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CALIFORNIA BEARING RATIO

BE01

This is a 50kN digital machine driven by a stepper motor, tailored for laboratory CBR (California Bearing Ratio) testing. Its microprocessor-based electronics ensure precise speed control and a user-friendly interface. It offers two fixed speeds: 1.2 mm/min for BS standards and 1.27 mm/min for ASTM standards, along with a fast platen adjustment speed of 50 mm/min.

In simpler terms, it's a specialized lab device for testing soil strength, using a motor to control movement accurately. The built-in computer chip makes it easy to operate and maintains consistent speeds for different testing standards, with a quick adjustment option for the testing platform.

HILIGHT

1) **Precise Speed Control**: Stepper motor ensures accurate speed regulation.
2) **Microprocessor-Driven**: Advanced microprocessor for reliable operation.
3) **Large LED Display**: 20mm LED for clear, easy-to-read output.
4) **Dual Speed CBR**: Supports BS and ASTM standards.
5) **Fast Platen Adjustment**: 50mm/min for quick setup.
6) **Optional Data Logger**: Automatic data collection available at additional cost.

STANDARD FOLLOWING

IS: 9669, IS: 2720 (Part 16), EN 13286-47, ASTM D1883, AASHTO T193, BS 1377:4, 1924:2

BE 01-01

CALIFORNIA BEARING RATIO TEST APPARATUS, MOTORIZED, SINGLE SPEED

The equipment you're referring to has the same overall design and components as the BE 01-1 with the key difference being the material used for the mould assembly. Specifically, the mould, perforated base plate, and mould extension collar are made of Gun Metal instead of Mild Steel. The equipment operates at a one speed of 1.25 mm per minute.

CBR MACHINE WITH ACCESSORIES

BE 01-01	**Load Frame,** 50 kN (5000kgf) Capacity, Single Speed 1.25 mm per minute.
BE 01-02	**Steel Mould-**150 mm ID x 175 mm high
BE 01-03	**Steel Perforated Base Plate-**for BE 12001 Mould
BE 01-04	**Steel Extension Collar-**150 mm ID x 50 mm high
BE 01-05	**Penetration Piston,** 50 mm face die
BE 01-06	**Adjustable Bracket,** for Penetration Dial Gauge
BE 01-07	**Circular Metal Spacer Disc,** with detachable handle, 148 mm dia x 47.7 mm high
BE 01-08	**Annular Metal Weight,** 2.5 kg, 147 mm die with 53 mm dia central hole
BE 01-09	**Slotted Metal Weight,** 2.5 kg, 147 mm dia, with 53 mm dia slot
BE 01-10	**Perforated Plate,** 148 mm dia, with adjustable stem and lock nut
BE 01-11	**Aluminum Tripod,** for Dial Gauge
BE 01-12	**Cutting Collar**
BE 01-13	**Rammer,** 2.6 kg, 310 mm controlled drop
BE 01-14	**Rammer,** 4.9 kg, 450 mm controlled drop
BE 01-15	**Proving Ring,** Capacity 50 kN
BE 01-16	**Dial Gauge,** 25 mm travel, 0.01 mm least count

BE 01-02

LABORATORY CALIFORNIA BEARING RATIO TEST APPARATUS, MOTORISED,3 SPEED:-

The equipment you're referring to is almost identical to the BE 01-01 model in terms of its overall structure and components. However, there are a few key differences in the 3 Speed and as your order Manual type.

THE APPARATUS INDEX:-

BE 01-03

LABORATORY CALIFORNIA BEARING RATIO TEST APPARATUS, MOTORIZED, ELECTRONICS.

The equipment you're referring to is almost identical to the BE 01-01 model in terms of its overall structure and components. However, there are a few key differences in the Single Speed/3 Speed and include Load cell,LVDT,Digital Display.

CBR Test Electronic outfit for consists of:

BE 01-03-01

Channel Digital Indicators 1 No. Mode of Digital: The decimal Display point is positioned by display the channel selector switch Power: 220V ±10% mains, 50 Hz, Single Phase,

AC supply No. of channels: 2,

Parameter: By a selector switch display

BE 01-03-02 **LOAD CELL -** 1 No.

Capacity: 50 kN (5000 kgf), Compression Type with 3m long cable

Maximum: 110% of the rated capacity Overload

Sensing: Strain Gauges in full bridge configuration

BE 01-03-03 **LVDT-** 1 No.

With sufficient long cable 1 No.

Range: ±25 mm

Sensing element: LVDT

BE 01-05

BE 01-04

LABORATORY CALIFORNIA BEARING RATIO TEST APPARATUS, MOTORIZED, ELECTRONICS WITH SOFTWARE

The equipment you're referring to is almost identical to the BE 01-03 model in terms of its overall structure and components. However, there are a few key differences in the Single Speed/3 Speed.

IMPORTANT EXTRAS

BE 01-04-20 Data Acquisition system

BE 01-04-21 Software

LABORATORY CALIFORNIA BEARING RATIO TEST APPARATUS SERVO TYPE ELECTRONICS WITH SOFTWARE

The equipment you're referring to is almost identical to the BE 01-03 model in terms of its overall structure and components. However, there are a few key differences in the Single Speed/3 Speed and servo load type.

BALAJI ENTERPRISES

RELATIVE DENSITY APPARATUS

BE 02

The apparatus measures the relative density of cohesion less, free-draining soils, suitable for soils with up to 12% particles passing a No. 200 (75µm) sieve, which don't respond well to standard compaction tests. It uses vibratory compaction for maximum density and pouring for minimum density. The set includes a vibrating table.

STANDARD FOLLOWING

ASTM D4253, D4254.

IS 2720 (Part 14)

THE EQUIPMENT INCLUDES THE FOLLOWING PARTS

BE 02-01	VIBRATING TABLE	A steel table featuring a cushioned, vibrating steel platform, designed to operate at around 3,600 vibrations per minute when loaded with 115 kg. It is built to function on a 415 V, 50 Hz, three-phase AC power supply.
BE 02-01	Cylindrical Metal Unit Weight Mould	Cylindrical Mould of 3000 cm3 capacity complete with guide sleeves and clamp, assembly surcharge weight with base plate and handle is equivalent to 140 gm/cm2.
BE 02-02	Cylindrical Metal Unit Weight Mould	Cylindrical Mould of 15000 cm3 capacity complete with guide sleeves and clamp, assembly surcharge weight with base plate and handle is equivalent to 140 gm/cm2.
Be 02-03	Dial Gauge Holder	Dial Gauge holder
BE 02-04	Dial Gauge	Dial Gauge 0.01mm x 50mm with travel with extension piece
BE 02-05	Calibration bar	Calibration bar 75mm x 300mm x 3mm - 1 Set

SPEEDY MOISTURE METER

BE 03

The Speedy Moisture Meter is a device used to quickly measure the moisture content in materials like soil, sand, and other fine-grained substances with good accuracy, following standards IS:2720 (Part 2) and IS:12175. It works by mixing the sample with calcium carbide, which reacts with the water in the sample to produce acetylene gas. The amount of gas generated is proportional to the moisture present in the sample. This gas builds up pressure inside the device, which is measured by a built-in gauge. The gauge shows the moisture content as a percentage of the sample's wet weight. You can then use a formula to convert this reading to the moisture content based on the sample's dry weight.

