR-S6200/5	Interchangeable stainless steel needle	Ø 12,83
HR-S6200/6	Interchangeable stainless steel needle	Ø 16,54
HR-S6200/7	Interchangeable stainless steel needle	Ø 20,22
HR-S6200/8	Interchangeable stainless steel needle	Ø 24,79
HR-S6200/9	Interchangeable stainless steel needle	Ø 28,55

HR-S6200

UNIVERSAL EXTRUDER

STANDARDS: EN 12697-30, 13286-2, 13286-47; AASTHO T245, T134, T180, T193; ASTM D1559, D698, D1557, D1883; BS 598-107, 1377-4, 1924-2

Used to extrude samples having dia. 4", 6", 100 mm and 150 mm. It can therefore extrude CBR, Marshall and Proctor specimens.

The extruder is actuated by a 50 kN hydraulic jack, having ram travel of 130 mm + 90 mm screw.

Supplied complete with 2 pieces adaptors for 4", 6", 100 mm and 150 mm samples.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-AS1800	Universal Extruder	Ø 30 x 54	30

HR-AS1800

SCREW EXTRUDER-HAND OPERATED

STANDARDS: BS 598:107, 1377:4, 1924:2, ASTM D698, D1587, D1883

The unit extrudes samples from Ø35 to 101,6 mm with maximum stroke of 650 mm.

Horizontal Type and 60 kN extrusion force.

Supplied complete with adaptors (ring and tamper) to extrude samples having Ø 38 mm and Ø 100 mm, supporting bench, sample receiving table both adjustable in height and lowerable.

Ø 50 mm, Ø 70 mm and Ø 150 mm Adaptors (ring and tamper) should be ordered separately.

Technical Specifications:

Product Code	HR-S6320
Product Name	Hand Operated Screw Extruder
Stroke (mm)	650
Dimensions (cm)	70x170x120
Weight (kg)	65

Spare Parts & Accessories:

Product Code	Product Name
HR-S6320/1	Adaptor for Ø 38 mm moulds
HR-S6320/2	Adaptor for Ø 50 mm moulds
HR-S6320/3	Adaptor for Ø 70 mm moulds
HR-S6320/4	Adaptor for Ø 100 mm moulds
HR-S6320/5	Adaptor for Ø 150 mm moulds

HR-S6320

MOTORIZED HYDRAULIC SPECIMEN EXTRUDER

STANDARDS: EN 13286-2, 13286-47, 12697-30; AASHTO T134, T180, T193, T245; ASTM D698, D1557, D1587, D1559, D1883, BS 598-107, 1377-4, 1924-2

The Motorized Hydraulic Extruder is used for quick and smooth extrusion of soil specimens from 38 mm to 160 mm tubes and also Proctor, CBR and Marshall Moulds.

The Extruder has 60 kN capacity and 70 cm ram travel.

Specimens with different sizes can be safely collected after extrusion with the help of the adjustable V shaped sample receiving table. This V table can easily be dismounted for space saving. The hydraulic piston can be stopped at any position during the extraction.

The Motorized Hydraulic Extruder is supplied complete with Adaptors for Ø 100 mm (4") and Ø 150 mm (6") moulds.

Ø 38 mm, Ø 50 mm and Ø 70 mm Adaptors (ring and tamper) should be ordered separately.

Technical Specifications

MOTORIZED HYDRAULIC SPECIMEN EXTRUDER				
Product Code	HR-S6300	HR-S6300/60Hz	HR-S6310	HR-S6310/60Hz
Product Name	Motorized Hydraulic Specimen Extruder			
Type	Horizontal		Vertical	
Capacity (kN)	60			
Ram Travel (cm)	70			
Dimensions (cm)	280x50x125		65x75x175	
Weight (kg)	200			
Power Supply	220 V, 50 Hz, 1 ph	220 V, 60 Hz,1 ph	220 V, 50 Hz, 1 ph	220 V, 60 Hz,1 ph

HR-S6300

Spare Parts & Accessories:

Product Code	Product Name
HR-S6300/1	Adaptor for Ø 38 mm moulds
HR-S6300/2	Adaptor for Ø 50 mm moulds
HR-S6300/3	Adaptor for Ø 70 mm moulds
HR-S6300/4	Adaptor for Ø 100 mm moulds
HR-S6300/5	Adaptor for Ø 150 mm moulds

SOIL LATHE

Designed to reduce by trimming the diameter of a soil sample unit is reaching the desired diameter size by using a wire saw.

Soil Lathe can trim and Extrude samples from 35 mm to 100 mm diameter. It should be used together with Open Wire Saw.

The lathe is hand-operated, the height is adjustable up to 230 mm.

Open Wire Saw, Wires, Trimming Knife should be ordered separately.

HR-S6350

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S6350	Soil Lathe	30x30x35	27

Spare Parts & Accessories:

Product Code	Product Name
HR-G0753	Open Wire Saw
HR-G0754	Wire. Pack of 12
HR-G0755	Trimming Knife

HR-G0753
WITH
HR-G0754

HR-G0755

PARTICLE SIZE ANALYSIS OF SOILS

HYDROMETER TEST SET

STANDARDS: ASTM D422; AASHTO T88

This equipment is used to determine the quantitative size distribution of very fine particle in soils such as clay and silt.

Two models are available.

HR-S6450 Hydrometer Test Set is Supplied with Hydrometer Water Bath, Circulation Pump, Heater, High Speed Stirrer, 6 x 1000 ml Sedimentation Cylinder, 0,995 to 1,038 g/ml range 151 H Hydrometer, 1 kg Sodium Hexametaphosphate and 600 ml Beaker.

HR-S6460 Digital Hydrometer Test Set is Supplied with Digital Hydrometer Water Bath, Circulation Pump, Heater, High Speed Stirrer, 6 x 1000 ml Sedimentation Cylinder, 0,995 to 1,038 g/ml range 151 H Hydrometer, 1 kg Sodium Hexametaphosphate and 600 ml Beaker.

The Hydrometer Water Bath, circulation unit, ambient to 35°C working temperature, 50 L capacity tank with 8 pieces Sedimentation cylinder capacity. The Water Bath is available in two models one with Analogue and the other one with Digital Indicator.

High Speed Stirrer operates at over 10,000 rpm, includes dispersion cup, stirring paddle, automatic switch-on by positioning bowl.

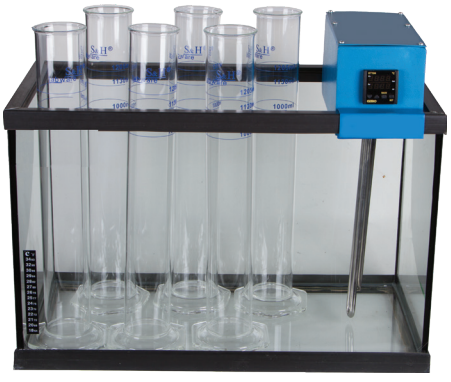
-5 to 60 g/l range 152 H Hydrometer should be ordered separately.

HR-S6410

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S6450	Hydrometer Test Set	35x65x45	25	220 V, 50-60 Hz, 1 ph
HR-S6460	Digital Hydrometer Test Set	35x65x45	26	220 V, 50-60 Hz, 1 ph

HR-S6470 with
HR-S6450/1 HR-S6470/1 HR-S6470/2



HR-S6480 with
HR-S6450/1 HR-S6470/2

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S6470	Hydrometer Water Bath	20x40x30	5	220 V, 50-60 Hz, 1 ph
HR-S6480	Digital Hydrometer Water Bath	25x40x45	6	220 V, 50-60 Hz, 1 ph
HR-S6470/1	Circulation Pump	---	---	220 V, 50-60 Hz, 1 ph
HR-S6470/2	Heater	---	---	220 V, 50-60 Hz, 1 ph
HR-S6420	151 H Hydrometer, 0,995 to 1,038 g/ml range	---	---	---
HR-S6415	152 H Hydrometer, -5 to 60 g/l range	---	---	---
HR-S6450/1	Sedimentation Cylinder, 1000 ml	---	---	---
HR-S6410	High Speed Stirrer	24x20x50	4	220 V, 50-60 Hz, 1 ph
HR-G0930	Sodium Hexametaphosphate, 1 kg	---	1	---
HR-G0007	Beaker, 600 ml	9x9x12,5	0,25	---

MEASURING SOIL TEXTURE TEST SET

Texture, or size distribution of mineral particles (or its associated pore volume), is one of the most important measures of a soil because finely divided soil particles have much greater surface area per unit mass or volume than do coarse particles. Thus, a small amount of fine clay and silt will be much more important in chemical reactions, release of nutrient elements, retention of soil moisture, etc., than a large volume of coarse gravel or sand.

Measuring Soil Texture Test Set is supplied with High Speed Stirrer, -5 to 60 g/l range 152 H Hydrometer, Bouyoucos Cylinder, 1205 ml and Stainless Steel Stirring Rod.

High Speed Stirrer operates at over 10,000 rpm, includes dispersion cup, stirring paddle, automatic switch-on by positioning bowl.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S6400	Measuring Soil Texture Test Set	35x65x45	25	220 V, 50-60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S6410	High Speed Stirrer	24x20x50	4	220 V, 50-60 Hz, 1 ph
HR-S6415	152 H Hydrometer, -5 to 60 g/l range	---	---	---
HR-S6400/1	Bouyoucos Cylinder, 1205 ml, graduated	9x9x12,5	0,25	---
HR-S6400/2	Stirring Rod, Stainless Steel	---	---	---

HR-S6400

CONE PENETROMETER

STANDARDS: BS 1377:2, CEN ISO/TS 17892-6, 17892-12

Semi-Automatic Digital Penetrometer apparatus is used to determine the moisture content at which clay soils pass from a plastic to a liquid state and it is used also for the determination of undrained shear strength.

The penetrometer has a cast iron base with leveling screws, digital penetration measurement gauge 0.01 mm precision, release button and automatic zeroing.

It is provided with lead screw gear arrangement, Leveling screws, and Spirit level. The head can be clamped at any desired height. A rack and pinion and pointer assemble provides fine adjustment of the cone tip to sample. It incorporates a clutch mechanism which makes reading of penetration and subsequent resetting a simple and accurate operation.

Semi-Automatic Digital Penetrometer for Liquid Limit is complete with automatic controller, which automatically releases the plunger by a magnetic device, complete with micrometer vertical adjustment and adjustable electronic timer of the fall time. The penetrometer is equipped with a digital timer, which can be set to the standard 5 second free-fall time or to some other setting for customized tests. When engaged the timer will allow the needle to free fall into the sample for the specific time interval and then lock the needle from advancing while providing a direct reading of the test results.

320 g weight should be added to the 30° angle cone to get a total weight of 400 g for the shear strength test.

The electronic timer allows the user to set up and read the fall time of the needle during testing.

