

SOIL TESTING

WS 1003 to WS 1007/2 BROOKFIELD Rotation Viscometer/Rheometer (ASTM D-4402) & BOHLIN Dynamic Shear Rheometer Model DSR)

WS 8500

DIMENSI Motorised Direct Shear Machine having a capacity of variable speed ranges to select electronically controlled speeds from 0.0001 to 1.8 mm/min. This corrosion resistant shear box apparatus carriage is mounted on a specially built ball tracks. The motor is design for reversed selection and a neutral gear is easily adjusted.

The usage is for the determination the consolidated drained shear strength of soil samples in direct shear. the residual shear is measured by reversing the direction and shear force is measured by a proving ring with dial. The vertical load is measured by adding weights to a level with hanger. The complete machine is supplied with horizontal dial gauge of 25 x 0.01 mm and a proving ring assembly of 5 kN with dial, 50 kg slotted weights and beam loading device 10:1. The shear box and cutter is to be ordered separately. Power for 220-240V, 50Hz, 1pH.

WS 8500/1

DIMENSI Motorised Direct Shear Machine, as described above but comes with digital display. Complete with

nonferrous material carriage, assembled on sliding guides and provided with travel unit, loading coupling device, gauge stand and bench.

WS 8500/2

DIMENSI Read Out Unit, Single Channel, Digital Type, it has a 3 ½ digits display with accuracy of 0.01 mm and can be used with only one transducer. Suitable for 220-240V, 50Hz, 1pH.

WS 8500/3

DIMENSI Read Out Unit, 3 Channel, Digital Type, it has a 3 ½ digits display with accuracy of 0.01 mm and can be used with only three transducers. Suitable for 220-240V, 50Hz, 1pH.

WS 8500/4

DIMENSI Read Out Unit, 6 Channel, Digital Type, it has a 3 ½ digits display with accuracy of 0.01 mm and can be used with only six transducers. Suitable for 220-240V, 50Hz, 1pH.

WS 8500/5

DIMENSI Read Out Unit, 12 Channel, Digital Type, it has a 3 ½ digits display with accuracy of 0.01 mm and can be used with only twelve transducers. Suitable for 220-240V, 50Hz, 1pH.

WS 8500/6

DIMENSI Read Out Unit, Single Channel, Digital Type, it has a 4 ½ digits display with accuracy of 0.01 mm and can be used with only one transducers. Suitable for 220-240V, 50Hz, 1pH.

WS 8500/7

DIMENSI Read Out Unit, 3 Channel, Digital Type, it has a 4 ½ digits display with accuracy of 0.01 mm and can be used with only three transducers. Suitable for 220-240V, 50Hz, 1pH.

WS 8500/8

DIMENSI Read Out Unit, 6 Channel, Digital Type, it has a 4 ½ digits display with accuracy of 0.01 mm and can be used with only six transducers. Suitable for 220-240V, 50Hz, 1pH.

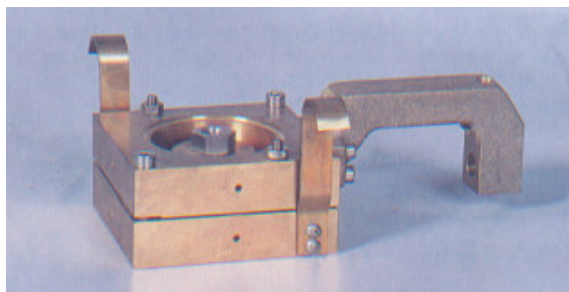
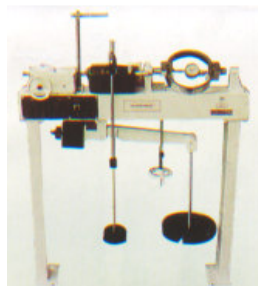
WS 8500/9

DIMENSI Read Out Unit, 12 Channel, Digital Type, it has a 4 ½ digits display with accuracy of 0.01 mm and can be used with only twelve transducers. Suitable for 220-240V, 50Hz, 1pH.