STANDARD FOLLOWING

IS 2729 (PART 2)

ITS TWO TYPPE EQUIPMENT

BE 03 -01	
Range	0-25%
Gauge Division	0.5%
BE 03 -02	
Range	0-50%
Gauge Division	1%

BALAJI ENTERPRISE

INFRA RED MOISTURE METER

BE 04

This moisture meter is a portable device designed to quickly and accurately measure the moisture content in various materials. It uses a torsion wire mechanism where a calibrated drum applies torque to one end of the wire to counterbalance the weight loss as the sample dries under infrared radiation. This rapid drying process, taking about 30 minutes, combined with a frictionless balancing system, delivers results as precise as traditional oven drying methods. The simultaneous drying and weighing feature makes it ideal for materials that quickly reabsorb moisture after drying. A voltage regulator controls the infrared radiation for precise heat management, and an indicator lamp signals when the device is powered on.

The torsion balance includes a magnetic damper to minimize pan vibrations, enabling faster and more stable weighing. The balance scale (drum) displays moisture percentages on a wet weight basis, with graduations from 0 to 100% in 0.2% increments, and readings can be estimated to 0.1% accuracy. The unit comes equipped with an infrared lamp and an L-shaped thermometer and operates on a 220 V, 50 Hz, single-phase AC power supply.

STANDARD FOLLOWING

IS 2720 (PART 2)

DESCRIPTION

Capacity	5g apporx.
Sensitivity	10 mg apporx.
Range	0 to 100% moisture content a wet weight basis
Reading Accuracy	± 0.20%
Probable error	± 0.25% in the lower range up to compared to 25% and ± 1% for moisture contents.
Oven Method	Above 50 %

EXTRA ACCESSORIES

BE 04-01 - Infra Red Lamp
BE 04-02 - Thermometers (L-shaped)
BE 04-03 - Torsion Wire, pack of six

LIQUID LIMIT

BE 05

The liquid limit, which marks the moisture content where soil transitions from a plastic to a liquid state, is crucial for assessing the potential characteristics of soil material. It indicates the soil's shear strength when combined with water. The liquid limit can be measured using either the Casagrande Method or the Cone Penetrometer Method.

CASAGRANDA METHOD

The Casagrande Method is a widely accepted, standardized test in soil mechanics used to determine the liquid limit of soil. It ensures reliable and consistent results through its high-quality design and compliance with international standards. A motorized version with an integrated blow counter is also available for enhanced precision.

The Liquid Limit Device features a hard rubber base supporting a sliding carriage with a hinged brass cup. The cup is lifted and dropped from a height of 1 cm onto the rubber base using a lead screw located at the back of the carriage. The device comes complete with a Casagrande grooving tool and a gauge block (Type A, as per IS: 9259).

STANDARDS FOLLOWING

IS 2720 (part 5), IS: 9259.BS:1377-2, ASTM D4318, **AASHTO T89**

DESCRIPTION

BE 05-01	Liquid limit	Hand Operated
BE 05-02	**Grooving Tool**	A grooving tool is provided to create a standardized groove in the soil paste. This groove serves as a reference point to observe the soil's behavior as it transitions from plastic to liquid state.

MOTORIZED LIQUID LIMIT DEVICES

BE 05

HAND OPERATED LIQUID LIMIT DEVICES

BE 05-01

BALAJI ENTERPRISES

PLASTIC LIMIT

BE 06

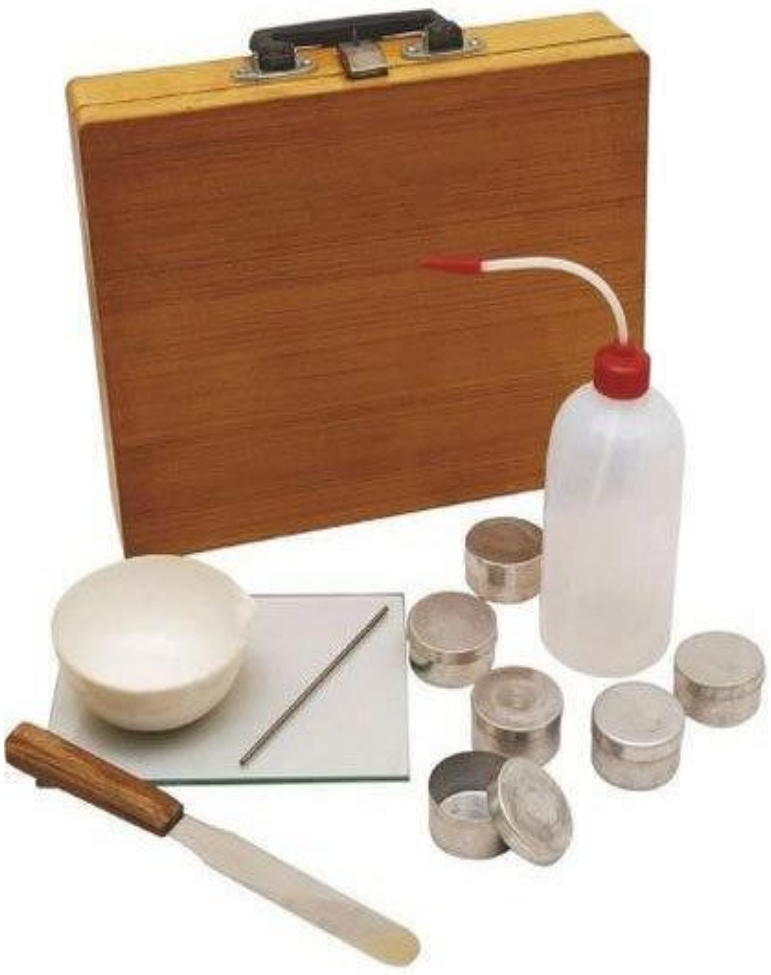
Plastic limit (PL) is the moisture content at which a fine-grained soil cannot be remolded without cracking. The plastic limit test requires repeated rolling of a soil sample into a thread until it reaches a point where it crumbles.
Plastic limit (PL) along with shrinkage limit (SL) and liquid limit (LL) comprise the Atterberg limits.
The PL is expressed as a percentage of the weight of the oven-dry soil, at the boundary of plastic and semi-solid consistency. It is the moisture content at which the rolled soil will begin to crumble when rolled into a thread 3mm or 1/8th inch in diameter.