HR-S6500

Semi-Automatic Penetrometer for Liquid Limit supplied complete with
- Automatic Penetration Timer Unit,
- 30° Penetration Cone
- Sample Cups, 3 pcs. Aluminum, Ø55 mm x 35 mm.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S6500	Semi-Automatic Digital Penetrometer	20x30x50	10	220 V, 50-60 Hz, 1 ph

Spare Parts & Accessories:

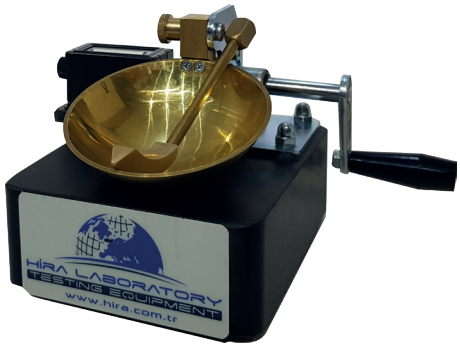
Product Code	Product Name	Dimensions (cm)	Weight (g)
HR-S6500/1	Liquid Limit Penetration Test Cone 30°	---	80
HR-S6500/10	Liquid Limit Penetration Test Cone 30°	---	100
HR-S6500/11	Liquid Limit Penetration Test Cone 30°	---	400
HR-S6500/2	Cone Test Gauge for HR-S6500/1	---	---
HR-S6500/3	Liquid Limit Penetration Test Cone 60°	---	10
HR-S6500/30	Liquid Limit Penetration Test Cone 60°	---	60
HR-S6500/4	Cone Test Gauge for HR-S6500/3	---	---
HR-G0610	Moisture content tin	Ø 5,5 x 3,5	20
HR-G0608	Moisture content tin	Ø 7 x 4,5	30

LIQUID LIMIT DEVICE

Casagrande Method

STANDARDS: BS 1377:2,ASTM D4318, AASHTO T89

Used to evaluate the relationship between the moisture percentage of a soil sample and the number of blows required to close a groove made into the soil; and therefore to determine when a clay soil changes from a plastic to a liquid state.



HR-S6585

The device is available in two models:

- Hand operated,
- Motor operated at 120 drops/min speed, ensuring better uniformity and accuracy.

Comprises a removable brass cup, adjustable crank and cam mechanism, blow counter and base. Supplied with Metal grooving tool.

Resilience Tester is used for measuring the resilience of liquid limit device bases. Resilience Tester consists of a clear acrylic plastic tube, steel ball and a small bar magnet. Resilience Tester should be ordered separately.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S6580	Liquid Limit Device, Hand operated, BS	25x25x15	2	---
HR-S6585	Liquid Limit Device, Hand operated, ASTM	25x25x15	2	---
HR-S6590	Liquid Limit Device, Motor operated, BS	25x30x20	4	220 V, 50-60 Hz, 1 ph
HR-S6595	Liquid Limit Device, Motor operated, ASTM	25x30x20	4	220 V, 50-60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name
HR-S6585/1	Metal Grooving Tool, ASTM
HR-S6585/2	Plastic Grooving Tool, ASTM
HR-S6585/3	Plastic Grooving Tool, BS
HR-S6585/4	Spare Brass Cup
HR-S6585/5	Resilience Tester, ASTM
HR-S6585/6	Steel Ball, ASTM
HR-S6585/7	Resilience Tester, TS 1900-1, AASHTO
HR-S6585/8	Steel Ball, TS 1900-1, AASHTO

HR-S6585/5

SHRINKAGE LIMIT TEST SET

STANDARDS: ASTM D427, AASHTO T92, BS 1377:2

Used to determine the maximum moisture content at which the soil does not shrink after drying the sample.

Supplied with 2 pieces Ø45 x 10 mm Moisture Content Tin, Ø55 x 35 mm Moisture Content Tin, Shrinkage Plate with three Metal Prongs, Ø120 mm Porcelain Dish, 150 mm Spatula, 25 ml Graduated Glass Cylinder and Carrying Case.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S6550	Shrinkage Limit Test Set	35x30x8	2

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (mm)	Weight (kg)
HR-S6550/1	Shrinkage Plate	---	---
HR-G0611	Moisture content tin	Ø 45 x 10	0,02
HR-G0610	Moisture content tin	Ø 55 x 35	0,02
HR-G0369	Porcelain Dish	Ø 120	0,25
HR-G0701	Spatula, 150 mm	40x40x150	0,2
HR-G0021	Graduated Glass Cylinder, 25 ml	20x20x150	0,1
HR-S6550/2	Carrying Case	225x72x220	0,75

HR-S6550

LINEAR SHRINKAGE MOULD

STANDARDS: BS 1377:2

Mould to produce a specimen of 140 mm long x 12,5 mm radius.

This test covers the determination of linear shrinkage of soils and indicates the plastic properties of soils with a low clay content.

HR-S6570

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S6570	Linear Shrinkage Mould	2x3x16	0,3

PLASTIC LIMIT TEST SET

STANDARDS: ASTM D4318, AASHTO T90, BS 1377:2

The plastic limit determines the lowest moisture content of a soil, by which a sample can be rolled into threads Ø3 mm without breaking the same either longitudinally or transversely.

Supplied with 6 pieces Ø55 x 35 mm Moisture Content Tins, 300x300x5 mm Glass Plate, Ø12 cm Porcelain Dish, Ø3 x 100 mm Reference Rod, 100 mm Spatula and Carrying Case.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S6600	Plastic Limit Test Set	40x40x20	3

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (mm)	Weight (kg)
HR-S6600/1	Plastic Limit Glass Plate	300x300x5	0,1
HR-S6600/2	Plastic Limit Reference Rod	Ø 3 x 100	0,3
HR-G0610	Moisture content tin	Ø 55 x 35	0,02
HR-G0369	Porcelain Dish	Ø 120	0,2
HR-G0700	Spatula, 100 mm	40x40x100	0,2
HR-S6600/3	Carrying Case	350x500x110	1

HR-S6600

PROCTOR MOULDS AND HAMMERS

STANDARDS: ASTM D 698, D 1557, D 558; AASHTO T 99, T180, T 134, CNR No. 69
EN 12386-2, 13286-4, BS 1377:4, BS 1924:2

Used for determining the relationship between the moisture content and density of compacted soils.

Made of plated steel, includes collar, mould body and base plate.

Rammers are used to compact the soil sample in the Proctor Moulds and made of plated steel.

Different models are available conforming to the relevant standards.

Technical Specifications for Proctor Moulds

Product Code	Product Name	Standard	Internal Diameter (mm)	Body Height (mm)	Volume (cm^3)	Weight (kg)
HR-S6650	Standard Proctor Mould	ASTM / AASHTO / CNR	101.6 ± 0,4	116,4 ± 0,5	944 ± 14	4,5
HR-S6655	Modified Proctor Mould	ASTM / AASHTO/ CNR	152.4 ± 0,7	116,4 ± 0,5	2124 ± 25	7,5
HR-S6660	A Type Standard Proctor Mould	EN	100 ± 1	120 ± 1	942	5
HR-S6665	B Type Modified Proctor Mould	EN	150 ± 1	120 ± 1	2120	8
HR-S6670	1 Liter Standard Proctor Mould	BS, TS 1900-1	105 ± 0,5	115,5 ± 0,5	1000	5
HR-S6673	CBR Type Modified Proctor Mould (Vibrating Hammer Mould)	BS, EN, TS-1900-1	152 ± 0,5	127 ± 1	2303	8,5

Technical Specifications for Proctor Rammers

Product Code	Product Name	Standard	Rammer Dia. (mm)	Free Fall Height (mm)	Mass of Rammer (g)	Weight (kg)
HR-S6680	Standard Proctor Rammer	ASTM / AASHTO / CNR	50,8	304.8± 1	2495 ± 23	5
HR-S6685	Modified Proctor Rammer	ASTM / AASHTO/ CNR	50.8	457 ± 1.3	4540 ± 10	8
HR-S6690	A Type Standard Proctor Rammer	EN	50 ± 0.5	305± 3	2500 ± 20	5
HR-S6695	B Type Modified Proctor Rammer	EN	50 ± 0.5	457 ± 3	4500 ± 40	8
HR-S6700	2,5 kg Compaction Rammer	BS	50 ± 0.5	300± 3	2500 ± 25	5
HR-S6705	4,5 kg Compaction Rammer	BS	50 ± 0.5	450 ± 4	4500 ± 50	8

Spare Parts & Accessories:

Product Code	Product Name	Standard
HR-S6660/1	Steel Plate for The End Layer Compaction for HR-S6660	EN
HR-S6665/1	Steel Plate for The End Layer Compaction for HR-S6665	EN
HR-S6675	Straight edge. 40 cm	---

AUTOMATIC SOIL COMPACTOR

STANDARDS: ASTM D558, D559, D560, D698, D1557, D1883, EN 13286 2, 13286-47, AASHTO T99, T134, T135, T136, T180, T193

Automatic Soil Compactor is designed to compact Standard / Modified and CBR specimens, it ensures an extremely uniform compaction degree, granting reliable and repeatable test results.

The compactor is easy to use, friendly menu driven, of simple and practical maintenance.

HR-S6800 with HR-S6655

HR-S6650

Compactor is equipped with programmable digital counter which allows machine to stop at the preset numbers of blows. The height and weight of the rammer is adjustable to suit test requirements. Top quality components and high accuracy mechanical workings grant very long life also under intensive utilizations.

The original lift system of the rammer can be selected at 305 or 457 mm, granting a correct and constant fall height.

This automatic blow pattern ensures effective and equal compaction for each layer of soil by rotating the base table, so the mould, in equal steps and travelling the rammer across the mould.

The table rotates the mould in equal steps and the number of blows per layer can be set at the beginning of the test by the digital counter. User defined blow number and in-out distribution is also available. A standard proctor / CBR switch, emergency stop and start push buttons are located beside the blow counter.

The rammer is circular faced. Rammer weight is adjustable to 2.5 kg or 4.5 kg according to reference standard. When compacting 100 mm diameter specimens the unit operates on a single radius and when compacting 150 mm diameter specimens the unit operates on inner and outer radius to obtain even compaction.

The machine is supplied with one rammer and must selected according to the desired Standard (ASTM or EN) (rammers are interchangeable).

HR-S6800 WITH HR-S6655

Technical Specifications:

Product Code	Product Name	Drop Height (mm)	Dimensions (cm)	Weight (kg)	Power Supply
HR-S6800	Automatic Soil Compactor	305 or 457	45x160x55	115	220 V, 50 Hz, 1 ph
HR-S6800/60Hz	Automatic Soil Compactor	305 or 457	45x160x55	115	220 V, 60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name	Drop Height (mm)	Circular Faced (mm)	Dimensions (mm)	Weight (kg)
HR-S6800/1	Rammer for HR-S6800, EN/BS	305 or 457	Ø50	Ø50x300	Adjustable to 2.5 kg or 4.54 kg weight
HR-S6800/2	Rammer for HR-S6800, ASTM	305 or 457	Ø50,8	Ø50,8x300	Adjustable to 2.5 kg or 4.54 kg weight

VIBRATING HAMMER

STANDARDS: EN 12697-9, 12697-10, 12697-32, BS 598:10, BS 1377:4, 1924:2

The HR-AS2335 Vibratory Compactor Set is used to prepare the moulded test specimens of bituminous mixtures in loose state by using the vibratory compaction technique. Such specimens are used to determine maximum density as described EN 12697- 5, bulk density as described in EN 12697-6, void characteristics as described in EN 12697-8, reference density as described in EN 12697-9 or compactability as described in EN 12697-10 for a bituminous mixtures.

The HR-AS2335 Vibratory Compactor Set consists of a Vibrating Hammer, Supporting Frame, Small and Large Tamping Foots and 300 mm Shank.

The set is also used for compaction of proctor and CBR soil specimens.

Supporting Frame for Vibrating Hammer; the sliding mass has a total weight (including hammer and tamping foot) of 37 kg as requested by EN standards. Steel made, plated against corrosion.

CBR Type Modified Proctor Mould (Vibrating Hammer Mould) and C Spanner should be ordered separately.

