ISSUE 13

Product Catalogue

Civil & Environmental Engineering Test Equipment

ELE INTERNATIONAL

IF IT'S WORTH BUILDING, IT'S WORTH TESTING

Easy to use Product Listings

Product Category
May be several products related to the category.

Product Name

Product Code(s)
Products are supplied in various power requirements. The below list covers how these appear throughout the catalogue.

If a product code ends with:

/01 = 220-240 V AC, 50 Hz, 1ph

/02 = 110-120 V AC, 60 Hz, 1ph

/06 = 220-240 V AC, 60 Hz, 1ph

Product Standards
The various standards the product complies to.

Product Description
Describes features/benefits and product components.

Concrete

Compression Machines

ADR Touch Control Pro 2000 BS EN Auto Compression Machine

Product Codes: 36-5150/01, 36-5150/06

Specifications	
Force Capacity (kN)	2000
Max Ram Travel (mm)	50
Cubes (Concrete)	Up to 200 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	Via optional Platen Handling System
TFV and ACV	Yes
Frame Type	Welded
Max vert. Clearance	375 mm
Max hor. Clearance	355 mm
Platen Sizes	Lower 220 mm² Upper 300 mm dia
Product Code	**Power Supply**
36-5150/01	220-240 V AC, 50 Hz, 1 ph
36-5150/06	220-240 V AC, 60 Hz, 1 ph

Product Standards:

EN 12390-4 (BS 1881-115), EN 12390-3 (BS 1881-116), EN 12504-1, EN 1354, EN 13286-41, EN 772-1, EN ISO 7500-1, ASTM E4

The ADR Touch Control Pro 2000 BS EN is supplied complete with self-centring lower platen, oil filled ball seating assembly and safety gates fitted with interlock switches ready for testing 300 x 150 mm diameter cylinders. When used for cube testing, distance pieces (EN) of the appropriate size must be ordered separately.

Spares/Consumables:

Power Supply or Switch Mode PSU (1850A0044)
Switch (Console on/off) (6013X0186)
Outlet Adaptor (1858A0046)
Console Assembly (1887B0001)
ADR Autotest Power Pack (1858B0031)
Solenoid Assembly (1676A0083)
Gasket (1210B0015)
Oil Pump (5020A0061)
Top Plate Assembly (1676D0025)
Dump Valve Assembly, 110 V, 60 Hz, 1 ph (1676B0098)
Dump Valve Assembly, 240 V, 50 Hz, 1 ph (1676B0039)
Motor Power Pack (1312B201)
Upgrade Head (37-4900/01)
ADR MK111 LCD (1850A0050)
Relay Board (1819A0049)
Tension Spring (8426X0039)
Keyboard (1887B0031)
Flexible Hose (5038B0021)
Stepper Linear Actuator Assembly (1676C0024)

Product Specifications
Some product listings will have specification tables detailing the features of the product.

Models
Various model options with product codes.

Spares, Consumables & Accessories
A comprehensive list of additional products for use with or related to main product listing.

Easy to use Buyer's Guides

Within each section of the ELE Product Directory you will find a buyer's guide comprising of the various tests required for the construction industries. These tests are listed with the standards and a full list of products needed for completing the test along with their product codes making it easier to order for all your test requirements.

Test Type

Test Description

Test Standards

Product List
Comprehensive list of products required for test with product codes for easy ordering by phone or online.

Buyer's Guide

Concrete

Mixing & Sampling Fresh Concrete, Site & Laboratory

The correct sampling and mixing of fresh concrete is important if test results are to be reliable. This Standard specifies two procedures for sampling fresh concrete, by composite and spot sampling.

Standard(s) EN 12350-1

Product Code	Product	Qty
81-0222	Aggregate Scoop with Two Handles 250 mm long by 125 mm dia 5 kg capacity	1
81-0240	Shovel (Flat)	1
81-4230	Sample Tray 1200 x 1160 x 50 mm	1
81-3545	Transport/Storage Container complete with Snap-on Lid and Handle 22 ltrs	10
34-3540/01	ELE Concrete Mixer 56/40 ltrs capacity, 220-240 V AC, 50 Hz, 1 ph	1

Product Quantity
The number of items required for the test.