STANDARD FOLLOWING

2720 (Part 5)-1985

DESCRIPTION

BE 06-01	Ground Glass Plate	The ground glass plate having 30 cm (12 in.) sides and is square in shape with a thickness of 1 cm
BE 06-02	Spatula or a Pill knife	Consists of a blade of about 2cm width and 10 to 13 cm long.
BE 06-03	A metallic rod	a diameter of 3.2mm and 100mm long.
BE 06-04	Containers	Moisture Containers



SRINKAGE LIMIT

BE 07

The **shrinkage limit test** is a method used to assess the behavior of cohesive soils as they lose moisture. The shrinkage limit is defined as the water content at which a reduction in moisture does not lead to a decrease in the volume of the soil mass. This property is crucial for understanding soil stability and behavior in various engineering applications.

STANDARD FOLLOWING

IS-2720 (PART-VII), EN ISO 17892 (PART 12), BS 1377 (P-2), ASTM D4318

DESCRIPTION

BE 07-01	Evaporating Disc	Porcelain Disc
BE 07-02	Prong Plate	75 mm x 75 mm, 3 mm thick
BE 07-03	Plain Plate	75 mm x 75 mm
BE 07-04	Spatula	Consists of a blade of about 2cm width and 10 to 13 cm long.
BE 07-05	Straight Edge	6 cm long
BE 07-06	Measuring cylindrical	capacity of 25 ml
BE 07-07	Brass cup/Shrinkage Disc	45 mm diameter and 15 mm in height
BE 07-08	Glass cup	50 to 55 mm in diameter and 25 mm in height
BE 07-08	Mercury	Its extra charges(not include to Equipment) (750 gm)

BALAJI ENTERPRISE

CONE PENTROMETER

BE 08

The liquid limit (LL) of soil is a key Atterberg limit that defines the moisture content at which soil transitions from a plastic to a liquid state. Two primary methods are used for its determination: the Casagrande method (percussion cup method) and the Cone Penetrometer method (also known as the Fall Cone test). In the Casagrande method, a soil pat in a cup is grooved, and the number of blows (typically 25) required for the groove to close over 12 mm is measured to plot against moisture content. In contrast, the Cone Penetrometer method involves dropping a standardized cone (e.g., 80 g mass, 30° angle) onto a soil sample for 5 seconds and measuring the penetration depth (typically 20 mm for LL).

Ease of Performance

Dependence on Apparatus and Operator

Applicability to Soil Types

Repeatability and Consistency

Time and Effort

Shear Strength Basis

STANDARD FOLLOWING

IS 2720 (Part 5) BS:1377

DESCRIPTION

BE 08-01	Universal Type	Operated For Automatically
BE 08-02	Penetration Cone	cone has a tip angle of **60 degrees** and a base area of 10 cm^2
BE 08-03	Penetration Cup	55 mm dia x 40 mm deep

PYCNOMETER

BE 09

The pycnometer method is a precise laboratory technique used to measure the specific gravity (also known as relative density) of solids, liquids, or powders. Specific gravity is defined as the ratio of the density of the substance to the density of water at a specified temperature (typically 4°C or room temperature, around 20–27°C). A pycnometer, also called a specific gravity bottle, is a flask with a ground-glass stopper that has a small capillary hole, allowing it to hold a known, precise volume of liquid or material. This method is widely used in fields like soil mechanics, chemical engineering, and materials.

STANDARD FOLLOWING

IS 2386 (Part 3), ASTM D854, AASHTO T100,BS 137

DESCRIPTION

BE 09-01	PYCNOMETER 250 ML
BE 09-02	PYCNOMETER 500 ML
BE 09-03	PYCNOMETER 1000 ML

BALAJI ENTERPRISES

UNCONFINED COMPRESSION

BE 10

Unconfined Compressive Strength (UCS) stands for the maximum axial compressive stress that a cohesive soil specimen can bear under zero confining stress. Unconfined compression test is one of the fastest and cheapest methods of measuring shear strength of clayey soil.

Unconfined Compressive Strength (UCS) is the load per unit area at which an unconfined cylindrical specimen of soil will fail in the axial compression test. If the axial compression force per unit area has not reached a maximum value even at 20 percent axial strain, the UCS shall be taken as the value obtained at 20 percent axial strain.

BE 10-02

STANDARD FOLLOWING

IS 2720 (Part 10), AASHTO T208

DESCRIPTION

BE 10-01	MANUAL TYPE
BE 10-02	DIGITAL TYPE WITH SOFTWARE
BE 10-03	SPLIT MOULD
BE 10-04	UNCONFINED ATTACHMENT
BE 10-05	Different Size cutter
BE 10-06	PROVING RING 25 KN
BE 10-07	DIAL GAUGE 25 MM
BE 10-08	LOAD CELL 25 KN
BE 10-09	LVDT 25 MM

The Instrument you're referring to has the same overall design and components as the BE 10-01 & BE 10-02 with the key difference being manual type include Proving Ring, Dial gauge and 2nd type Digital with software and used to load cell, LVDT.Also Available Single Speed and Three Speed.

BE 10-01

TRIAXIAL CELLS

BE 11

The triaxial shear strength test is a widely used method to determine the mechanical properties of soil and rock samples. This test applies stress in different directions, allowing for the measurement of properties such as shear resistance, cohesion, and dilatancy stress. It involves subjecting a cylindrical core specimen to confining pressures on all sides to evaluate its shear strength.

STANDARD FOLLOWING

IS 2720 (Part 11) and (Part 12)

Triaxial Cell for Soil Testing (38mm and 50mm Diameter Specimens)

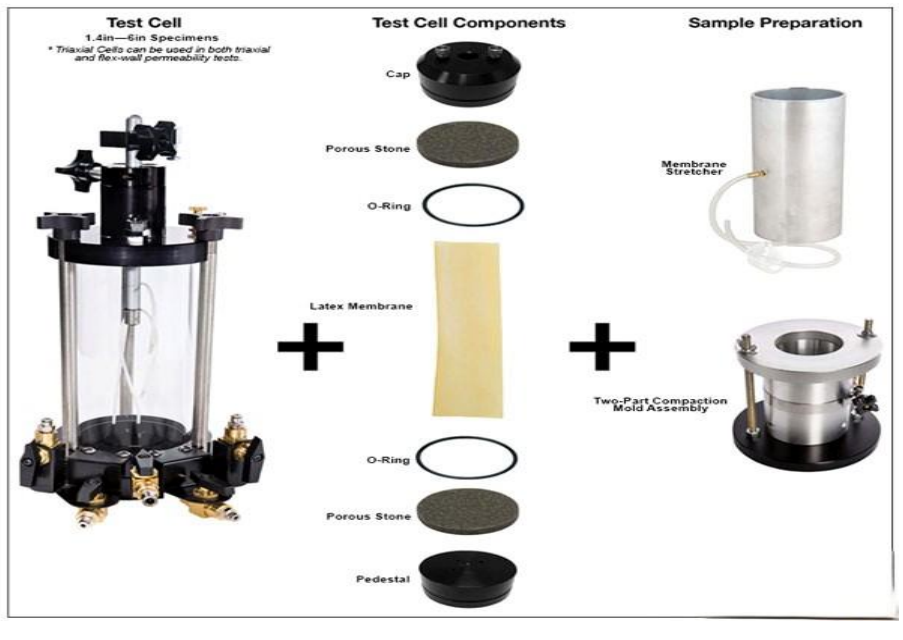
Specimen Sizes: Designed for cylindrical soil specimens of 38 mm diameter × 76 mm length (aspect ratio 1:2) and 50 mm diameter × 100 mm length (aspect ratio 1:2), compliant with standards like IS:2720 (Part XII).