HR-AS2335 WITH HR-AS2335/3

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-AS2335	Vibratory Compactor Set	51x30x112	75	220 V, 50-60 Hz, 1ph

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-AS2335/1	Vibrating Hammer	11x43x27	7	220 V, 50-60 Hz, 1ph
HR-AS2335/2	Supporting Frame for Vibrating Hammer	51x30x112	45	---
HR-AS2335/4	Small Tamping Foot, Ø 102 mm	Ø 10,2	---	---
HR-AS2335/5	Large Tamping Foot, Ø 146 mm	Ø 14,6	---	---
HR-AS2335/6	Shank, 300 mm Long for Tamping Foot	30	---	---
HR-S6673	CBR Type Modified Proctor Mould (Vibrating Hammer Mould) BS, EN, TS-1900-1	15,2 x 12,7	8,5	---
HR-S6673/1	C- Spanner for HR-S6673, 2 pieces	20x30x10	1	---

DIGITAL CBR TEST MACHINE

STANDARDS: EN 13286-47, BS 1377:4, ASTM D1883, AASHTO T193, NF P94-078, UNI CNR 10009

The Digital CBR Test Machine is designed for performing laboratory evaluation of the CBR value of highway sub-bases and sub-grade and determination of the strength of cohesive materials.

The device is composed of a robust and compact two column frame with adjustable upper cross beam driven by an electromechanical ram with a maximum capacity of 50 kN and a data acquisition and processing system.

The CBR Test Machine designed to load the penetration piston into the soil sample at a constant rate to measure the applied load and piston penetration at predetermined intervals.

The frame has 50 kN capacity. Two test speeds are provided 1.0 mm/min for BS and 1.27 mm/min. for ASTM/EN/AASHTO Tests.

Loading and unloading are down from the front panel by UP/DOWN buttons.

For safety, the up and down travel of the lower platen is limited the use of limit switches.

The measuring system consists of a 50 kN capacity load cell fitted to the upper cross beam to read stability values and the 25 x 0.01 mm Displacement Sensor fitted to the column.

Supplied complete with LCD Control Unit, 50 kN capacity Load Cell, 25 x 0.01 mm Displacement Sensor and CBR Penetration Piston.

HR-S5000

Spare Parts & Accessories:

Product Code	Product Name
HR-S5000/1	CBR Penetration Piston
HR-G0981	Load Cell, 50 kN capacity
HR-G0995	Displacement Sensor, 25 x 0,01 mm

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S5000	Digital CBR Test Machine	47x61x115	80	220 V, 50 Hz, 1 ph
HR-S5000/60Hz	Digital CBR Test Machine	47x61x115	80	220 V, 60 Hz, 1 ph

CBR TEST MACHINE WITH LOAD RING

STANDARDS: EN 13286-47, BS 1377:4, ASTM D1883, AASHTO T193, NF P94-078, UNI CNR 10009

CBR Test Machine is designed for performing laboratory evaluation of the CBR value of highway sub-bases and sub-grade and determination of the strength of cohesive materials.

The device is composed of a robust and compact two column frame with adjustable upper cross beam.

The CBR Test Machine designed to load the penetration piston into the soil sample at a constant rate to measure the applied load and piston penetration at predetermined intervals.

The frame has 50 kN capacity. Two test speeds are provided 1.0 mm/min for BS and 1.27 mm/min. for ASTM/EN/AASHTO Tests.

Loading and unloading are down from the front panel by UP/DOWN buttons.

For safety, the up and down travel of the lower platen is limited the use of limit switches.

The measuring system consists of a 50 kN capacity Load Ring fitted to the upper cross beam to read stability values and the 30 x 0.01 mm Analog Dial Indicator fitted to the column.

Supplied complete with 50 kN Load Ring with 0,01 mm resolution Analog Dial gauge, 30 x 0,01 mm Analog Dial Indicator and CBR Penetration Piston.

HR-S5005

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S5005	CBR Test Machine	47x61x115	80	220 V, 50 Hz, 1 ph
HR-S5005/60Hz	CBR Test Machine	47x61x115	80	220 V, 60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name
HR-S5000/1	CBR Penetration Piston
HR-G5003	Load Ring, 50 kN capacity with 0,01 mm resolution Analog Dial gauge
HR-G0876	Analog Dial Indicator, 30 x 0,01 mm

CBR MOULD AND ACCESSORIES

STANDARDS: ASTM D1883, AASHTO T193, EN 13286-47, 13286-4, BS 1924:2, BS 1377:4

This method has been developed by the California State Highway Department, and is now accepted by almost all the International Standards in force. The test is aimed to the evaluation of the bearing capacity of soil for flexible pavement design in road construction. The compaction test can be performed both with the manual rammers and the automatic compactor.

The CBR equipment, steel made and plated against corrosion is available in different versions according to the various Standards in force.

Technical Specifications for ASTM D1883, AASHTO T193 Models;

CBR Mould Set is supplied complete with Extension Collar and Perforated Base Plate.

The other accessories should be ordered separately.

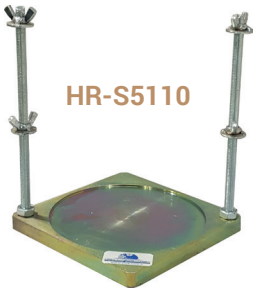
Technical Specifications:

Product Code	Product Name	Standard	Dimensions (mm)	Weight (kg)
HR-S5100	CBR Mould Set	ASTM, AASHTO	200x200x450	8

HİRA TESTING EQUIPMENT

Spare Parts & Accessories for ASTM D1883, AASHTO T193 Models;

Product Code	Product Name	Standard	Dimensions (mm)	Weight (kg)
HR-S5100/1	CBR Mould	ASTM, AASHTO	Ø 152.4 (6") x 177.8 (7")	4,5
HR-S5100/2	Extension Collar	ASTM, AASHTO	Ø 152.4 (6") x 50 (2")	1,5
HR-S5100/3	Perforated Base Plate	ASTM, AASHTO	200x200x100	2
HR-S5110	CBR Solid Base Plate	ASTM, AASHTO	200x200x100	3,4
HR-S5115	Spacer Disc with 'T' Handle	ASTM, AASHTO	Ø 150.8 x 61.4	8,5
HR-S5120	Annular Surcharge Weight	ASTM, AASHTO	200x200x100	2,27
HR-S5125	Slotted Surcharge Weight	ASTM, AASHTO	200x200x100	2,27
HR-S5130	Straight edge	---	300x30x5	1
HR-S5135	Filter Paper. No.5 x Ø 150 mm. Pack of 100.	ASTM, AASHTO	200x200x20	0,1
HR-S5140	Filter Screen, 150 µm mesh. Ø 144 mm.	ASTM, AASHTO	150x150x20	1



Technical Specifications for EN 13286-47 Models;

CBR Mould Set is supplied complete with Extension Collar and Solid Base Plate.

The other accessories should be ordered separately.

Technical Specifications:

Product Code	Product Name	Standard	Dimensions (mm)	Weight (kg)
HR-S5200	CBR Mould Set	EN 13286-47	200x200x180	8,9

Spare Parts & Accessories for EN 13286-47 Models;

Product Code	Product Name	Standard	Dimensions (mm)	Weight (kg)
HR-S5200/1	CBR Mould (B Type Modified Proctor Mould)	EN 13286-47	Ø 150 x 120	5,3
HR-S5200/2	Extension Collar	EN 13286-47	Ø 150 x 500	1,5
HR-S5200/3	CBR Solid Base Plate	EN 13286-47	200x200x100	3,4
HR-S5210	Perforated Base Plate	EN 13286-47	200x200x100	2
HR-S5215	Spacer Disc with 'T' Handle	EN 13286-47	Ø 149,5 x 36	8,5
HR-S5220	Annular Surcharge Weight	BS, EN 13286-47	200x200x100	2
HR-S5225	Split Surcharge Weight	BS, EN 13286-47	200x200x100	2
HR-S5235	Filter Paper. Coarse, Ø 148 mm. Pack of 100.	BS, EN 13286-47	200x200x20	0,1
HR-S5130	Straight edge	---	300x30x5	1

Technical Specifications for EN 13286-4, BS 1924:2, BS 1377:4 Models;

CBR Mould Set is supplied complete with Extension Collar and Solid Base Plate.

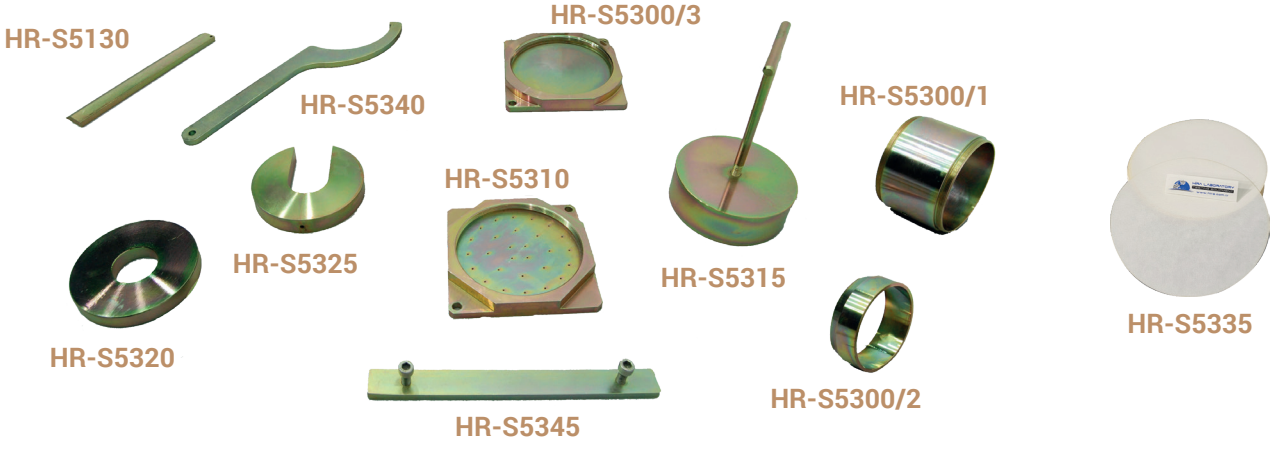
The other accessories should be ordered separately.

Technical Specifications:

Product Code	Product Name	Standard	Dimensions (mm)	Weight (kg)
HR-S5300	CBR Mould Set	BS, EN 13286-4	200x200x450	8,5

Spare Parts & Accessories for EN 13286-4, BS 1924:2, BS 1377:4 Models;

Product Code	Product Name	Standard	Dimensions (mm)	Weight (kg)
HR-S5300/1	CBR Mould	BS, EN 13286-4	Ø 152 x 127	4,9
HR-S5300/2	Extension Collar	BS, EN 13286-4	Ø 152 x 50	1,5
HR-S5300/3	CBR Solid Base Plate	BS, EN 13286-4	200x200x100	3,4
HR-S5310	Perforated Base Plate	BS, EN 13286-4	200x200x100	2
HR-S5315	Compaction Plug with 'T' Handle	BS, EN 13286-4	Ø 150 x 50	8,5
HR-S5320	Annular Surcharge Weight	BS, EN 13286-4	200x200x100	2
HR-S5325	Split Surcharge Weight	BS, EN 13286-4	200x200x100	2
HR-S5335	Filter Paper. No.1 x Ø 150 mm. Pack of 100.	BS, EN 13286-4	200x200x20	0,1
HR-S5340	C- Spanner for HR-S5300, 2 pieces	---	200x300x100	1
HR-S5345	Assembly Tool for Base Plate for HR-S5300	---	350x30x15	1
HR-S5130	Straight edge	---	300x30x5	1



SWELLING

Placed on top of the soil sample to enable monitoring of swelling.

The Swell Test Set consists of Swell Plate with adjustable stem, Dial Indicator (any Dial Gauges are listed below can be chosen) and Tripod for mounting swell dial indicator in position on CBR Mould Collar.

CBR Soaking Tank has two models as 6 or 15 pieces CBR Mould capacity.

Swell Test Set and CBR Soaking Tank should be ordered separately for swelling test.