Accessories (To be ordered separately)

Mankopuri Shear Box Assemblies and Cutters

<i>Size</i>	<i>Shear Box Assembly</i>	<i>Specimen Cutter</i>
50 mm dia.	WS 8501	WS 8502
60 mm dia.	WS 8503	WS 8504
70 mm dia.	WS 8505	WS 8506
100 mm dia.	WS 8507	WS 8508
60 x 60 mm	WS 8509	WS 8510
100 x 100 mm	WS 8511	WS 8511/1



SOIL TESTING

WS 8512 TO WS 8521/8 Soil Index Properties & Electronic Load Cell

Determination of Density and Particle Density

Particle density or specific gravity (SG) is determined by measure of the actual particles which make up the soil mass and is defined as the ratio of the mass of the particle to the mass of the water they displace. Knowledge of the particle density is important in relation to another soil tests. This is used when calculation porosity and voids and is particularly important when compaction and consolidation properties are being investigated. The majority of apparatus used for the various tests is general laboratory equipment. This apparatus needs the use of the following apparatus and a general range is listed below.

Particle Density Gas Jar Method. BS 1377

This method is suitable for soils containing up to 10% of particles retained on a 37.5 mm BS sieve.

WS 8512

DIMENSI Gas Jar, 1 litre capacity complete with rubber bung and gas cover. Weight 1.4 kg.

WS 8513

DIMENSI Mechanical End-over-end Shaker, capable of rotating two WS 70 012 Gas Jars at approximately 50 rpm to satisfy BS 1377. Weight 19 kg. For 220-240V, 50Hz, 1pH.

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DIMENSI Mechanical End-over-end Shaker, capable of rotating two WS 70 012 Gas Jars at approximately 50 rpm to satisfy BS 1377. Weight 19 kg. For 220-240V, 50Hz, 1pH.

DIMENSI Pkymometer, glass jar complete with non-corrodible cone and rubber seat. Capacity 1 kg.

WS 8516

DIMENSI Rubber seal

WS 8517

DIMENSI Displacement Transducer, L.V.D.T. range ± 5 mm, spring loaded.



WS 8517

DIMENSI Displacement Transducer, L.V.D.T. range ± 10 mm, spring loaded.

WS 8518

DIMENSI Displacement Transducer, L.V.D.T. range ± 20 mm, spring loaded.

WS 8519

DIMENSI Displacement Transducer, L.V.D.T. range ± 50 mm, spring loaded.

Load Cell, is a load measuring device which produces an electrical output proportional to the applied axial load. This output can be displayed on a read out unit placed at a convenience location. In operation, the elastic deformation of the steel column (body of the load cell) is sensed by four foil type strain gauges connected to form a balanced wheatstone bridge. This bridge is connected to the read out unit through electrical leads.

The sensitivity of the load cell is 0.1% of the total capacity. Safe maximum load is 150% of the rated capacity. Each load cell, duly calibrated, is supplied with a read-out-unit.

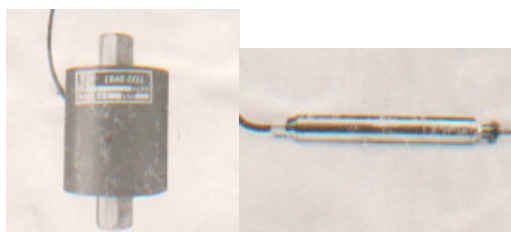
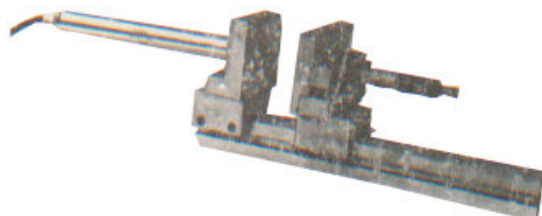
Standard load cells are listed below :

Universal Load Cells (Both Compression & Tension)

WS 8520	10 Kgf (100N)
WS 8520/1	20 Kgf (200N)
WS 8520/2	100 Kgf(1kN)
WS 8520/3	200Kgf(2kN)
WS 8520/4	500Kgf(5kN)
WS 8520/5	1,000Kgf(10kN)
WS 8520/6	2,000Kgf(5kN)
WS 8520/7	5,000Kgf(50kN)
WS 8520/8	10,000Kgf(100kN)

Load Cells (Compression only)

WS 8521	10 Kgf (100N)
WS 8521/1	20 Kgf (200N)
WS 8521/2	100 Kgf(1kN)
WS 8521/3	200Kgf(2kN)
WS 8521/4	500Kgf(5kN)
WS 8521/5	1,000Kgf(10kN)
WS 8521/6	2,000Kgf(5kN)
WS 8521/7	5,000Kgf(50kN)
WS 8521/8	10,000Kgf(100kN)



SOIL TESTING

WS 8573 TO WS 8575/1 Hand Vane Tester & Laboratory Vane Tester

WS 8573

Hand Vane Tester

Direct reading gauge and portable instrument meant for the determination of in-situ shear strength of cohesive soils, either on-site or on the undisturbed or remoulded samples.