Chamber Construction: Made from Perspex (acrylic plastic) for transparency, allowing visual observation during testing. Includes an anvil (base pedestal) and a loading plunger (top cap) for applying axial load

Design Features:

Easily disassembled by releasing four tie rods for quick specimen access.

Leak proof sealing up to 10 bar (approximately 10 kg/cm² or 145 psi) fluid pressure, ensuring reliable confining pressure application.



DESCRIPTION

BE 11-01	Manual type Load frame
BE 11-02	Digital type with Software
BE 11-03	Perspex loading pads (38 mm and 50 mm dia.)
BE 11-04	Pair of plain Perspex discs (38 mm and 50 mm dia. × 6 mm thick)
BE 11-05	Porous stones (38 mm and 50 mm dia. × 6 mm thick) for drainage
BE 11-06	Split sand former and sheath stretcher for sample preparation (38 mm and 50 mm)
BE 11-07	Pore Pressure Apparatus: Includes a null indicator, mercury manometer, and volume change burette
BE 11-08	Proving Ring 50 kn
BE 11-09	Dial Gauge 25 mm
BE 11-10	Load Cell 50 kn
BE 11-11	LVDT 25 mm
BE 11-12	Constant Pressure System: Air or oil-based for maintaining confining pressure (up to 10 bar)
BE 11-13	Foot Pump
BE 11-14	Water Tank Assembly

BE 11-01

BE 11-02

This Equipment same as a BE 11-01 Only Change is Load Cell,LVDT and Digital Indicator.

BE 11-12

Constant Pressure System: Air or oil-based for maintaining confining pressure (up to 10 bar)

DIRECT SHEAR

BE 12

A direct shear test is a geotechnical laboratory procedure to measure the shear strength of soil by applying a normal load to a soil sample and then shearing it horizontally across a predetermined plane until failure. The test determines the soil's cohesion (C) and angle of internal friction (Ø), which are critical parameters for designing structures like foundations and retaining walls. The soil sample is contained in a two-part shear box, and the upper half is moved horizontally relative to the fixed lower half, while the shear force and horizontal displacement are measured until the sample fails.

STANDARD FOLLOWING

Ref. Standards IS:11229, 2720 (Part 13)

DESCRIPTION

Type of Shear - Direct/Residual measurement

Operation - Motorized

Rates of Strain – A - 1.25, 0.625, 0.25, 0.125, 0.05, 0.025,

(mm/min) B - 0.01, 0.005, 0.002, 0.001, 0.0004, 0.0002

Specimen Size - 60 x 60 x 25mm

Power - 220 V, 50 Hz, Single Phase, AC supply

BE 12-01	Manual type Direct Shear
BE 12-02	Digital with Software type Direct Shear
BE 12-03	Shear Box Assembly
BE 12-04	Halves of the Shear Box
BE 12-05	Plane Gripper Plate
BE 12-06	Perforated Gripper Plate
BE 12-07	Porous Stone
BE 12-08	Top Loading Pad
BE 12-09	Base Plate
BE 12-10	Shear Box Housing, with two Ball Roller Strips
BE 12-11	Specimen Cutter
BE 12-12	Surcharge Weights to attain Normal Stress of 3 kg/cm² 0.05 kg/cm² 4 Nos. 0.10 kg/cm² 1 No. 0.20 kg/cm² 1 No. 0.50 kg/cm² 3 Nos. 1.00 kg/cm²
BE 12-13	Tension- Compression Proving Ring, 25 kN (25000 kgf) capacity
BE 12-14	Dial Gauge - 25 mm (2 Nos.)
BE 12-15	Load Cell 25 kn
BE 12-16	LVDT – 25 mm (2 Nos)
BE 12-17	Digital Indicator

BE 12-01

BE 12-02

It’s Machine same as a BE 12-01 only some difference Digitalization with Software and include Load Cell, LVDT.

CONSOLIDATION

BE 13

Clay soils, which are common in many regions, can pose significant challenges for construction due to a process called **consolidation**. This occurs when the soil's volume decreases over time as water is squeezed out of the tiny voids (pores) between soil particles under the weight of a structure, like a building or road. The process is gradual and time-dependent, often taking weeks, months, or even years to fully develop. If not accounted for in design, consolidation can lead to uneven settling of the ground, causing cracks in walls, floors, and foundations, or even structural failures. For example, buildings on thick clay layers may tilt or develop wide fissures if the soil compresses more on one side than the other.

Engineers use lab tests to predict and mitigate these issues. The key tool is the **one-dimensional consolidation test** (also known as the odometer test), performed on undisturbed soil samples from the site. This test simulates how the soil will behave under sustained loads, helping calculate expected settlement (how much the ground will sink) for safe foundation design. By understanding the soil's "history"—like whether it's been previously loaded by natural deposits—engineers can estimate both the total amount of settlement and how quickly it will happen.

The outfit is also available as Single gang, Three-gang or Six-gang in which three /
Six consolidometers are mounted on a single frame. The consolidation May be measured by the conventional dial gauges or using the LVDT to Digital Display.