Technical Specifications for Dial Indicators:

Product Code	Product Name
HR-G0875	Analog Dial Indicator, 10 x 0,01 mm
HR-G0876	Analog Dial Indicator, 30 x 0,01 mm
HR-G0877	Digital Dial Indicator, 12,7 x 0,01 mm
HR-G0878	Digital Dial Indicator, 25 x 0,01 mm
HR-G0879	Digital Dial Indicator, 12.7 x 0,001 mm
HR-G0880	Digital Dial Indicator, 25 x 0,001 mm

HR-S5415
with
HR-S5400
HR-S5410
HR-G0875

HİRA TESTING EQUIPMENT

Technical Specifications for Swelling:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5400	Swell Plate	18x18x16	0,5
HR-S5410	Tripod	20x20x30	1
HR-S5415	CBR Soaking Tank, 6 sample capacity	50x70x40	3
HR-S5416	CBR Soaking Tank, 15 sample capacity	74x112x65	5

PLATE BEARING TEST SET

STANDARDS: ASTM D1194, 1195, 1196, BS 1377:9

This test is performed for the determination of the bearing capacity of a soil in-situ on road constructions, foundations, road subgrades, and airport and highway pavements.

HR-S5630 with All Accessories

A wide range of models are available.

300 kN capacity Plate Bearing Test Set consists of a 300 kN capacity Piston Assembly and Hydraulic Hand Pump, Analog Manometer, 2.4 m long Datum Bar, 3 pcs. 30 mm travel x 0.01 mm Analog Dial Gauges with Dial Gauge Holders, Ø12"(305 mm) and Ø18"(457 mm) Loading Plates.

500 kN capacity Plate Bearing Test Set Set consists of a 500 kN capacity Piston Assembly and Hydraulic Hand Pump, Analog Manometer, 2.4 m long Datum Bar, 3 pcs. 30 mm travel x 0.01 mm Analog Dial Gauges with Dial Gauge Holders, Ø24"(610 mm) and Ø30"(762 mm) Loading Plates.

HR-S5630

1000 kN capacity Plate Bearing Test Set Set consists of a 1000 kN capacity Piston Assembly and Hydraulic Hand Pump, Analog Manometer, 2.4 m long Datum Bar, 3 pcs. 30 mm travel x 0.01 mm Analog Dial Gauges with Dial Gauge Holders, Ø24"(610 mm) and Ø30"(762 mm) Loading Plates.

300 kN capacity Plate Bearing Test Set Set consists of a 300 kN capacity Piston Assembly and Hydraulic Hand Pump, Pressure Transducer, Battery operated digital readout unit, 2.4 m long Datum Bar, 3 pcs. 30 mm travel x 0.01 mm Analog Dial Gauges with Dial Gauge Holders, Ø12"(305 mm) and Ø18"(457 mm) Loading Plates.

500 kN capacity Plate Bearing Test Set Set consists of a 500 kN capacity Piston Assembly and Hydraulic Hand Pump, Pressure Transducer, Battery operated digital readout unit, 2.4 m long Datum Bar, 3 pcs. 30 mm travel x 0.01 mm Analog Dial Gauges with Dial Gauge Holders, Ø24"(610 mm) and Ø30"(762 mm) Loading Plates.

HR-S5600

1000 kN capacity Plate Bearing Test Set Set consists of a 1000 kN capacity Piston Assembly and Hydraulic Hand Pump, Pressure Transducer, Battery operated digital readout unit, 2.4 m long Datum Bar, 3 pcs. 30 mm travel x 0.01 mm Analog Dial Gauges with Dial Gauge Holders, Ø24"(610 mm) and Ø30"(762 mm) Loading Plates.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5600	Plate Bearing Test Set, 300 kN capacity	85x33x60	110
HR-S5610	Plate Bearing Test Set, 500 kN capacity	90x33x60	130
HR-S5620	Plate Bearing Test Set, 1000 kN capacity	95x33x60	150
HR-S5630	Plate Bearing Test Set with Digital Readout Unit, 300 kN capacity	85x33x60	110
HR-S5640	Plate Bearing Test Set with Digital Readout Unit, 500 kN capacity	90x33x60	130
HR-S5650	Plate Bearing Test Set with Digital Readout Unit, 1000 kN capacity	95x33x60	150

Technical Specifications:

Product Code	Product Name	Dimensions (mm)	Weight (kg)
HR-S5600/1	Piston Assembly, 300 kN capacity	---	---
HR-S5610/1	Piston Assembly, 500 kN capacity	---	---
HR-S5620/1	Piston Assembly, 1000 kN capacity	---	---
HR-G9000	Hydraulic Hand Pump, 700 bar	---	---
HR-G9000/1	High Pressure Hose, 1 m	---	---
HR-G9010	Analog Manometer	---	---
HR-S5600/2	Datum Bar, 2.4 m long	---	---
HR-G0876	Analog Dial Indicator, 30 x 0,01 mm	---	---
HR-G0885	Dial Gauge Holder	---	---
HR-S5654	Pressure Transducer	---	---
HR-S5655	Battery Operated Digital Readout Unit	---	---
HR-S5600/3	Loading Plate, Ø 12"(305 mm)	305	15
HR-S5600/4	Loading Plate, Ø 18"(457 mm)	457	30
HR-S5600/5	Loading Plate, Ø 24"(610 mm)	610	60
HR-S5600/6	Loading Plate, Ø 30"(762 mm)	762	95
HR-S5656/1	Extension Rods. Pack of 16.	Ø 12x250	---
HR-S5656/2	Top End Plates. Pack of 4.	Ø 50	---
HR-S5656/3	Columns. 2 pieces.	Ø 150x250	---
HR-S5656/4	Column	Ø 150x500	---
HR-S5657/1	Mild Steel Plate, Square	750x750x25	---
HR-S5657/2	Mild Steel Plate, Square	600x600x25	---
HR-S5657/3	Mild Steel Plate, Square	450x450x25	---
HR-S5657/4	Mild Steel Plate, Square	300x300x25	---
HR-S5657/5	Mild Steel Plate, Round	Ø 750x25	---
HR-S5657/6	Mild Steel Plate, Round	Ø 500x25	---

FIELD CBR TEST SET

STANDARDS: ASTM D4429, BS 1377:7, 1924:2

Used to determine quickly and efficiently the bearing capacity of soils on road constructions, foundations, road subgrades etc.

The Field (In-situ) CBR Test Set is 50 kN capacity.

The set consist of 50 kN capacity Mechanical Jack with ball seating, 50 kN capacity Load Ring, CBR Penetration Piston, Analog Penetration Dial Gauge (30 x 0,01 mm), Adjustable Dial Gauge Holder, Set of Extension Rods (2 pieces 102 mm, 1 pieces 305 mm and 1 pieces 610 mm), Datum Bar Assembly with two Tripod Stands, 4,5 kg Annular Surcharge Weight, 4,5 kg Slotted Surcharge Weights and Carrying Case.

Conversion Frame is used to convert the In-situ CBR test to a Mechanical Laboratory CBR test machine.

The system is easily assembled onto the Conversion Frame with the addition of some of the accessories included in The Field (In-situ) CBR Test Set. The frame is used with the Jack, Load Ring, CBR Mould and Penetration Piston.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5500	Field CBR Test Set	24x165x25	50

Spare Parts & Accessories:

Product Code	Product Name
HR-S5500/1	Mechanical Jack with ball seating
HR-G5003	Load Ring, 50 kN
HR-S5000/1	CBR Penetration Piston
HR-G0876	Analog Dial Indicator, 30 x 0,01 mm
HR-G0885	Adjustable Dial Gauge Holder
HR-S5500/2	Set of Extension Rods (2 x 102 mm, 1x 305 mm, 1 x 610 mm)
HR-S5500/3	Datum bar assembly with two Tripod Stands
HR-S5500/4	4,5 kg Annular Surcharge Weight
HR-S5500/5	4,5 Kg Slotted Surcharge Weight
HR-S5500/7	Conversion Frame

HR-S5500

SAND DENSITY CONE APPARATUS

STANDARDS: ASTM D1556, AASHTO T181, T191

Used to determine the in-situ density of fine grained compacted soil.

The test consists in digging a hole into the ground and then collect, dry and weight the sampled soil.

The hole is than filled with dry sand from the cone container.

6,5" Sand Density Cone Set is supplied with Sand Cone Assembly with valve, Metal Base with Centre Hole and 5lt capacity Plastic Sand Jar.

Calibrating Container for HR-S5700 should be ordered separately.

12" Sand Density Cone Set is supplied with Sand Cone Assembly with valve, Metal Base with Centre Hole and 15 lt capacity Metal Sand Jar.

12" Density Cylinder is used for determining in place density of compacted base courses containing large sizes of coarse aggregates.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5700	Sand Density Cone Set, 6,5"	30x30x60	4
HR-S5720	Sand Density Cone Set, 12"	70x70x85	15
HR-S5730	Density Cylinder, 12"	47x32x26	10

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)
HR-S5700/1	Sand Cone Assembly with valve, 6,5"	Ø 6,5x18
HR-S5700/2	Metal Base with Centre Hole for HR-S5700	30x30x2
HR-S5710	Plastic Sand Jar, 5 lt capacity	Ø 16x33
HR-S5700/4	Calibrating Container for HR-S5700	Ø16,5x18,7
HR-S5720/1	Sand Cone Assembly with valve, 12"	Ø 12"x35
HR-S5720/2	Metal Base with Centre Hole for HR-S5720	70x70x5
HR-S5720/3	Metal Sand Jar, 15 lt capacity	25x50

HR-S5700/4

HR-S5700

BALLOON DENSITY APPARATUS

STANDARDS: ASTM D2167, AASHTO T205

Balloon Density Apparatus is used to determine the in-situ density of compacted or firmly bonded soils.

The HR-S7700 consists of a graduated cylinder 1596 ml capacity, housed inside an aluminium guard, a reversible rubber aspirator pump, a density plate 9" square and 12 rubber balloons. The principle of operation is similar to the sand replacement but the hole is filled by a rubber balloon where water is pumped. The amount of water can be easily determined by the graduation of the cylinder.

The HR-S7705 is 3000 ml capacity. A metal cylinder is filled with water which is then pumped into a rubber membrane mounted on the base of the cylinder. The water pressure is controlled by a pressure gauge and the volume of the balloon is measured on the graduated piston stem.

Technical Specifications:

Product Code	Product Name	Capacity (ml)	Dimensions (cm)	Weight (kg)
HR-S7700	Balloon Density Apparatus	1600	25x25x70	7
HR-S7705	Balloon Density Apparatus	3000	36x36x100	10

Spare Parts & Accessories:

Product Code	Product Name
HR-S7700/1	Rubber balloons, Pack of 12

HR-S7700

SAND REPLACEMENT APPARATUS

STANDARDS: BS 1377:9, 1924:2

Used to determine the in-situ density of fine grained compacted soil.

Complete set consists of Sand Pouring Cylinder, Metal Tray with Centre Hole and Calibration Container.

The Sand Pouring Cylinder with shutter made of cast aluminum and accurately machined, The Calibration Container and Metal Tray are made of plated sheet steel.

The test set is available in three different sizes.

HR-S5760

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5750	Sand Replacement Test Set, Ø 100 mm	30x30x44	8
HR-S5760	Sand Replacement Test Set, Ø 150 mm	30x30x57	10
HR-S5770	Sand Replacement Test Set, Ø 200 mm	50x50x66	27

Spare Parts & Accessories:

Product Code	Product Name
HR-S5750/1	Cone With Valve And Upper Cylinder, Ø 100 mm for HR-S5750
HR-S5750/2	Calibration Container for HR-S5750
HR-S5750/3	Metal Tray for HR-S5750
HR-S5760/1	Cone With Valve And Upper Cylinder, Ø 150 mm for HR-S5760
HR-S5760/2	Calibration Container for HR-S5760
HR-S5760/3	Metal Tray for HR-S5760
HR-S5770/1	Cone With Valve And Upper Cylinder, Ø 200 mm for HR-S5770
HR-S5770/2	Calibration Container for HR-S5770
HR-S5770/3	Metal Tray for HR-S5770

STANDARD SAND

STANDARDS: BS 1377:9, 1924:2

Standard Sand for density tests has two alternatives;

- passing 600 micron and retained on 300 micron.
- passing No. 16 (1,18 mm) and retained on No.30 (600 mikron).