The instrument comprises a torque head with direct reading scale and non-return pointer. The vanes come either 19 mm or 33 mm diameter mounted on an extension rod that is supplied separately and are screwed into the rear of the torque head and can be pushed well into the undisturbed material below or behind an excavated surface. Extra 300 mm or 1 000 mm extension rods can be used for higher penetration.

Comes complete with 19 mm vane, range 0 to 120 kPa; 33 mm vane, range 0 to 28 kPa, spanners and carrying case.

Accessories

WS 8573/1 Vane, 19 mm dia. x 38 mm long

WS 8573/2 Vane, 33 mm dia. x 66 mm long

WS 8573/3 300 mm extension rod

WS 8573/4 1 000 mm extension rod

WS 8574

DIMENSI Vane Tester BS 1377, suitable to determine the shear resistance value on samples of coherent soils, placed in cutters having max. diameter of 82 mm. Supplied complete with 12.7 x 12.7 mm cores vane and 4 springs manufactured so to obtain 4 twists : 1 – 1.5 – 2 e 2.5 kg cm. The vane tester consists of a base with 4 columns supporting either torquemeter or a device for the adjustment of its vertical position.

The torquemeter is operated by means of a gear motor provided with clutch, which allows a rotation of 10 ° every 30 seconds.

Power for 220-240V, 50Hz, 1pH

Dimensions : 500x231x300mm

Weight 15 kg.

WS 8575 DIMENSI Set of 4 Springs

WS 8575/1 DIMENSI Cross Vane. Dimension 12.7 x 12.7 mm



SOIL TESTING

WS 8576 TO WS 8587/1 Determination of Particle Density, Pycnometer method & Relative Density of Cohesionless Soils

Water displacement method

WS 8576

VESSEL, BS 1924

Suitable for determining dry density of stabilized soils by means of water displacement.

Used with fine and medium size particle soils. Provided with siphon placed 150 mm far from the base.

Dimensions : 150 x 250 mm (dia. x height)

Weight : about 1.5 kg.

WS 8577

VESSEL, BS 1924

Suitable for determining dry density of stabilized soils by means of water displacement.

Used with large size particle soils.

provided with siphon 300 mm far from the base.

Dimensions : 300 x 500 mm (dia. x height)

Weight : about 4.5 kg.

WS 8578

Pycnometers Bench, BS 1377, ASTM 854, AASHTO T100

Used to allow the water outlet from the pycnometers during the test for the determination of the specific gravity of fine-grained soils.

It can receive up to 6 pycnometers with capacity of 50 to 1000 ml.

Supplied complete with adjustable supports, 6 valves and vacuum gauge (0-1200 mbar).

Vacuum pump, pycnometers and flasks are to be ordered separately.

Dimensions : 1060 x 600 x 1900 mm

Weight : 40 kg.

WS 8579 SUPPORTING BEAM

Made of steel. Supplied in two pieces, complete with holders.

Length : 2500 mm

Weight : 20 kg.

WS 8580 APPARATUS FOR DETERMINING THE RELATIVE DENSITY, ASTM D4253, D4254.

Suitable for cohesionless soils having at least 12 % of particles passing through an ASTM No. 200 sieve (0.075 mm opening).

It consists of a vibrating table, two moulds having capacity of 2.83 and 14.16 litres, two guides with clamps, two surcharge base plates, two bases with handles, a 50 x 0.01 mm dial gauge with support and calibration bar. Entirely manufactured of varnished steel.

Table dimensions : 760 x 760 mm

Frequency : 3600 vibrations/min.

Power supply : 3 x 220 / 380V 50 Hz

Weight : 225 kg.

WS 8580/1 POURING DEVICE, suitable for soils having max. particle size of 9.5 mm

Diameter : 25.4 mm (1")

WS 8580/2 POURING DEVICE, suitable for soils having max. particle size of 4.75 mm

Diameter : 12.7 mm (1/2")

WS 8581 DIMENSI UNIVERSAL VARIABLE SPEED MOTORISED

It consists of a two-column rigid frame, its beam is equipped with ball joint and its height is adjustable by means threaded nuts.

Operated by means of a motorgear which, through an electrical convertor, allows an infinitesimal variation of the test speed.

Complete with control panel with main switch, potentiometer to select the test speed and up/down reverser.

Max. capacity : 50 kN

Test speed : from 0.11 to 61 mm/min

Max. available vertical clearance : 320 mm

Upper beam adjustment : 460 mm

Horizontal clearance : 270 mm

Lower plate travel : 100 mm

Dimensions : 500 x 520 x 1450 mm

Weight : 144 kg.