STANDARD FOLLOWING

IS 2720 (Part 15), IS 12287, BS 1377, ASTM D2435

DESCRIPTION

BE 13-01-A/B	Consolidation Cell Assembly Manual/Digital	Single gang
BE 13-02-A/B	Consolidation Cell Assembly Manual/Digital	3 gang Assembly
BE 13-03-A/B	Consolidation Cell Assembly Manual/Digital	6 gang Assembly
BE 13-04	Fixed ring with Guide ring	Single, Three and Six Assembly Set
BE 13-05	Top Porous stone	Single, Three and Six Assembly
BE 13-06	Bottom Porous stone	Single, Three and Six Assembly
BE 13-07	Channeled base with water inlet	Single, Three and Six Assembly
BE 13-08	Gasket	Single, Three and Six Assembly
BE 13-09	Water Jacket	Single, Three and Six Assembly
BE 13-10	Set of weights: 7 x 0.05 kg/cm² 5 x 0.1 kg/cm², 6 x 0.2 kg/cm², 6 x 0.5 kg/cm², 5 x 1.0 kg/cm²	Single, Three and six assembly
BE 13-11	Water Reservoir with plastic tube, T - connection and a pinch cock	Single, Three and Six Assembly
BE 13-12	Dial Gauge, 5 mm travel, 0.002 mm least count	Single, Three and Six Assembly
BE 13-13	Digital Display	Single,Three,Six Channel
BE 13-14	Displacement sensor, 0-10 mm complete with 3 m long cable (side entry) mounting bracket	Single – 1 Nos Three – 3 Nos Six – 6 Nos
BE 13-15	Software	Single, Three or Six Channel Need One Software all of us

NOTE:- A & B Means A Series Model no. like this Manual & B Series Model no. Digital. Single gang, Three gang and Six gang equipment manual or digital frame are same only minor differences like this Dial gauge,LVDT and Digital display with Software as per order.

MOULD ASSEMBLAY

BE 13-01-A & 13-02-A

BE 13-02-B

BE 13-01-A

BE 14-08	Drainage Cap	with recess for a Porous Stone and fitted with Inlet Valve and Air Release Valve
BE 14-09	Dummy Plate	to serve as False Bottom during compaction
BE 14-10	Porous Stone	for Drainage Base Plate
BE 14-11	Porous Stone	for Drainage Cap
BE 14-12	Rubber Connection Tube	3 m long, with Pinch Cock
BE 14-13	Overhead Tank	made of steel, approx. 37.5 cm dia and1 m high. It is provided with an inlet port at the top, six outlets at the bottom with cocks, air inlet and water filling tube at the top. An arrangement is provided to indicate the water level
BE 14-14	Rammer	2.6 kg X 310 mm controlled fall
BE 14-15	Rammer	4.9 kg X 450 mm controlled fall
BE 14-16	Rubber Pipe	For Connecting to Constant or Falling head

SOIL PERMEABILITY

BE 14

Permeability refers to a soil's ability to allow water to flow through its interconnected voids. This property is critical in engineering because it influences how quickly saturated, compressible soil layers settle and how much water an aquifer can supply. Permeability is considered in various applications, such as pumping groundwater, spacing well points for dewatering excavation sites, designing reservoirs and dams, and selecting soils for different parts of embankments in dams and reservoirs.

The coefficient of permeability can be estimated using factors like the effective diameter of soil particles, porosity, specific surface area, or data from consolidation tests. However, since permeability depends on many variables, direct measurement in a laboratory using a device called a Permeameter is considered more reliable. Permeameters test small soil samples, require less time, and provide accurate results.

There are two main types of Permeameters: Constant Head Permeameters and Falling Head Permeameters. Constant Head Permeameters are used for coarse-grained, cohesion less soils, while Falling Head Permeameters are suitable for fine-grained soils (either remolded or undisturbed) with a coefficient of permeability less than 10^{-2} cm/sec.

STANDARD FOLLOWING

IS 2720 (Part 17), IS 11209

MOULD ASSEMBALY

BE 14-01-02

DESCRIPTION

BE 14-01	Constant Head	used for coarse-grained, cohesion less soils
BE 14-02	Falling Head	suitable for fine-grained soils (either remolded or undisturbed) with a coefficient of permeability less than 10^{-2} cm/sec.
BE 14-03	Stand	with three glass tubes of 6 mm, 10 mm and 20 mm dia approx.
BE 14-04	Metallic Mould	100 mm dia x 127.3 mm height, 1,000 ml volume
BE 14-05	Extension Collar	100 mm dia x 60 mm height
BE 14-06	Drainage Base Plate	with a recess for Porous Stone and an Outlet Valve
BE 14-07	Metallic Clamping Ring	Used for Mould Fixed

BE 15-08	Load Transfer Bar	
BE 15-09	Steel Ball	
BE 15-10	Soaking Tank	250 mm dia x 210 mm high

SWELL PRESSURE

BE 15

It sounds like you're describing a **swell pressure test apparatus** used in geotechnical engineering to measure the swelling pressure of expansive soils. This device determines the pressure exerted by a soil specimen when it swells upon water saturation, which is critical for designing foundations on expansive soils. Below is a concise explanation based on your description.

The apparatus is designed to measure the swelling pressure of soil specimens molded to a specific density and moisture content. When the specimen is soaked in water within a soaking tank, it tends to swell. The load required to restrain this swelling is transferred through a perforated swell plate and a load transfer bar to a proving ring, which measures the force. The proving ring is connected to a hand-operated load frame's lead screw, allowing precise application and measurement of the restraining load.

STANDARD FOLLOWING

IS 2720 (Part 41) 1977 and IS 11550 (1985)

DESCRIPTION

BE 15-01	Load Frame, Hand operated	Capacity 50 kN (5,000kgf)
BE 15-02	Mould	100 mm dia x 127.3 mm height (1,000 ml volume) with base plate and collar
BE 15-03	Proving Ring	with integral boss, high sensitivity 2.5 kN (250 kgf) capacity
BE 15-04	Dial Gauge	25 mm travel, 0.01 mm least count
BE 15-05	Perforated Swell Plate	100 mm dia x 16 mm thick
BE 15-06	Spacer	100 mm dia x 12.7 mm thick
BE 15-07	Pair of Porous Stones	100 mm dia x 12.7 mm thick

SAND REPLACEMENT METHOD

SAND POURING CYLILENDER

BE 16

The apparatus described is used for the sand replacement method (also known as the sand cone test), a common field test to determine the in-situ dry density of compact, fine, and medium-grained soils in layers up to 50 cm thick. Here's a concise explanation of the process and apparatus.

They are Two type Cylinder, Small Type and Large Type

STANDARD FOLLOWING

IS 2720 (Part 28), BS 1377-9

DESCRIPTION

BE 16-01-A	Sand Pouring cylinder	fitted with Conical Funnel and Shutter, capacity 3 litre
BE 16-01-B	Cylindrical calibration Container	100 mm ID x 150 mm height
BE 16-01-C	Metal Tray	size 30 x 30 x 4 cm, with 10 cm central hole
BE 16-02-A	Large sand Pouring Cylinder	fitted with Conical Funnel and Shutter, capacity 16.5 litre
BE 16-02-B	Cylindrical Calibration Container	Internal diameter 200 mm and internal depth
BE 16-02-C	Metal Tray	45 cm square and 5 cm deep with hole

BE 16-01-A (SMALL SAND POURING)

BE 16-02-A (LARGE SAND POURING)

CORE CUTTER

BE 17

The core cutter method is a standard field test used to determine the in-situ density and moisture content of soil, particularly cohesive soils like clay or silt. Here's a concise explanation of the process you described.