HR-S6050

Technical Specifications:

Product Code	Product Name	Specifications
HR-S6050	Standard Sand, Pack of 1000 gr	Between 300-600 micron grain size
HR-S6055	Standard Sand, Pack of 1000 gr	Between 1,18 mm-600 micron grain size

RELATIVE DENSITY TEST

STANDARDS: EN 13286-5, ASTM D4253, ASTM D4254

Relative density relates the dry density of cohesionless soil to the maximum and minimum densities. The degree of compaction of cohesionless soil can be stated in terms of relative density.

This method, in the EN standard, covers the determination of the maximum dry density and water content of cohesionless materials when compacted using a vibrating table. Materials for which this method is applicable may contain up to 12% by mass fines (<0.063 mm). The maximum particle size of the materials to be tested is 80 mm. This method applies to mixtures to be used in road construction.

The ASTM, also specify that it is used for the determination of the relative density of cohesionless soil for which impact compaction will not produce a well-defined moisture-density relationship curve and where the maximum density of impact method will generally be less than by vibratory method.

The two versions: HR-S7500 Conforming to EN and HR-S7505 Conforming to ASTM are practical identical except for the 0.1 cu.ft. mould.

HR-S7500 Relative Density Test Set Supplied complete with 762x762 mm Vibrating Table (3600 rpm) which adjustable vibration magnitude, 14200 cm³ 0,5 cu.ft. Relative Density Mould Set (Cylinder with lead, cylinder in cast aluminum, disc with handle and upper cylinder) and Relative Density Gauge Set.

HR-S7505 Relative Density Test Set Supplied complete with 762x762 mm Vibrating Table (3600 rpm) which adjustable vibration magnitude, 0,1 cu.ft. and 0,5 cu.ft. Relative Density Mould Set (Cylinder with lead, cylinder in cast aluminum, disc with handle and upper cylinder) and Relative Density Gauge Set.

Relative Density Pouring Funnel Set is required for loose placement of 9.5mm and finer granular soils in the Mould Set. The Funnel Set includes two Ø152 x 305 mm metal cylinders, each with funnel and 152 mm long delivery spout attached to one end. Spouts are 25.4 mm and Ø 12.7mm. The pouring devices are mandatory according to ASTM D4253 and should be ordered separately.

Technical Specifications:

Product Code	Product Name	Dimensions (mm)	Weight (kg)	Power Supply
HR-S7500	Relative Density Test Set, EN	762x762	290	220 V, 50 Hz, 1 ph
HR-S7500/60Hz	Relative Density Test Set, EN	762x762	290	220 V, 60 Hz, 1 ph
HR-S7505	Relative Density Test Set, ASTM	762x762	310	220 V, 50 Hz, 1 ph
HR-S7505/60Hz	Relative Density Test Set, ASTM	762x762	310	220 V, 60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name	Power Supply
HR-S7500/1	Vibrating Table, 762x762 mm	220 V, 50 Hz, 1 ph
HR-S7500/1/60Hz	Vibrating Table, 762x762 mm	220 V, 60 Hz, 1 ph
HR-S7500/2	0,1 cu.ft. Relative Density Mould Set	---
HR-S7500/3	0,5 cu.ft. Relative Density Mould Set	---
HR-S7500/4	Relative Density Gauge Set	---
HR-S7500/5	Relative Density Pouring Funnel Set	---

HR-S7500

CONSTANT HEAD PERMEAMETER SET

STANDARDS: ASTM D2434, BS 1377:5, AASHTO T215

Used to determine the permeability of granular, gravel and sandy soils.

The specimen is formed in an acrylic permeability cell and water is passed through it from a constant level tank.

The permeability cell has pressure points at different levels which are connected to the manometer tubes fixed on a stand with graduated scale.

Two Constant Head Permeability Cells are available; Ø75 mm and Ø114 mm.

Constant head permeability cell Ø75 mm, with three pressure take-off points. Formed by an acrylic Plexiglas body held between two aluminum anodized end plates.

Constant head permeability cell Ø114 mm, with six pressure take-off points and an additional six blanked-off pressure points. Formed by an acrylic Plexiglas body held between two aluminum anodized end plates.

The Stand, comprising 3 pieces Ø6 mm x 1 m long Manometer Tubes of constant bore, graduated scale, Rubber Tube and Connectors.

Constant Level Tank, made from acrylic Plexiglas, wall mounting, is used to provide constant water level in the manometer tubes. The inlet, outlet and overflow pipes can be adjusted for height within the tank.

HR-S5800 Model, Supplied complete with Ø 75 mm Constant Head Permeability Cell, Stand with 3 pieces Manometer Tubes, Constant Level Tank, Soaking Reservoir Tank, Rubber Tube and 1 m Steel Ruler.

HR-S5810 Model, Supplied complete with Ø114 mm Constant Head Permeability Cell, Stand with 3 pieces Manometer Tubes, Constant Level Tank, Soaking Reservoir Tank, Rubber Tube and 1 m Steel Ruler.

HR-S5800

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5800	Constant Head Permeameter Set, Ø 75 mm	30x10x170	15
HR-S5810	Constant Head Permeameter Set, Ø 114 mm	40x10x170	20

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5800/1	Constant Head Permeability Cell, Ø 75 mm	Ø8x40	3
HR-S5810/1	Constant Head Permeability Cell, Ø 114 mm	Ø15x70	7
HR-S5800/2	Stand with 3 pieces Manometer Tubes	22x7x170	6
HR-S5800/3	Constant Level Tank	35x35x35	2
HR-S5800/4	Soaking Reservoir Tank	32x32x25	4
HR-S5800/5	Rubber Tube	---	---
HR-G0478	Steel Ruler, 1 m	100	---
HR-G0762	Tamping Rod	Ø 0,8 x 30	0,5

HR-S5800/1

HR-S5800/3

FALLING HEAD PERMEAMETER

STANDARDS: CEN ISO/TS 17892-11

Used to determine the permeability of fine-grained soils such as clay-like or silty soils.

The specimen is confined within the permeameter which is connected to the manometer tube filled with water.

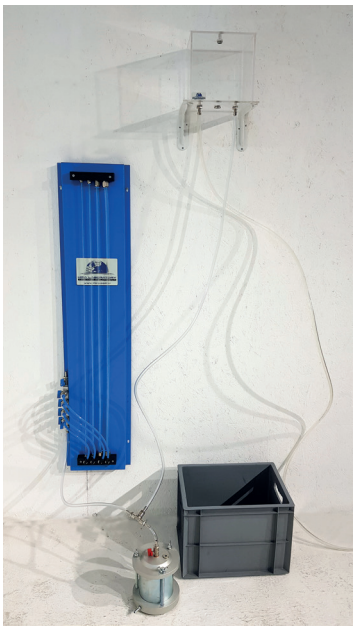
The sample must be completely saturated with water before the test, and the operator will check the rate of fall of the water in the tube passing through the test specimen.

The Falling Head Permeability Cell is manufactured from plated steel with an inside diameter of 100 mm.

The Stand, comprising 4 pieces Ø4, Ø5, Ø6, Ø8 mm x 1,5 m long Manometer Tubes, Rubber Tube and Connectors.

The Soaking Reservoir Tank is used for containing the permeability cell during the test.

Falling Head Permeameter Set is supplied complete with Ø100 mm Falling Head Permeability Cell, Stand with 4 pieces Manometer Tubes, Water Tank, Soaking Reservoir Tank, Steel Ruler, Rubber Tube and Connectors.



HR-S5820

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5820	Falling Head Permeameter Set, Ø 100 mm	32x70x170	15

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S5820/1	Falling Head Permeability Cell, Ø 100 mm	Ø10x13	3
HR-S5820/2	Stand with 4 pieces Manometer Tubes	23x10x170	7
HR-S5820/3	Water Tank	35x35x35	2
HR-S5820/4	Soaking Reservoir Tank	32x32x25	4
HR-S5820/5	Rubber Tube	---	---
HR-S5820/6	Connectors	---	---
HR-G0478	Steel Ruler	100	---

HR-S5820/1

DE-AIRING WATER SYSTEM

De-Airing Water Apparatus is a compact and self-contained equipment which can de-air water quickly and efficiently down to levels of dissolved oxygen acceptable for geotechnical test methods. The apparatus used in conjunction with the De-Airing Tank. Air is removed from the water by a vacuum system. De-airing tank should be ordered separately.

The first option for De-Airing Water;

- De-Airing Water Apparatus,
- De-Airing Water Tank,
- Vacuum Control and Water Connection Panel with Regulator and Vacuum Gauge Manometer or Connection Panel for Vacuum and Water with Vacuum Gauge (These panels are optional),
- Plastic Hose.
-

The second option for De-Airing Water;

- Filter Flask or Air Drying Unit / Water Trap,
- Vacuum Pump,
- De-Airing Water Tank,
- Vacuum Control and Water Connection Panel with Regulator and Vacuum Gauge Manometer or Connection Panel for Vacuum and Water with Vacuum Gauge (These panels are optional),
- Plastic Hose.

By using Vacuum Control and Water Connection Panel, vacum pressure degree can be regulate.

By using Connection Panel for Vacuum and Water with Vacuum Gage Manometer and Vacuum Control and Water Connection Panel with Regulator, De-Aring Water Equipment can be used without repeated assembling the hoses.

HR-S5850

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S5850	De-Airing Water Apparatus	50x25x35	15	220V, 50 Hz, 1 ph
HR-S5850/60Hz	De-Airing Water Apparatus	50x25x35	15	220V, 60 Hz, 1 ph
HR-S5850/1	De-Airing Water Tank, 7 lt	25x25x25	3	---
HR-S5855	Vacuum Control and Water Connection Panel with Regulator and Vacuum Gauge Manometer	45x15x50	7	---
HR-S5860	Connection Panel for Vacuum and Water with Vacuum Gage Manometer	15x15x25	0,5	---
HR-G0800	Vacuum Pump, 51 lt/min	30x15x25	8,5	220V, 50-60 Hz, 1 ph
HR-G0083	Filter Flask, 2000 ml	---	---	---
HR-S5850/2	Air Drying Unit / Water Trap, Vacuum Type	70x80x17	0,5	---
HR-S5850/3	Plastic Hose, Ø8mm, 6m	---	---	---

PINHOLE TEST APPARATUS

STANDARDS: BS 1377:5, ASTM D4647

Certain fine-grained soils with high sodium content are highly erodible by the water flowing through them. During the test the flow of water under a high hydraulic gradient through a cavity in the soil is reproduced.

Pinhole Test Apparatus is used for evaluating clay soils for erodibility by flowing water through a small hole that is drilled through the compacted specimen.

The apparatus consists of a cylindrical metal container fitted one end with a water inlet and the other end with an outlet connection, a standpipe tube with scale and a stand to support the apparatus.

Constant Level Tank should be ordered separately.

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-S7725	Pinhole Test Apparatus	15x20x120	4

Spare Parts & Accessories:

Product Code	Product Name
HR-S7725/1	Cylindrical Metal Container
HR-S7725/2	PVC Tubing, Ø 10x8 mm, 10 m Coil
HR-S7725/3	Stand
HR-S7725/4	Constant Level Tank

HR-S7725

CONSOLIDATION TEST SET

STANDARDS: ASTM D2435, D3877, D4546, AASHTO T216, CEN ISO/TS 17892-5, BS 1377:5

The one-dimensional consolidation test of a soil sample enables to ascertain the settlement characteristic over a given period of time. Loads are applied with progressive increases and the settlement values are read on a dial gauge.