ELE International

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ELE International
The Company

ELE International Centre of Excellence, Bedfordshire, United Kingdom

ELE International specialise in the design, manufacture and supply of high quality construction materials testing equipment and environmental instrumentation.
Our products are backed by global customer service, with comprehensive technical and applications support.

ELE International was founded in 1961 with a mission to serve the materials testing needs of the Construction Materials Industry. The Environmental Division, specialising in international projects, was created in 1983.

ELE is considered one of the pioneers within the Materials Testing Industry both in the UK and internationally.
The business has seen steady growth over the years and the portfolio has increased from single digits to hundreds of new and innovative testing products. The company now has a major global presence with a highly talented and diverse workforce.

Product sales, manufacturing, service and customer support are available from strategically located offices in the UK and USA, together with dedicated sales offices in the Middle East and Asia, and more than 40 channel partners around the globe supporting the ELE brand in region. The UK head office is located in Leighton Buzzard, Bedfordshire, and is a centre of excellence for ELE's new product developments.

ELE International is part of the multi-national Danaher Corporation. Danaher acquired ELE in 2001 with the aim to further strengthen the business by investing in research and development. The ELE business now enjoys all the benefits associated with being part of a Fortune 150 company.

Mission Statement

To develop new materials testing technologies that ensure the safety of civil infrastructure systems globally, technologies that improve the quality of our buildings, roads, bridges, and homes.

Vision Statement

For ELE International to be identified as a benchmark for quality, innovation and customer support. To empower its employees and associates to develop and grow with the business to reach their full potential.

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DANAHER

Danaher is a Fortune 150 ranked company renowned for acquiring and building strong growth businesses worldwide. 90% of its revenue comes from scientific and technological companies. Danaher employs 59,000 people worldwide.

In its early days, Danaher consisted of a group of discrete, manufacturing businesses. In the mid-1990s this fragmented structure was transformed into one built around strategic platforms, each with sustainable competitive advantages in sizeable global markets. Over the next decade the company established leadership in the markets that define it today, beginning with water in 1998 and followed by product identification (2001), dental (2004), diagnostics (2006) and life sciences (2009).

Today Danaher is a global science and technology innovator committed to helping customers solve complex challenges and improving quality of life around the world. Our trusted brands hold unparalleled leadership positions in diagnostics, life sciences, dental care and environmental and applied solutions.

Through strategic acquisitions, Danaher Corporation has formed a diverse portfolio of water quality optimization companies that, as a united platform, can significantly impact the way its customers approach water.
The company portfolio includes Hach, Trojan Technologies, McCrometer, ChemTreat and OTT Hydromet. ELE International is a proud member of Danaher's Water Quality Group (WQG) as a division of Hach Lange Ltd.

ELE International
Innovators

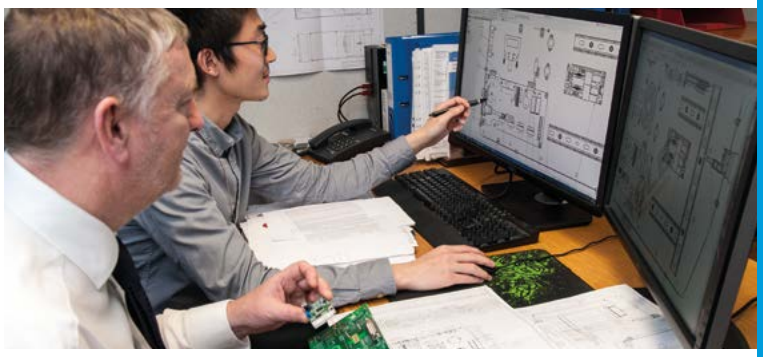
Advanced Engineering

The Engineering team is split into three disciplines; mechanical, electronic and software. These teams work together to introduce new products, maintain existing products and support our internal departments requiring engineering input and assistance.