STANDARD FOLLOWING

IS 2720 (Part 29)

DESCRIPTION

BE 17-01	Cylindrical Core Cutter	made of steel,100 mm dia x 130 mm long
BE 17-02	Steel Dolly	25 mm high and 100 mm dia, fitted with a lip, to enable it to be located on top of the Core-Cutter
BE 17-03	Rammer	with Steel Rod
OPETIONAL ACCESERIES		
BE 17 -04	Cylindrical Core Cutter	100 mm dia x 175 mm long
BE 17 -05	Cylindrical Core Cutter	100 mm dia x 250 mm long
BE 17 -06	Cylindrical Core Cutter	150 mm dia x 300 mm long

PROCTOR PENETROMETER

BE 18

You're describing a penetrometer, an instrument commonly used to measure the hardness or consistency of materials, such as soil, asphalt, or food products like fruits or cheese. The details you provided suggest a specific type of penetrometer, likely a cone penetrometer or needle penetrometer, used for determining the penetration resistance of a material. Here's a breakdown of the instrument based on your description

STANDARD FOLLOWING

ASTM D 1558

DESCRIPTION

BE 18-1	Needle Point Set	comprising one each of 0.25, 0.5, 1, 1.5, 2, 3.5cross sectional area and 6 cm^2, and a Tommy Pin Complete as above in a carrying case

PROCTOR COMPACTION

BE 19

Soil compaction is critical for constructing stable earth structures like dams, reservoirs, canal embankments, highways, railways, and runways. The relationship between soil moisture content and compacted dry density is key for establishing construction specifications and ensuring quality control of earth fill. When designing earth or earth-retaining structures, soil strength and deformation behavior are assessed by testing specimens compacted to the target density expected in the field. Quality control during construction involves verifying that the compacted soil's density meets the required standards, ensuring adequate strength.

The Two type compaction set available for one type Standard compaction and second type Modified, both are same only difference to the size.

STANDARD FOLLOWING

IS 2720 (Part 7), IS 2720 (Part 8), IS 9198, ASTM D 698, D 1557

DESCRIPTION

BE 19-01-A	Compaction Test Apparatus	100 mm ID, 127.3 mm height 1,000 ml volume
BE 19-01-B	light compaction test	2.6 kg x 310 mm fall
BE 19-01-C	heavy compaction test	4.9 kg x 450 mm fall
BE 19-02-A	Compaction Test Apparatus	150 mm ID, 127.3 mm height 2,250 ml volume

LIGHT COMPACTION BE 19-01-A

MODIFIED COMPACTION BE 19-02-B

UNIVERSAL AUTOMATIC COMPACTOR

BE 20

The described motor-driven mechanical compactor is a specialized piece of equipment designed for soil compaction testing in laboratories, offering significant improvements over manual methods. Used for compaction and penetration tests, including California Bearing Ratio (CBR) tests, in soil testing laboratories. Electrically operated, eliminating the labor-intensive hand compaction process, saving time. Motor-driven, with a rammer that travels across a 100 mm or 150 mm diameter mould. The mould rotates in equal steps on a stable base for uniform compaction. Circular-faced, 50 mm diameter. Adjustable weight: 2.6 kg or 4.9 kg.Adjustable to 310 mm or 450 mm.Number of blows per layer can be preset at the start of the test. Operates on 220V, 50 Hz, single-phase AC supply. This equipment enhances efficiency and consistency in soil compaction testing, making it suitable for standard laboratory procedures, including CBR tests. If you need further details.

STANDARD FOLLOWING

IS 2720 (Part 7 and 8), ASTM D558, D559, D560, D698, D1557; AASHTO T99, T134, T135, T136, T180

VANE SHEAR APPARATUS MOTORIZED

BE 21

A **vane shears test apparatus**, commonly used to measure the shear strength of soft, cohesive soils (like clays) in geotechnical engineering. Here's a concise breakdown of its components and operation. The main component that applies torque to the vane, adjustable in height. Allows precise height adjustment to lower the vane into the soil specimen. A cross-shaped blade inserted into the soil to measure shear resistance. Drives the rotation of the vane by turning a calibrated torsion spring. The spring connects to the vane shaft, and its deformation measures torque. The shaft links to a resettable pointer. The pointer moves on a dial graduated in degrees, showing the angle of torque. The torque is calculated by multiplying the dial reading by the spring factor (a constant specific to the spring). The vane is lowered into the soil, rotated by the motor, and the torque required to shear the soil is measured via the spring's deformation, indicated on the dial. The torque value (in units like Nm or kNm) is obtained by multiplying the dial reading (in degrees) by the spring factor. Rate of rotation : 1/60 rpm operates on 220, 50 Hz, Single Phase, AC supply. Supplied complete.

STANDARD FOLLOWING

IS 4434 (1978),IS 2720 (Part 30)

DESCRIPTION

BE 21-01	Container	For Sample
BE 21-02	Set of 4 Springs	each of capacity 2 kg-cm,4 kg-cm, 6 kg-cm and 8 kg-cm

SIEVE ANALYSIS & MOTORISED SIEVE SHAKER

BE 22

The description outlines the importance of soil particle size analysis in engineering, aiding in applications like frost action assessment, filter design, grouting material selection, and concrete mix design. Coarse soils (gravel and sand) are analyzed using sieving, while finer soils require sedimentation procedures. For mixed soils, both methods are combined. BALAJI offers equipment for these analyses, though specific equipment details are not provided.

If you need information on BALAJI's equipment range, their suitability for specific tests, or further details on sieving/sedimentation procedures, please clarify or provide additional context. I can also search for real-time information on BALAJI's offerings if needed.

STANDARD FOLLOWING

IS 2720 (Part 4), ASTM D 422, AASHTO T 88, BS 1377

DESCRIPTION

BE 22-01	Sieves,	GI Frame of 450 mm diameter
BE 22-02	Sieves,	GI Frame of 300 mm diameter
BE 22-03	Sieves,	Brass Frame of 200 mm diameter
BE 22-04	Sieve Shaker	Single type
BE 22-04-1	Sieve Shaker	Universal type (200,300,450 mm)

GI SIEVE SIZE FOR 300 MM & 450 MM

SIZE IN MM	BE 22-01 (450 MM)	BE 22-02 (300 MM)
125	BE 22-01-A	BE 22-02-A
106	BE 22-01-B	BE 22-02-B
90	BE 22-01-C	BE 22-02-C
75	BE 22-01-D	BE 22-02-D
63	BE 22-01-E	BE 22-02-E
53	BE 22-01-F	BE 22-02-F
45	BE 22-01-G	BE 22-02-G
37.5	BE 22-01-H	BE 22-02-H
31.5	BE 22-01-I	BE 22-02-I
26.5	BE 22-01-J	BE 22-02-J
22.4	BE 22-01-K	BE 22-02-K
19	BE 22-01-L	BE 22-02-L
16	BE 22-01-M	BE 22-02-M
13.2	BE 22-01-N	BE 22-02-N
11.2	BE 22-01-O	BE 22-02-O
9.5	BE 22-01-P	BE 22-02-P
8.0	BE 22-01-Q	BE 22-02-Q
6.3	BE 22-01-R	BE 22-02-R
5.0	BE 22-01-S	BE 22-02-S
4.75	BE 22-01-T	BE 22-02-T
Pan & Cover	BE 22-01-U	BE 22-02-U