Tests are carried out on specimens prepared from undisturbed samples. Data obtained from these tests together with classification data and a knowledge of the soils loading history, enables estimates to be made of the behavior of foundations under load.

The High Pressure Consolidation Test Set is complete with Front Loading Oedometer, Bench for 3 Consolidation Oedometer, Ø50 mm Consolidation Cell, 10x0,01 mm Analog Dial Gauge and 64 Kg Set of Weights.

The ASTM Consolidation Test Set is complete with Front Loading Oedometer, Bench for 3 Consolidation Oedometer, Ø63,5 mm Consolidation Cell, 10x0,01 mm Analog Dial Gauge and 64 Kg Set of Weights.

The BS/EN Consolidation Test Set is complete with Front Loading Oedometer, Bench for 3 Consolidation Oedometer, Ø75 mm Consolidation Cell, 10x0,01 mm Analog Dial Gauge and 80 Kg Set of Weights.

The other accessories are optional.

The Front Loading Oedometer is rigidly manufactured from aluminum alloy casting to provide a high degree of accuracy with any frame distortions under load. The frame is designed to load the specimen through a lever arm assembly and one of three alternative beam ratios as 9:1, 10:1 and 11:1. The beam is fitted with a counter balance weight and beam support jack. The cell platform will accept the complete range consolidation cells and is fitted with a central spigot to ensure accurate centering of the cell under the loading.

The fixed ring Consolidation Cells are manufactured from corrosion-resistant materials and conform to the requirements of the relevant standards. All cells are supplied complete with Upper and Lower Porous Disc, Pressure Pad and Cutting (Specimen) Ring. Any Consolidation Cells are listed below can be chosen.

HR-S9000

HİRA TESTING EQUIPMENT

Any Dial Gauges and Set of Weights are listed below can be chosen.

Apparatus for prepare Consolidation Samples and Calibration Disc should be ordered separately.

Technical Specifications:

Product Code	Product Name	Dimensions (mm)	Weight (kg)
HR-S9000	High Pressure Consolidation Test Set	80x80x115	110
HR-S9025	ASTM Pressure Consolidation Test Set	80x80x115	112
HR-S9050	BS/EN Pressure Consolidation Test Set	80x80x115	114

Typical Loading

Product Name	Consolidation Test (Front Loading Oedometer)		
Product Code	HR-S9000	HR-S9025	HR-S9050
Application	High Pressure	ASTM	BS/EN
Specimen Diameter	50 mm	2,5" (63.5 mm)	75 mm
Specimen Area	1963 mm²	4.906 inch²	4416 mm²
Beam Ratio	10:1	11:1	9:1
Total Load	64 kg	64 kg	80 kg
Stress	32 kg/cm²	20 t/ft²	16.3 kg/cm²
Stress for 1 kgf	0.5 kg/cm²	0.3125 ton/ft²	0.2/cm²

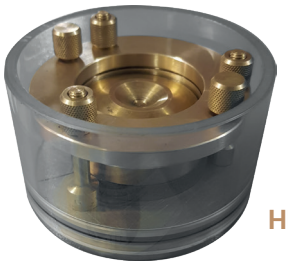
Spare Parts & Accessories:

Product Code	Product Name	Dimensions (mm)	Weight (kg)
HR-S9000/1	Front Loading Oedometer	80x80x93	30
HR-S9000/2	Bench for Consolidation, 3 Oedometer Capacity	20x80x50	20
HR-S9100	Consolidation Cell, Ø 50 mm	Ø 50	5
HR-S9100/1	Upper and Lower Porous Disc for Ø 50 mm Cell	---	---
HR-S9100/2	Pressure Pad for Ø 50 mm Cell	---	---
HR-S9100/3	Cutting (Specimen) Ring for Ø 50 mm Cell	---	---
HR-S9100/4	Calibration disc for Ø 50 mm Consolidation Cell, stainless steel	---	---
HR-S9100/5	Apparatus for prepare Consolidation Sample for Ø 50 mm samples	---	---
HR-S9200	Consolidation Cell, Ø 63,5 mm	Ø 63.5 (2.5")	6
HR-S9200/1	Upper and Lower Porous Disc for Ø 63,5 mm Cell	---	---
HR-S9200/2	Pressure Pad for Ø 63,5 mm Cell	---	---
HR-S9200/3	Cutting (Specimen) Ring for Ø 63,5 mm Cell	---	---
HR-S9200/4	Calibration disc for Ø 63,5 mm Consolidation Cell, stainless steel	---	---
HR-S9200/5	Apparatus for prepare Consolidation Sample for Ø 63,5 mm samples	---	---
HR-S9300	Consolidation Cell, Ø 75 mm	Ø 75	7
HR-S9300/1	Upper and Lower Porous Disc for Ø 75 mm Cell	---	---
HR-S9300/2	Pressure Pad for Ø 75 mm Cell	---	---
HR-S9300/3	Cutting (Specimen) Ring for Ø 75 mm Cell	---	---
HR-S9300/4	Calibration disc for Ø 75 mm Consolidation Cell, stainless steel	---	---
HR-S9300/5	Apparatus for prepare Consolidation Sample for Ø 75 mm samples	---	---
HR-G0875	Analog Dial Indicator, 10 x 0,01 mm	---	---
HR-G0876	Analog Dial Indicator, 30 x 0,01 mm	---	---
HR-G0877	Digital Dial Indicator, 12,7 x 0,01 mm	---	---
HR-G0878	Digital Dial Indicator, 25 x 0,01 mm	---	---
HR-G0879	Digital Dial Indicator, 12.7 x 0,001 mm	---	---
HR-G0880	Digital Dial Indicator, 25 x 0,001 mm	---	---

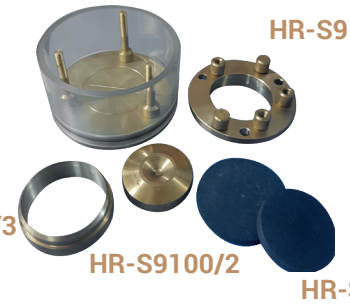
Set of Weights

Product Code	Set of Weights for Consolidation
HR-S9500	16 kg Set (2x 5 kg, 1x 2 kg, 2x 1 kg, 3x 0,5 kg, 2x 0,25 kg)
HR-S9510	32 kg Set (1x 10 kg, 3x 5 kg, 2x 2 kg, 1x 1 kg, 3x 0,5 kg, 2x 0,25 kg)
HR-S9520	50 kg Set (3x 10 kg, 2x 5 kg, 3x 2 kg, 2x 1 kg, 3x 0,5 kg, 2x 0,25 kg)
HR-S9530	64 kg Set (4x 10 kg, 3x 5 kg, 2x 2 kg, 3x 1 kg, 3x 0,5 kg, 2x 0,25 kg)
HR-S9540	80 kg Set (6x 10 kg, 2x 5 kg, 3x 2 kg, 2x 1 kg, 3x 0,5 kg, 2x 0,25 kg)

HR-S9510



HR-S9100



HR-S9100/5

HR-S9100/3

HR-S9100/2

HR-S9100/1

CORE BOX

Core Box is made of sturdy, yet lightweight plastic material.

Core Box provides stable stacking and can withstand the weight of several boxes full of cores stacked on its top.

A lid comes with each Core Box that is easily removed.

Provides the best protection and is easy to transport.

HR-M4501
with
HR-M4505
HR-M4506

Technical Specifications:

Product Code	Product Name	Type	Core Dia. (mm)	Capacity (m)	Dimensions (cm)	Weight (kg)
HR-M4500	Core Box	BQ	26-36	6x1	107x34x5	1,6
HR-M4501	Core Box	NQ	37-48	5x1	107x34x6	1,8
HR-M4502	Core Box	HQ	49-64	4x1	107x34x8	2
HR-M4503	Core Box	PQ	65-86	3x1	107x34x10	2,1

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-M4505	Lid	107x34x2	0,9
HR-M4506	Separator	---	---

DIRECT SHEAR TEST MACHINE

STANDARDS: ASTM D3080; BS 1377:7; AASHTO T236, CEN-ISO/TS 17892-10

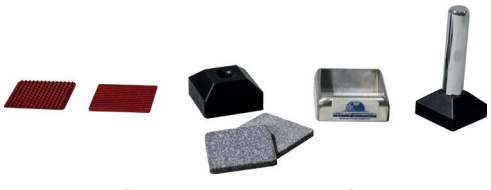
The test measures the consolidated drained shear strength of a soil material in direct shear. Automatic Direct Shear Test Machine is motorized with servo motor and measuring sensors are electronically connected to a digital readout unit to get accurate readings. Supplied with carriage assembly load hanger and integral 9:1, 10:1 and 11:1 lever loading device as standard. The loading arm which is used to amplify the vertical load on the shear box assembly can receive up to 50 kg of weight. The total load on the specimen can reach up to 5 kN.

The shear machine is driven by high resolution servomotor and gear box assembly. Speed range is fully steeples variable over the range 0.00001 to 9.9999 mm/min. 5 kN load cell is used for load measurement. 10 x 0.002 mm and 25 x 0.01 mm sensitivity displacement sensors are used for vertical and horizontal displacement measurements respectively. Displacement limits are controlled by limit switch.

The machine shear box tests on 60 mm and 100 mm square, Ø60 mm round, Ø100 mm round and Ø2,5" round samples. All Shear box assemblies can contain water that surrounds the specimen. The Assemblies consist of a shear box with a rigid wall square, complete with a Vertical Loading Pad grooved back face, a Grooved Retaining Plate, 2 pieces Porous Plates, 2 pieces Plane Grids and 2 pieces Perforated Grids.

Direct Shear Test Machine Supplied with Slotted Weight Set.

Shear Box Assembly, Specimen cutter and Extrusion Dolly should be ordered separately depending on the sample size.



Shear Box Accessories

HR-S2000

Spare Parts & Accessories:

Product Code	Product Name
HR-S2000/1	Slotted Weight Set, 50 kg (4x10 kg + 1x5 kg + 2x2 kg + 1x1 kg)

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Speed Range (mm/min)	Maximum Shear Force (kN)	Maximum Vertical load (N)	Power Supply
HR-S2000	Automatic Direct Shear Test Machine	65x155x135	120	0.0001 to 9.9999	5	0 to 500 N applying 5000 N using 10:1 beam loading device	220 V, 50-60 Hz, 1 ph

The Accessories of Shear Box Assemblies:

Product Name	Product Code				
	60x60 mm	Ø 60 mm	100x100 mm	Ø 100 mm	Ø 2.5 inch
Shear Box Assembly	HR-S2100	HR-S2200	HR-S2300	HR-S2400	HR-S2500
Shear Box	HR-S2100/1	HR-S2200/1	HR-S2300/1	HR-S2400/1	HR-S2500/1
Loading Pad	HR-S2100/2	HR-S2200/2	HR-S2300/2	HR-S2400/2	HR-S2500/2
Retaining Plate	HR-S2100/3	HR-S2200/3	HR-S2300/3	HR-S2400/3	HR-S2500/3
Porous Plate	HR-S2100/4	HR-S2200/4	HR-S2300/4	HR-S2400/4	HR-S2500/4
Plane Grid	HR-S2100/5	HR-S2200/5	HR-S2300/5	HR-S2400/5	HR-S2500/5
Perforated Grid	HR-S2100/6	HR-S2200/6	HR-S2300/6	HR-S2400/6	HR-S2500/6
Specimen Cutter	HR-S2100/7	HR-S2200/7	HR-S2300/7	HR-S2400/7	HR-S2500/7
Extrusion Dolly	HR-S2100/8	HR-S2200/8	HR-S2300/8	HR-S2400/8	HR-S2500/8

UNCONFINED TESTING MACHINE

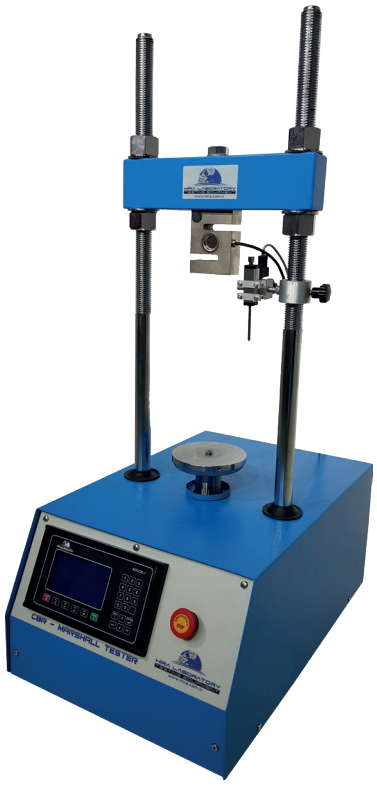
STANDARDS: ASTM D2166, ASTM D1663, AASHTO T208

Unconfined Testing Machine is used to make Uniaxial Tests.