Following significant capital investment, our engineering team run the latest 3D CAD and FEA simulation software to verify our designs and ensure our equipment is safe, robust and meets international standards.

These investments help us to introduce new products in a fast and efficient manner utilizing the latest production methods such as multi axis CNC and laser cutting equipment, along with 3D printing technology for rapid prototyping.

The Engineering Design team can assist with laboratory layouts, helping plan the position of machines and advising on their service requirements such as water, power and drainage, and also producing fly-through videos and detailed floor plans.



Quality Control

It is the policy of ELE International to provide its customers with good quality products, service and workmanship that fully meets their expectations by maintaining continual development of quality and laboratory management systems. It is the intention for products to be safe, reliable, fully fit for purpose and compliant to statutory health and safety regulations. ELE International has a quality management system certified to the requirements of BS EN ISO 9001 covering all aspects of the business, from concept design, manufacturing, assembly, test and inspection, to warehousing and after-sales support, with UKAS accreditation for repair and calibration. Our system is subject to regular surveillance by an internationally recognised third-party certification body. All processes are defined and documented to meet the requirements of our customers.

In addition to this ELE International has a laboratory management system certified to ISO/IEC 17025 for the calibration and testing of force measurement systems, enabling us to carry out on-site service and calibration of compression testing machines and associated equipment. The organisation is committed to the use of good professional practice in providing a high standard of calibration and service.

Our quality control procedures, backed by the proven reliability of our test equipment and the experience of our team, ensure we can repeatedly supply the highest quality products to give a long and trouble free operating life with minimal maintenance costs.

ELE International

Leading-edge Innovations

SoilTest PRO Range

AUTO Soils Consolidator (ASC)

The ASC is fully automatic and runs a full consolidation test without user intervention, which saves valuable time. A built-in electronic stepper motor ensures precise control of loading over the entire 15 kN range. This design improves the accuracy of loading and avoids the need for a compressor.

- Fully Automatic – reduces testing time.
- No compressor – stepper motor improves accuracy across entire 15 kN load range.
- Variable speed to suit sample type.
- Multi language.
- 7” waterproof, colour, graphical touchscreen.
- Ability to include manual Consolidation Frames.
- Can change target loads during a test.
- Flexible reports.
- Save configurations for easy set-up of multiple cells and repeat tests.
- Compatible with latest DS8 software.
- Wide range of sample cells.

DS 8.0 ATM Software

For Systematic Testing

The AUTO Soils Consolidator has been launched alongside the latest version of ELE’s DataSystem soil test management software, DS8.0 which is loaded with the current BS, ASTM and AASHTO standards, and is compliant with windows 10.

- Automatic Test Management Software
- Cost effective
- User friendly
- Reduces test time
- Ethernet connectivity
- Manage up to 16 machines simultaneously
- Remote service diagnostics
- Advanced customisable reporting

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ADR Touch Control PRO

Accurate & Consistent Testing

The ADR Touch Control Pro will deliver all the features and quality of the established ADR-Auto range, with its 20 year history, but with a new sleek design and additional capabilities. The console assembly consists of an ADR Touch Control Pro and power base which can be used with all existing concrete and cement frames.

- Larger 7-inch, high resolution, colour display.
- Favourites option for test samples.
- Flexible head: 75-degree rotation and 45-degree tilt.
- Available in English, Spanish, Portuguese and French options.
- Remote operation away from test area via App.
- Remote diagnostics.
- Dual sensor for testing both concrete and cement samples on one frame.
- Upgrade kits available for compatibility with existing lower consoles.
- Over 100 pre-programmed test profiles and large memory storage capacity available.