SIEVE SHAKER

BE 22-04/22-04-1

Electrically operated mechanical Sieve Shakers streamline dry sieving, offering a standardized, efficient process that minimizes errors compared to manual sieving. With over 40 years of design improvements, these shakers are compact, lightweight, and bench-mountable, eliminating the need for a concrete foundation. They feature reduced noise levels and a digital timer adjustable from 0-99 minutes. Widely used in industries like soil testing, ores, refractories, aggregates, pigments, coal, cement, roofing materials, plastics, and pharmaceuticals, they can handle up to 8 sieves. Powered by a ½ HP geared motor, the shaker combines gyratory and tapping motions, with the table inclined from the vertical axis and direction changing clockwise. They operate on 220 V, single-phase AC.

Its shaker's two types, one type is single size fixed sieve and second type universal type means 200,300,450 mm fixed sieve.

BRASS SIEVE SIZE FOR 200 MM

BRASS SIEVE SIZE	BE 22-03 (200 MM)
5.60 MM	BE 22-03-A
4.75 MM	BE 22-03-B
4.0 MM	BE 22-03-C
3.35 MM	BE 22-03-D
2.80 MM	BE 22-03-E
2.36 MM	BE 22-03-F
2.0 MM	BE 22-03-G
1.70 MM	BE 22-03-H
1.40 MM	BE 22-03-I
1.18 MM	BE 22-03-J
1.0 MM	BE 22-03-K
850 micron	BE 22-03-L
710 micron	BE 22-03-M
600 micron	BE 22-03-N
500 micron	BE 22-03-O
425 micron	BE 22-03-P
355 micron	BE 22-03-Q
300 micron	BE 22-03-R
250 micron	BE 22-03-S
212 micron	BE 22-03-T
180 micron	BE 22-03-U
150 micron	BE 22-03-V
125 micron	BE 22-03-W
106 micron	BE 22-03-X
90 micron	BE 22-03-Y
75 micron	BE 22-03-Z
63 micron	BE 22-03-AA
53 micron	BE 22-03-AB
45 micron	BE 22-03-AC
38 micron	BE 22-03-AD
PAN & COVER	BE 22-03-AE

HYDROMETER

BE 23

A hydrometer is an instrument used to measure the density or specific gravity of liquids base on the principle of buoyancy. It typically consists of a sealed glass tube with a weighted bottom that floats in the liquid being measured. Hydrometers are commonly used in various applications, including brewing, winemaking, and measuring salinity in aquariums. to use a hydrometer, you simply place it in the liquid, and the level at which it floats indicated the specific gravity or density of the liquid.

STANDARD FOLLOWING

ASTM D422, AASHTO T88, IS 2720 (Part-IV)

DESCRIPTION

Range - 0.995 to 1.030 g/ml
Division - 0.001
Shipping weight - 500 Grams

BE 24-03	High Pressure Flexible Metallic Hose	5 m long
BE 24-04	Ball and Socket Arrangement	consisting of two steel plates, with one steel ball in-between the plates
BE 24-05	Extension Rod	12 mm dia x 25 cm long, for taking Dial Gauge readings
BE 24-06	Magnetic base	with female thread on top, for holding extension rod
BE 24-07	Top End Plate	50 mm dia with male thread, for fitting on to the Extension Rods and positioning the Dial Gauge Plunger
BE 24-08	Column	15 cm dia x 25 cm long, with flanges, complete with four bolts and nuts
BE 24-09	Column	15 cm dia x 50 cm long, with flanges, complete with four bolts and nuts
BE 24-10	BE 15708 Datum Bar	light weight, portable, total span 5 m,height approx. 30 cm, mounted on two removable legs. (It is made in two parts. Provision exists for Datum Bar of 2.5 m span to be used. A spare leg is provided for the purpose. Complete with two quick release clamps for Positioning and holding the dial gauge brackets)
BE 24-11	Dial Gauge	25 mm travel, 0.01 mm least count Four
BE 24-12	Anchor Spike	for plate bearing test apparatus
BE 24-13	Quick Release Clamp	for positioning dial gauge bracket
BE 24-14	Grooved MS Plate	30 cm x 30 cm square x 25 mm thick
BE 24-15	Grooved MS Plate	45 cm x 45 cm square x 25 mm thick
BE 24-16	Grooved MS Plate	60 cm x 60 cm square x 25 mm thick
BE 24-17	Grooved MS Plate	75 cm x 75 cm square x 25 mm thick
BE 24-18	Plain MS Plate	30 cm x 30 cm square x 25 mm thick
BE 24-19	Plain MS Plate	45 cm x 45 cm square x 25 mm thick
BE 24-20	Plain MS Plate	60 cm x 60 cm square x 25 mm thick
BE 24-21	Plain MS Plate,	75 cm x 75 cm square x 25 mm thick

PLATE LOAD TEST

BE 24

A Plate Load Test Apparatus this test is carried out to determine the bearing capacity of the ground on Road Structures, Road foundations, Road Infrastructures, Bridge, Airport and Highway Pavements. The plate bearing test is essentially a model test of foundations which projects the stress and strain characteristics for evaluating the ultimate bearing capacity of foundations. This technique is a standard one for estimating the bearing value of soil in-situ. The results of other methods are always compared with the values obtained by the plate load test. In this method, a steel plate of a certain dimension is subjected to gradually increasing loads and the corresponding settlement is noted. The ultimate bearing capacity is taken as the load at which the plate starts sinking continuously at a rapid rate.

STANDARD FOLLOWING

IS 1888-1982, ASTM D1194, ASTM D1195

DESCRIPTION

BE 24-01	Hand Operated Hydraulic Jack	Capacity 500 kN (50,000 kgf)
BE 24-02	Hydraulic Hand Operated Pump	with 200 mm Dia Load Gauge capacity 500 kN (50,000 kgf)

DYNAMIC CONE PENTROMETER

BE 25

The Dynamic Cone Penetrometer (DCP) is a portable tool for rapidly measuring the in-situ structural properties of unbound road pavement layers. It consists of an 8 kg weight dropping 575 mm onto a 20 mm diameter cone attached to a shaft, allowing penetration measurements up to approximately 850 mm deep. Readings are taken after a set number of blows, adjusted based on layer strength: 5–10 blows for strong granular bases, and 1–2 blows for weaker sub-base layers or sub grades. The test requires three operators—one to hold the device vertically, one to operate the hammer, and one to record results. It's quick, taking only a few minutes, and efficiently identifies layer boundaries and thicknesses without excavation.