The device is composed of a robust and compact two column frame with adjustable upper cross beam driven by an electromechanical ram with a maximum capacity of 50 kN.

The testing speed can be set between 0,5 mm/min to 5 mm/min. The test automatically stops when load and displacement is reached to 95% value of the set measuring range.

Unconfined Testing Machine is supplied complete with 50 kN Load Cell, 25 mm Displacement Sensor, Digital Readout and Control Unit and Compression Platens with ball seating assembly.



HR-S1000

Technical Specifications:

Product Code	HR-S1000
Product Name	Unconfined Testing Machine
Test Speed (mm/min)	0,5 - 5
Capacity (kN)	50
Dimensions (cm)	40x65x110
Weight (kg)	100
Power Supply	220 V, 50-60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name
HR-S1000/1	Unconfined Testing Frame
HR-G0981	Load Cell, 50 kN capacity
HR-G0995	Displacement Sensor, 25 x 0,01 mm
HR-E9000	Digital Readout and Control Unit

Spare Parts & Accessories:

Product Code	Product Name
HR-S1010	Compression Platens with ball seating assembly

CBR & MARSHALL & UNAXIAL TESTING MACHINE

CBR & Marshall & Unaxial Testing Machine is used to make CBR, Marshall and Uniaxial Tests.

The device is composed of a robust and compact two column frame with adjustable upper cross beam driven by an electromechanical ram with a maximum capacity of 50 kN.

The testing speed can be set between 0,001 mm/min to 51mm/min. The test automatically stops when load and displacement is reached to 95% value of the set measuring range.

CBR & Marshall & Unaxial Testing Machine features a microprocessor controlled drive system with an advanced servo motor enabling the operator to easily set any test speed via the membrane keyboard. The keyboard comprises adjustment buttons such as “start”, “stop”, “down”, “up”.

CBR & Marshall & Unaxial Testing Machine is supplied complete with 50 kN Load Cell, 25 mm Displacement Sensor and Digital Readout and Control Unit.

The other Test Accessories should be ordered separately according to the test. Compression Platens with ball seating assembly for Unaxial Tests, Penetration Piston for CBR Tests and Breaking Head for Marshall Tests should be ordered separately.

HR-AS5000/1

HR-AS0500
with
HR-S5000/1
HR-S5100

HİRA TESTING EQUIPMENT

Technical Specifications:

Product Code	HR-AS0500
Product Name	CBR & Marshall & Unaxial Testing Machine
Test Speed (mm/min)	0,001 - 51
Capacity (kN)	50
Dimensions (cm)	40x65x110
Weight (kg)	100
Power Supply	220 V, 50-60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name
HR-AS0500/1	CBR & Marshall & Unaxial Frame
HR-G0981	Load Cell, 50 kN capacity
HR-G0995	Displacement Sensor, 25 x 0,01 mm
HR-E9000	Digital Readout and Control Unit

UNIAXIAL TEST SYSTEMS

STANDARDS: ASTM D2166, AASHTO T208

Compression Platens, used to perform uniaxial and unconfined compression tests.

Supplied complete with ball seating assembly.

Spare Parts & Accessories:

Product Code	Product Name
HR-S1010	Compression Platens with ball seating assembly

MARSHALL TEST SYSTEMS

STANDARDS: EN 12697-34, 12697-23, 12697-12, 13108, ASTM D1559, AASHTO T245

Should be used with Breaking Head Stability Mould for 4" (101,6 mm) or 6" (152,4 mm) Marshall Samples and Adaptor for Breaking Head to perform Marshall Tests.

Spare Parts & Accessories:

Product Code	Product Name
HR-AS5000/1	Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples
HR-AS5000/2	Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples

HR-AS0500/1 & HR-G0981
HR-G0995 & HR-AS5000/1

CBR TEST SYSTEMS

STANDARDS: EN 13286-47, BS 1377:4, ASTM D1883, AASHTO T193, NF P94-078, UNI CNR 10009

Should be used with CBR Penetration Piston to perform CBR Tests.

Spare Parts & Accessories:

Product Code	Product Name
HR-S5000/1	CBR Penetration piston, used to perform CBR Tests

HR-AS0500/1 & HR-G0981
HR-G0995 & HR-S5000/1
HR-S5100

CBR & MARSHALL TESTING MACHINE WITH LOAD RING

CBR & Marshall Testing Machine with Load Ring is used to make CBR and Marshall Tests.

The device is composed of a robust and compact two column frame with adjustable upper cross beam driven by an electromechanical ram with a maximum capacity of 50 kN.

The frame has 50 kN capacity. Three test speeds are provided 1.0 mm/min for BS CBR Tests, 1.27 mm/min for ASTM/EN/AASHTO CBR Tests and 50.8 mm/min for Marshall Tests.

Three models are available according the Dial Gauge.

The HR-AS0505 Analog Model is supplied complete with 50 kN Load Ring with 0,01 mm resolution Analog Dial Gauge.

The HR-AS0510 Digital Model is complete with 50 kN Load Ring with 0,01 mm resolution Digital Dial Gauge.

The HR-AS0515 Digital Model is complete with 50 kN Load Ring with 0,001 mm resolution Digital Dial Gauge.

The other Test Accessories should be ordered separately according to the test. Penetration Piston for CBR Tests and Breaking Head for Marshall Tests should be ordered separately.

Technical Specifications:

Product Code	HR-AS0505	HR-AS0510	HR-AS0515
Product Name	CBR & Marshall Testing Machine with Load Ring		
Type	Analog Dial Gauge	Digital Dial Gauge	Digital Dial Gauge
Dial Gauge Resolution (mm)	0,01	0,01	0,001
Test Speed (mm/min)	Can be selected as 1.0 & 1.27 & 50.8		
Capacity (kN)	50		
Dimensions (cm)	40x65x110		
Weight (kg)	100		
Power Supply	220 V, 50-60 Hz, 1 ph		

Spare Parts & Accessories:

Product Code	Product Name
HR-AS0505/1	CBR & Marshall Testing Frame
HR-G5003	Load Ring, 50 kN capacity with 0,01 mm resolution Analog Dial gauge
HR-G5013	Load Ring, 50 kN capacity with 0,01 mm resolution Digital Dial gauge
HR-G5008	Load Ring, 50 kN capacity with 0,001 mm resolution Digital Dial gauge

MARSHALL TEST SYSTEMS

STANDARDS: EN 12697-34, 12697-23, 12697-12, 13108, ASTM D1559, AASHTO T245

Should be used with Breaking Head Stability Mould for 4" (101,6 mm) or 6" (152,4 mm) Marshall Samples and Adaptor for Breaking Head to perform Marshall Tests.

Spare Parts & Accessories:

Product Code	Product Name
HR-AS5000/1	Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples
HR-AS5000/2	Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples

HR-AS0505/1 & HR-G5003
HR-AS5000/1

HİRA TESTING EQUIPMENT

CBR TEST SYSTEMS

STANDARDS: EN 13286-47, BS 1377:4, ASTM D1883, AASHTO T193, NF P94-078, UNI CNR 10009

Should be used with CBR Penetration Piston to perform CBR Tests.

Spare Parts & Accessories:

Product Code	Product Name
HR-S5000/1	CBR Penetration piston, used to perform CBR Tests

HR-AS0505/1 & HR-G5003
HR-S5000/1 & HR-G0876

TRIAXIAL TEST MACHINE, UU TEST SYSTEMS

STANDARDS: ASTM D2850, D4767, D7181, AASHTO T297, BS 1377-7, BS 1377-8

Triaxial Testing Machine is used to make Triaxial Tests. Determining the mechanical properties of soils is a very important step to design foundations, embankments and other soil structures.

Building constructions, excavations, tunneling and similar applications have several effects on the subsoil structures and these effects are successfully simulated with Triaxial Tests where the stress-strain relation of undisturbed soil specimen are investigated by subjecting the soil sample to different stress levels and drainage conditions.

The Triaxial Test System provides Automated Triaxial Compression Tests on cylindrical undisturbed and remolded soil samples. Unconsolidated Undrained (UU) Compression Tests can be automatically run, controlled and reported using this apparatus.

The device is composed of a robust and compact two column frame with adjustable upper cross beam driven by an electromechanical ram with a maximum capacity of 5 kN.

The testing speed can be set between 0,0001 mm/min to 9,9999 mm/min. The test automatically stops when load and displacement is reached to 95% value of the set measuring range.

Triaxial Testing Machine is supplied complete with 5 kN Load Cell, 25 mm Displacement Sensor and Digital Readout and Control Unit.

The other Test Accessories should be ordered separately.

HR-E4000

UNCONSOLIDATED UNDRAINED (UU) TEST

The System is Supplied with Triaxial Testing Machine, 5 kN capacity Load cell, Triaxial Cell for Ø38 and Ø50 mm samples or Triaxial Cell for Ø70 and Ø100 mm samples (Choose the suitable cell for the specimen size), Analog Manometer, Air and Water Constant Pressure System, Software to Perform UU Triaxial Tests and De-Airing Water Tank and Hose.

Digital Manometer is optional and should be ordered separately instead of Analog Manometer.

Technical Specifications:

Product Code	HR-E4000
Product Name	Triaxial Test Machine
Test Speed (mm/min)	0,0001 – 9,9999
Capacity (kN)	5
Dimensions (cm)	50x50x135
Weight (kg)	120
Power Supply	220 V, 50-60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name
HR-E5000/1	Triaxial Testing Frame
HR-G0980	Load Cell, 5 kN capacity
HR-G0995	Displacement Sensor, 25 x 0,01 mm
HR-E9000	Digital Readout and Control Unit

TRIAXIAL CELLS

The cell has been designed and treated to minimize corrosion. Particular attention has been paid to the quality of finish between the piston and the head. The piston load capacity is designed to accept high axial loads which may be present during the final stages of a test.