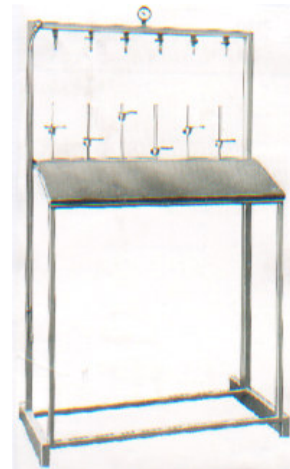
WS 8582 EQUIPMENT FOR UNCONFINED COMPRESSION TEST

Complete with base plate, to house testing machines on the lower plate, upper plate, dial gauge holder with reference hanger.

WS 8587/1 DIMENSI Autographic Unconfined Compression Apparatus

Comply to BS 1277. The apparatus is to be used for the determination of the unconfined compressive strength and shear strength of cohesive and semi-cohesive soil for sample size 38 mm dia. 76 mm length. Supplied with the following items :

A pair of calibrated platens, 4 sets of calibrated springs, 2 transparent masks, stress/strain curve charts (100 pcs), vernier caliper – steel 150 mm x 0.1 mm, field tripod, bench mounting, strong carrying case and all necessary tools.



SOIL TESTING

WS 8583 TO WS 8591/1 Test Instruments For Soil - Analysis Soil Penetrometers & Soil Density Tools

Soil Thermometer

For temperature measurement in soil.
The thermometer with a built-in glass thermometer has a sturdy metal holder with a strong insertion tip at the lower pole part. A defect glass thermometer is easy to change. Two handles at each side (screwed) optimise easy handling. In order to penetrate harder or thicker soils.
Measuring range : - 30 °C to + 50 °C
Penetration depth : 300 mm maximum

WS 8583

Thermometer with frame

WS 8583/1

Replacement thermometer

WS 8584

Digital display thermometer with thermocouple type K (NiCr - Ni)
Measuring range : - 100 °C to 800 °C
Accuracy : ± 1 °C (from - 20 °C to 180 °C)
Diameter of probe : 8 mm
Length of probe : 500 resp. 1000 mm
Inc. probe of 500 mm length

WS 8585

Digital display thermometer with thermocouple type K (NiCr - Ni)
Measuring range : - 100 °C to 800 °C
Accuracy : ± 1 °C (from - 20 °C to 180 °C)
Diameter of probe : 8 mm
Length of probe : 500 resp. 1000 mm
Inc. probe of 1000 mm length

WS 8586

DIMENSI De-Aeration Water Apparatus.

This apparatus consists of a 20 litres capacity clear water container.
Build-in with spray nozzle, vacuum and water outlet.
Assembled on a metallic support wall mounted. Weight 7.2 kg.
Dimensions : 500 x 450 x 360 mm. The purpose of this apparatus is to remove the dissolved air from the water.

WS 8587

Pressure Gauge
Brand : Badotherm, Holland
Diameter : 2 1/2"

WS 8588

High Speep Direct Coupled Slide Vane Vacuum Pump
Brand : China
Pumping Speed : 1 litre/second
Rotating Speed : 1,400 rpm
Power Required : 0.25 kW/1/3 hP

WS 8589 DIMENSI Pocket Soil Penetrometer

The purpose is for used as a simple tool to assist the engineers in the field exploration and in checking and comparing similar types of soil, but it cannot apply to obtain foundation design data.
This pocket type is used in the field for classifying cohesive soils in terms of consistency and estimation of approx. unconfined compressive strength and shear strength. In the operation, the stainless steel cylindrical tip of 0.32 cm² area is pushed into the soil in order to penetrate upto 6 mm marked point. A cursor on the scale reads directly unconfined compressive strength in kg/cm².

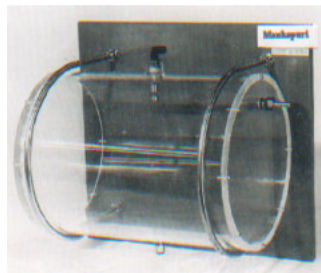
WS 8590 DIMENSI Proctor Penetrometer, Spring Type

The purpose is for used in the field for controlling soil compaction by initial calibration from laboratory tests for moisture density relationship. Consists of a barrel housing a spring. A piston compresses the spring and the piston rod is calibrated upto 40 kg in 1 kg divisions. Two penetration stems which is able to be attached to the other end of the spring barrel, one at a time, to suit the needle point which is been used and graduated in 1.25 cm divisions. Supplied with eight needles of 6.0, 5.0, 3.0, 2.0, 1.5, 1.0, 0.5 and 0.25 cm² area. In wooden box.