STANDARD FOLLOWING

ASTM D6951, IRC SP 72

DESCRIPTION

BE 25-01	Cone	diameter: 20 mm ± 0.1 mm
BE 25-02	Cone angle	60°
BE 25-03	Hammer Weight	8 kg ± 0.1 kg
BE 25-04	Hammer freefall height	575 mm ± 1 mm
BE 25-05	Upper steel shaft	16 mm diameter
BE 25-06	Lower steel shaft	16 mm Diameter
BE 25-07	Graduation of lower shaft	Marked in 5 mm increment
BE 25-08	Length of lower shaft	900 - 1200 mm long
BE 25-09	Case size approximately	1100 x 250 x 150mm
BE 25-10	Weight	29kg

BE 26-03	Shoe	hardened with an inside cutting edge
BE 26-04	Head	fitted with a ball check valve and adapter to connect 'A' type drill rod
BE 26-05	Drive Weight	Cast Iron, 63.5 kg, 78 mm bore ID approx.
BE 26-06	Guide Pipe Assembly	Bore 73 mm OD approx.
BE 26-07	Tripod	with Pulley and built-in Ladder & Rope

STANDARD PENETRATION TEST

BE 26

The Standard Penetration Test (SPT) is a widely used in-situ test to evaluate soil properties. It measures penetration resistance by counting the number of blows (N-value) needed to drive a split spoon sampler 300 mm into the ground using a 65 kg hammer falling from 750 mm. The N-value indicates the degree of compactness for cohesionless soils (e.g., sand) and consistency for cohesive soils (e.g., clay), aiding in foundation design and assessing liquefaction potential under dynamic forces like earthquakes. Measures undisturbed soil strength and liquefaction resistance. A 65 kg weight drops 750 mm to drive a sampler 300 mm; blow count (N) is recorded. Foundation design, soil classification, and seismic risk assessment.

STANDARD FOLLOWING

IS 2131, IS 9640, ASTM D-1586

DESCRIPTION

BE 26-01	Split Spoon Sampler	50.8 mm Outer Dia and 38 mm Inner Dia
BE 26-02	Body	split lengthwise

FIELD CALIFORNIA BEARING RATIO (FIELD CBR)

BE 27

The in-situ California Bearing Ratio (CBR) apparatus has become increasingly vital in large road construction projects due to its ability to efficiently assess the bearing capacity of soils. Mounted on a rolled steel joist cantilevered from a truck or attached to a mobile frame's underside, the apparatus enables rapid field testing through piston penetration. This method is particularly effective under specific conditions: when soil has a saturation degree of 80% or higher, when the material is coarse-grained and cohesionless (unaffected by water content changes), and when the material is already in place. These characteristics make the in-situ CBR test a practical tool for determining load-carrying capacity directly in the field, ensuring reliable data for road design and construction.

STANDARD FOLLOWING

IS 2720 (PART-31), IS 12287

DESCRIPTION

BE 27-01	Loading Jack	with U-bracket, capacity 50 kN (5,000 kgf). This is specially designed for use with Field CBR test apparatus. It consists of a hand operated, two speed, screw jack fitted with a U-bracket. A hexagonal adapter is provided to fix a proving ring. A thrust bar, which passes through the U-bracket, is screwed on to a proving ring (supplied at extra cost) which protects the proving ring when the loading is eccentric.
BE 27-02	Proving Ring	50 kN (5,000kgf) capacity
BE 27-03	Dial Gauge	25 x 0.01 mm
BE 27-04	Slotted Metal Weight	10 kg, 215 mm to 250 mm dia with 53 mm dia slot 2 Nos.
BE 27-05	Slotted Metal Weight	5 kg, 215 mm to 250 mm dia with 53 mm dia slot - 2 Nos.
BE 27-06	Annular Metal Weight	5 kg, 250 mm dia with 53 mm dia central hole
BE 27-07	Adjustable Bracket	for mounting the Dial Gauge
BE 27-08	Datum Bar Assembly	consisting of two stands and 1 m long Bar
BE 27-09	Connector Set	consists of eight connectors for coupling the penetration piston and proving ring assembly, either directly or through extension pieces
BE 27-10	Extension Set	consisting of 1 length of 5 cm, 2 lengths of 10 cm, 1 length of 30 cm, 1 length of 50 cm and a length of 100 cm used as spacers between the proving ring and penetration piston. The lengths are machined from steel tubing
BE 27-11	Penetration Piston	50 mm dia threaded at the upper end, to connect to the various lengths of extension sleeves, through a connector
BE 27-12	Swivel Head	for the Loading Jack

POCKET PENETROMETER

BE 28

A pocket penetrometer is a handheld measuring tool that evaluates the penetration resistance and compression strength of soils. It is portable and compact, allowing for a quick soil analysis to determine soil consistency, moisture content, and approximate unconfined shear strength.
Pocket penetrometers provide rapid estimates of unconfined compressive strength, which is crucial for determining soil stability and safety during trench excavations.
This tool comprises a measuring rod with a graduated scale. The sharp tip penetrates the soil to evaluate factors such as load-bearing capacity, compaction level, and overall stability for building foundations. Because of the simple function, many people employ pocket penetrometers for rapid soil assessments.

STANDARD FOLLOWING

ASTM D 1558 D 2573

RIFFLE SAMPLER DIVIDER

BE 29

A Riffle Sample Divider is a device used for the rapid and representative sampling of aggregates, sand, and fillers. It consists of a metal box equipped with a series of equally wide chutes that alternately discharge material in opposite directions into separate pans. The chutes are designed with a steep incline to ensure a swift and smooth flow of material, facilitating accurate division of the sample into smaller, representative portions.

STANDARD FOLLOWING

IS 1607-1977, 2720, ASTM C 136, 0421 , D422, D427, D4517, 0452, 0457, D806, D4318, BS: 812 (Part 103), 1377, AASHTO T27, T87

This is two types to sampler divider available.

TYPES

BE 29-01	13	14	2.1
BE 29-02	25	16	4.4

HIGH SPEED STIRRER

BE 30

The described device is a compact, bench-mounted laboratory stirrer designed specifically for the pretreatment of soil samples prior to particle size analysis. It features a mixer spindle that operates within a dispersion cup, which can be equipped with an anti-splashing baffle to enhance mixing efficiency by reducing sample loss and improving uniformity. This setup ensures effective dispersion and preparation of soil samples for accurate analysis. Suitable for operation on 220 V, 50 Hz, single phase, AC Supply.

STANDARD FOLLOWING

IS 2720 (Part 4)