Spare Parts & Accessories:

Product Code	Product Name
HR-E4100	Triaxial Cell for Ø 38 and Ø 50 mm samples
HR-E4300	Triaxial Cell for Ø 70 and Ø 100 mm samples
HR-G9010	Analog Manometer
HR-G9015	Digital Manometer (Optional)
HR-E4000/1	Air and Water Constant Pressure System
HR-E4000/2	Software to Perform UU Triaxial Tests
HR-E4000/3	De-Airing Water Tank, 7 lt
HR-E4000/4	Plastic Hose, Ø 8 mm x 6 m

HR-E4100

Technical Specifications for Triaxial Cells

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-E4100	Triaxial Cell for Ø 38 and Ø 50 mm samples	16x16x40	4.5
HR-E4300	Triaxial Cell for Ø 70 and Ø 100 mm samples	21x21x55	12

Triaxial Cell Accessories

Product Name	Product Code			
Sample Diameter (mm)	38	50	70	100
Base Adaptor	HR-E4130	HR-E4330	HR-E4430	HR-E4530
Porous Top Cap	HR-E4131	HR-E4331	HR-E4431	HR-E4531
Nylon Tubing for Drainage	HR-E4132	HR-E4332	HR-E4432	HR-E4532
Pair of Porous Discs	HR-E4133	HR-E4333	HR-E4423	HR-E4533
Rubber Membrane	HR-E4134	HR-E4334	HR-E4434	HR-E4534
Membrane Placing Tool (Strecher)	HR-E4135	HR-E4335	HR-E4435	HR-E4535
0 Ring (Pack of 10)	HR-E4136	HR-E4336	HR-E4436	HR-E4536
0 Ring Placing Tool	HR-E4137	HR-E4337	HR-E4437	HR-E4537
Lateral Filter Paper (Pack of 50)	HR-E4138	HR-E4338	HR-E4438	HR-E4538
Filter Paper Discs (Pack of 100)	HR-E4139	HR-E4339	HR-E4439	HR-E4539
Plastic Discs (Pack of 2)	HR-E4140	HR-E4340	HR-E4440	HR-E4540

Sample Preparation Accessories

Product Name	Product Code			
Sample Diameter (mm)	38	50	70	100
Split Sand Former	HR-E4125	HR-E4325	HR-E4425	HR-E4525
Split Mould	HR-E4126	HR-E4326	HR-E4426	HR-E4526
Cutter	HR-E4127	HR-E4327	HR-E4427	HR-E4527
Aluminum Dolly	HR-E4128	HR-E4328	HR-E4428	HR-E4528

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-G9010	Analog Manometer	---	---	---
HR-G9015	Digital Manometer	---	---	---
HR-E4000/1	Air and Water Constant Pressure Unit	30x25x25	7.5	220-240V, 50-60Hz, 1ph

MULTIPLEX TESTING MACHINE

Multiplex Testing Machine is used to make Uniaxial, CBR, Marshall and Triaxial Tests.

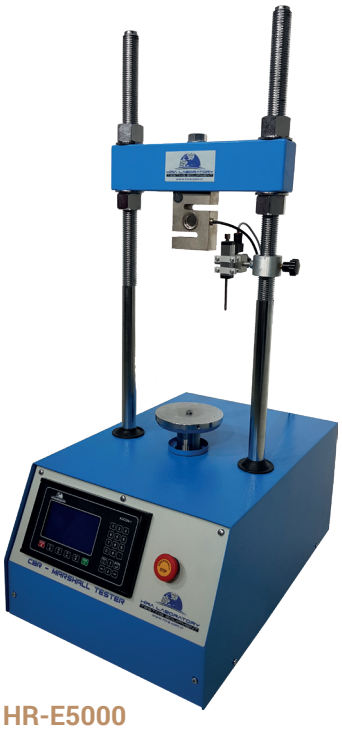
The device is composed of a robust and compact two column frame with adjustable upper cross beam driven by an electromechanical ram with a maximum capacity of 50 kN.

The testing speed can be set between 0,001 mm/min to 51mm/min. The test automatically stops when load and displacement is reached to 95% value of the set measuring range.

The Multiplex Testing Machine features a microprocessor controlled drive system with an advanced servo motor enabling the operator to easily set any test speed via the membrane keyboard. The keyboard comprises adjustment buttons such as "start", "stop", "down", "up".

The HR-E5000 Servo Controlled Multiplex Testing Machine is supplied complete with 50 kN Load Cell, 25 mm Displacement Sensor and Digital Readout and Control Unit.

The other Test Accessories should be ordered separately according to the test. 5 kN Load Cell for Triaxial Tests, Compression Platens with ball seating assembly for Unaxial Tests, Penetration Piston for CBR Tests and Breaking Head for Marshall Tests should be ordered separately.



HR-E5000

Technical Specifications:

Product Code	HR-E5000
Product Name	Multiplex Testing Machine
Test Speed (mm/min)	0,001 - 51
Capacity (kN)	50
Dimensions (cm)	50x50x135
Weight (kg)	120
Power Supply	220 V, 50-60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name
HR-E5000/1	Multiplex Testing Frame
HR-G0981	Load Cell, 50 kN capacity
HR-G0995	Displacement Sensor, 25 x 0,01 mm
HR-E9000	Digital Readout and Control Unit

TRIAXIAL TEST SYSTEMS

STANDARDS: ASTM D2850, D4767, D7181, AASHTO T-297, BS 1377-7, BS 1377-8

Determining the mechanical properties of soils is a very important step to design foundations, embankments and other soil structures.

Building constructions, excavations, tunneling and similar applications have several effects on the subsoil structures and these effects are successfully simulated with Triaxial Tests where the stress-strain relation of undisturbed soil specimen are investigated by subjecting the soil sample to different stress levels and drainage conditions.

The Triaxial Test System provides Automated Triaxial Compression Tests on cylindrical undisturbed and remolded soil samples. Unconsolidated Undrained (UU) Compression Tests can be automatically run, controlled and reported using this apparatus.

5 kN Load Cell should be ordered separately for Triaxial Tests.

UNCONSOLIDATED UNDRAINED (UU) TEST

The System is Supplied with Multiplex Testing Machine, Load cell, 5 kN capacity, Triaxial Cell for Ø38 and Ø50 mm samples or Triaxial Cell for Ø70 and Ø100 mm samples (Choose the suitable cell for the specimen size), Analog Manometer, Air and Water Constant Pressure System, Software to Perform UU Triaxial Tests and De-Airing Water Tank and Hose.

Digital Manometer is optional and should be ordered separately instead of Analog Manometer.

TRIAXIAL CELLS

The cell has been designed and treated to minimize corrosion. Particular attention has been paid to the quality of finish between the piston and the head. The piston load capacity is designed to accept high axial loads which may be present during the final stages of a test.

Spare Parts & Accessories:

Product Code	Product Name
HR-G0980	Load Cell, 5 kN capacity
HR-E4100	Triaxial Cell for Ø 38 and Ø 50 mm samples
HR-E4300	Triaxial Cell for Ø 70 and Ø 100 mm samples
HR-G9010	Analog Manometer
HR-G9015	Digital Manometer (Optional)
HR-E4000/1	Air and Water Constant Pressure System
HR-E4000/2	Software to Perform UU Triaxial Tests
HR-E4000/3	De-Airing Water Tank, 7 lt
HR-E4000/4	Plastic Hose, Ø 8 mm x 6 m

HR-E4100

Technical Specifications for Triaxial Cells

Product Code	Product Name	Dimensions (cm)	Weight (kg)
HR-E4100	Triaxial Cell for Ø 38 and Ø 50 mm samples	16x16x40	4.5
HR-E4300	Triaxial Cell for Ø 70 and Ø 100 mm samples	21x21x55	12

Triaxial Cell Accessories

Product Name	Product Code			
Sample Diameter (mm)	38	50	70	100
Base Adaptor	HR-E4130	HR-E4330	HR-E4430	HR-E4530
Porous Top Cap	HR-E4131	HR-E4331	HR-E4431	HR-E4531
Nylon Tubing for Drainage	HR-E4132	HR-E4332	HR-E4432	HR-E4532
Pair of Porous Discs	HR-E4133	HR-E4333	HR-E4423	HR-E4533
Rubber Membrane	HR-E4134	HR-E4334	HR-E4434	HR-E4534
Membrane Placing Tool (Strecher)	HR-E4135	HR-E4335	HR-E4435	HR-E4535
0 Ring (Pack of 10)	HR-E4136	HR-E4336	HR-E4436	HR-E4536
0 Ring Placing Tool	HR-E4137	HR-E4337	HR-E4437	HR-E4537
Lateral Filter Paper (Pack of 50)	HR-E4138	HR-E4338	HR-E4438	HR-E4538
Filter Paper Discs (Pack of 100)	HR-E4139	HR-E4339	HR-E4439	HR-E4539
Plastic Discs (Pack of 2)	HR-E4140	HR-E4340	HR-E4440	HR-E4540

Sample Preparation Accessories

Product Name	Product Code			
Sample Diameter (mm)	38	50	70	100
Split Sand Former	HR-E4125	HR-E4325	HR-E4425	HR-E4525
Split Mould	HR-E4126	HR-E4326	HR-E4426	HR-E4526
Cutter	HR-E4127	HR-E4327	HR-E4427	HR-E4527
Aluminum Dolly	HR-E4128	HR-E4328	HR-E4428	HR-E4528

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-G9010	Analog Manometer	---	---	---
HR-G9015	Digital Manometer	---	---	---
HR-E4000/1	Air and Water Constant Pressure Unit	30x25x25	7.5	220-240V, 50-60Hz, 1ph

HİRA TESTING EQUIPMENT

UNIAXIAL TEST SYSTEMS

STANDARDS: ASTM D2166, AASHTO T208

Compression Platens, used to perform uniaxial and unconfined compression tests.

Supplied complete with ball seating assembly.

Spare Parts & Accessories:

Product Code	Product Name
HR-S1010	Compression Platens with ball seating assembly

HR-E5000/1
HR-G0981
HR-G0995
HR-AS5000/1

MARSHALL TEST SYSTEMS

STANDARDS: EN 12697-34, 12697-23, 12697-12, 13108, ASTM D1559, AASHTO T245

Should be used with Breaking Head Stability Mould for 4" (101,6 mm) or 6" (152,4 mm) Marshall Samples and Adaptor for Breaking Head to perform Marshall Tests.

Spare Parts & Accessories:

Product Code	Product Name
HR-AS5000/1	Breaking Head Stability Mould, cast iron, for 4" (101,6 mm) Marshall Samples
HR-AS5000/2	Breaking Head Stability Mould, cast iron, for 6" (152,4 mm) Marshall Samples

CBR TEST SYSTEMS

STANDARDS: EN 13286-47, BS 1377:4, ASTM D1883, AASHTO T193, NF P94-078, UNI CNR 10009

Should be used with CBR Penetration Piston to perform CBR Tests.

Spare Parts & Accessories:

Product Code	Product Name
HR-S5000/1	CBR Penetration piston, used to perform CBR Tests

HR-E5000/1
HR-G0981
HR-G0995
HR-S5000/1
HR-S5100

CLAY ABRASION TESTER

STANDARDS: TS 10521, TS10521-T1

Clay Abrasion Tester is used to determine the abrasion property of materials like clay, calcite, sepiyolit, talcum which are used in production of paper, ink, pigment, paint etc.

The device work like the same principle of Voith Allis Valley abrasion testing device.

The motor rotates Abrasive apparatus and the weight on it works 75-80 rpm (forward-backward 1 revolution, total hit 170 can be adjustable)

The device works without any problem in that revolution rate for 2 hours (6000 revolutions)

The device control unit stop the device at any given revolution value.

Metal plate supports the abrasion wire is made of stainless steel. The plate is locked by a locking mechanism.

The suspension tank has a 3,5 lt capacity and made of corrosion and wear resistant material.

The capacity of the circulation pump which send suspension to abrasion wire is 190 lt/h(50 gal/h).

The device is complete with a 210 µm opening, 22,4 x 8,7 cm wide brass wire, Pack of 1000.

HR-S7000

Technical Specifications:

Product Code	Product Name	Dimensions (cm)	Weight (kg)	Power Supply
HR-S7000	Clay Abrasion Tester	120x40x100	150	220 V, 50- 60 Hz, 1 ph

Spare Parts & Accessories:

Product Code	Product Name	Dimensions (cm)
HR-S7000/1	Wide Brass Wire	22,4 x 8,7