WS 8591 DIMENSI Proctor Penetrometer, Hydraulic Type

Same as WS 8590 except it operate with hydraulic system to record load. Calibrated up to 75 kg x 2 kg divisions. Supplied with 8 needles, complete with wooden case.

WS 8591/1 Spares set of 8 needles.



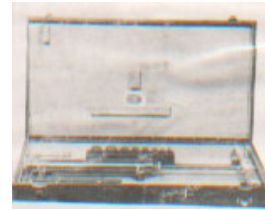
SOIL TESTING

WS 8592 TO WS 8617 Plate Bearing Test & Relative Density Apparatus

Plate Bearing Test

This test is for the performance and determination of bearing capacity of soils to allow settlement under the static loads at shallow foundation.

This test is performed at the bottom of a pit excavated to the pre-determined foundation level or at any other surface levelled for this purpose. Then the load is applied to a bearing plate of approx. size through a hydraulic jack, in increment of five or more until the load intensity on the plate is approx. 3 times the designed bearing pressure of the prototype foundation.



WS 8592 DIMENSI Plate Load Test Apparatus

The apparatus comes with:

- Hydraulic-jack of 500kN(50,000kgf) capacity and supplied complete with hand operated pumping unit with 150 mm dia. pressure gauge and one 5 metre long metal connecting pipe with adaptor. (1 set)
- Ball and socket assembly. (1 set)
- Set of MS plates with the following dimensions. (600x600x25mm – 1 no), (450x450x25mm – 1 no) and (300x300x25mm – 1 no).
- "L" bracket for Dial Gauge – 4 nos
- Connecting pipe set of 600mm long(1no) and 300mm long (2 nos) extensions with nuts and bolts.



Accessories

WS 8593 DIMENSI Bridge support (Datum bar) of welded steel angle, 5 metre span for positioning and fitting of the dial gauges. (2 sets)

WS 8594 DIMENSI MS plate 750x750x25mm thick.

WS 8595 DIMENSI MS plate 500x500x25mm thick

WS 8596 DIMENSI Load Truss 200 kN Capacity.

The load truss is used to provide necessary reaction for loading bearing plates in place of static load reaction in conducting the plate load tests.

Comes complete with:

WS 8597 DIMENSI Truss in two parts

WS 8598 DIMENSI Two joists

WS 8599 DIMENSI Eight anchors

WS 8600 DIMENSI Eight anchor straps with sixteen bolts

WS 8601 DIMENSI Six guy wires with turn buckles

WS 8602 DIMENSI Ninety anchor spikes

WS 8603 DIMENSI Eight joining bolts with nuts

WS 8604 DIMENSI Set of tools for assembly and set up



WS 8605 DIMENSI Load Truss 300 kN Capacity

Same as WS 8596 but is applied for higher reaction loading of up to 300 kN capacity

WS 8606 DIMENSI Load Truss 500 kN Capacity

Same as WS 8596 but is applied for higher reaction loading of up to 500 kN capacity.

WS 8607 DIMENSI Relative Density Apparatus

The apparatus is used for the determination of void ratio of cohesionless, free draining soils, in loosest and dens states.

The apparatus consists of :

WS 8607 DIMENSI vibrating table suitable on 3pH power supply with vibration deck size 750mm square and vibrating at the frequency of 3600 v/min at 115 kg load and amplitude variable from 0.05mm to 0.66mm.

WS 8608 DIMENSI Cylindrical unit weight mould of 3000 ml capacity

WS 8609 DIMENSI Guide sleeve with clamps for WS 8608.

WS 8610 DIMENSI Surcharge base plate with handle for WS 8608.

WS 8611 DIMENSI Cylindrical unit weight mould, 15000 ml capacity.

WS 8612 DIMENSI Guide sleeve with clamps for WS 8611.

WS 8613 DIMENSI Surcharge base plate with handle for WS 8611.

WS 8614 DIMENSI Metal calibration bar 75x300x3mm.

WS 8614/1 DIMENSI Dial Gauge holder and Dial gauge 50x0.01mm.

Accessories

WS 8615 DIMENSI Pouring Device 120mm dia. x 150mm long cylindrical with spout.

WS 8617 DIMENSI Pouring Device 250mm dia. x 150mm long cylindrical with spout.