AUTO Soil Compactors

BS/EN & ASTM Models

The time and effort required to prepare specimens for compaction studies and other test methods can often be costly and time-consuming. The use of an automatic, mechanical compactor will show considerable cost benefits over hand compaction methods. Two models meeting the requirements of BS/EN and ASTM are available.

- NEW CE compliant guarding as an extra safety measure for users.
- Complies to BS 1377-4, BS 1924-2, EN 13286-2, EN 13286-47, ASTM D558, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T134, AASHTO T180 standards.
- Pre-set blow pattern ensures even compaction.
- Solid state controls for reliability and ease of maintenance.
- Automatic re-setting of counter after completion of blow pattern.

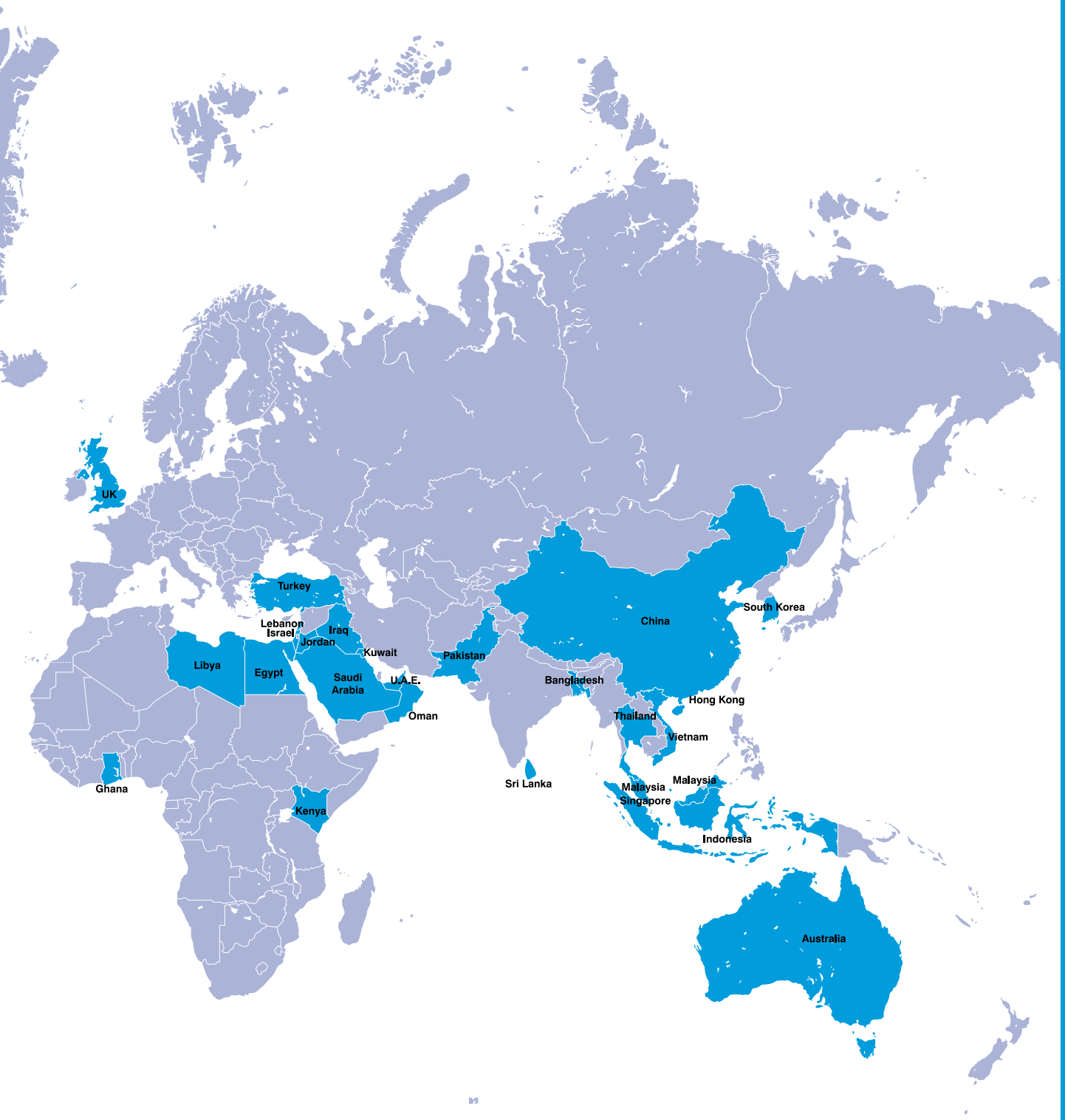
ELE International
Global Distribution

Our network of distributors and service providers gives us a global reach and allows us to react quickly and efficiently to the needs of our customers, whatever they may be. From quotation to installation, calibration to training, ELE will strive to give the best possible service to the standard they would expect.

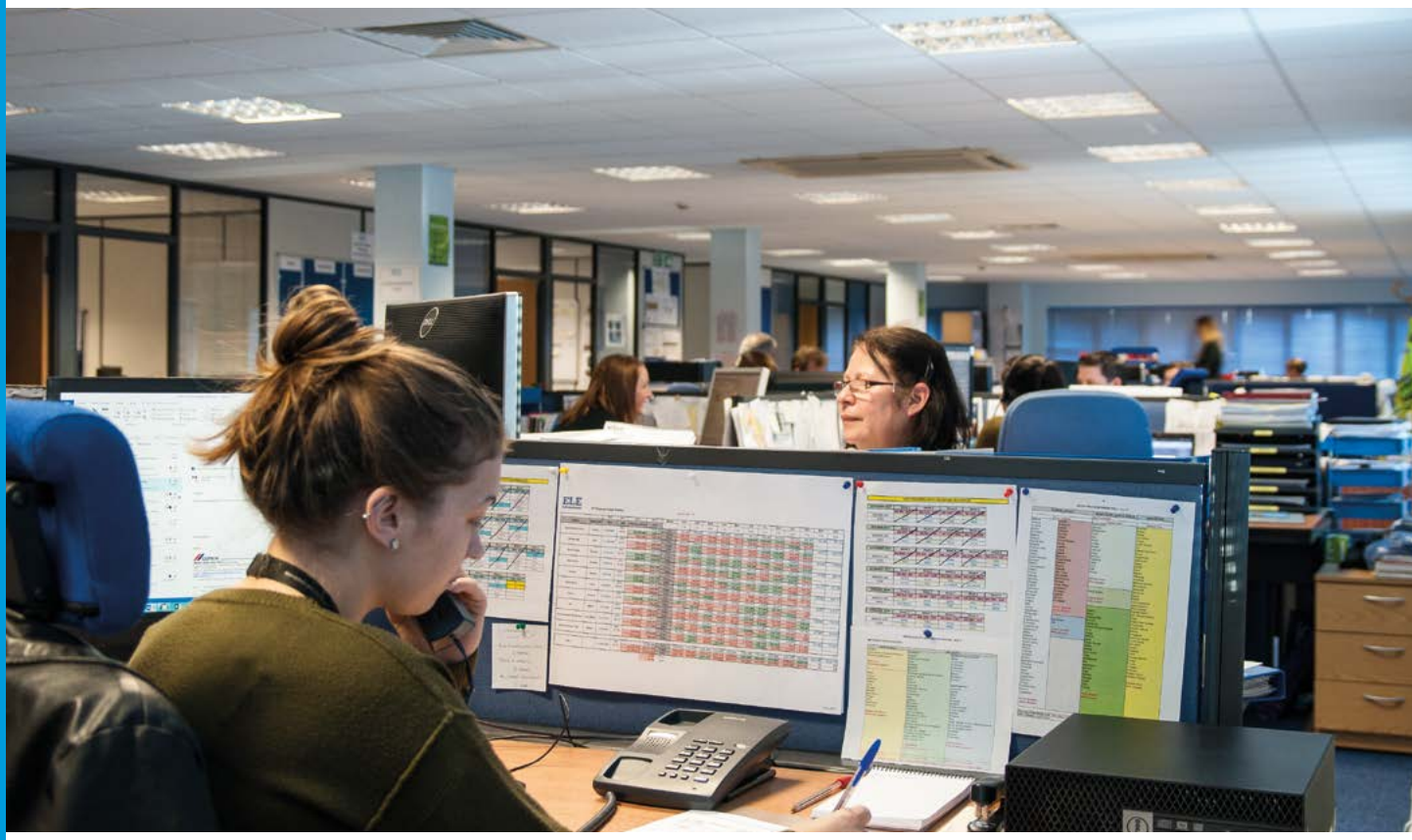
We have distributors based in the following countries:

Argentina	Ecuador	Kenya	Singapore
Australia	Egypt	Kuwait	South Korea
Bangladesh	El Salvador	Lebanon	Sri Lanka
Bolivia	Ghana	Libya	Thailand
Brazil	Guatemala	Malaysia	Trinidad & Tobago
Canada	Honduras	Mexico	Turkey
China	Hong Kong	Nicaragua	U.A.E.
Colombia	Indonesia	Oman	United Kingdom
Costa Rica	Iraq	Pakistan	USA
Dominican Republic	Israel	Peru	Vietnam
	Jordan	Saudi Arabia	

Global Distribution



ELE International
Service



Exceptional Customer Support

At ELE we are committed to providing the best possible support and after-sales care to our customers.
ELE has been in business for more than 50 years and has a worldwide reputation for quality. This not only covers the wide range of testing and laboratory equipment that we supply, but also the standard of service and technical support that we offer.

In the modern market place, and with the diversity of our end users, we understand that each customer has different requirements, which is why we pride ourselves on being able to react quickly and efficiently to any situation.
Our UK and USA based teams of trained service engineers are dedicated to responding to customer enquiries and we aim to provide complete solutions, whatever the nature of the enquiry. Purchasing equipment is just the start of our journey together; we offer a comprehensive training program for operators and engineers alike, with courses based in our UK and USA offices and at customers' sites.

Our skilled Engineers will ensure that any issues arising are dealt with in a timely and professional manner.

Calibration is an essential part of ensuring the accuracy of our test equipment. We proudly hold the accreditation certificate from UKAS, the United Kingdom Accreditation Service, who ensure that our equipment and procedures are fully traceable to the relevant standards. Our highly trained, UK based service engineers are all accredited by the UKAS body, so you can rest assured that the calibration of your equipment is carried out to the highest possible standard.

When you buy ELE, you are not just getting high quality equipment from one of the leading companies in the market, you are also buying the comfort of knowing that we are here to support you every step of the way.

Soils Testing Equipment

It is vitally important to know the characteristics of soils in construction projects because soil mechanics affect the performance of foundations, backfill, embankments, drainage, etc. It is also necessary to understand the behaviour of soils under varying conditions of moisture, loading, stress, temperature, etc. ELE International designs and manufactures a comprehensive range of soil sampling and testing equipment to meet this requirement in accordance with international standards for both field and laboratory testing. ELE's materials testing equipment enables the accurate classification of soils and the measurement of key parameters such as moisture, density, shear strength, permeability, bearing capacity, compaction and CBR, consolidation, Atterberg limits - shrinkage limit, plastic limit, and liquid limit, particle size distribution, sand equivalent value, slope stability, triaxial soil strength, pore water pressure, effective stress, soil chemistry and much more. Providing everything from a simple pocket penetrometer to a sophisticated triaxial soil testing system with control and data acquisition software, ELE's soils testing range includes all the equipment necessary to run standard test methods in the field or the laboratory.

In-situ Sampling & Preparation

In-situ Sampling & Preparation

The correct sampling, description and preparation of soil and soil mixtures is necessary if subsequent tests are to be meaningful and provide representative results. Various national and international standards specify a range of procedures and equipment necessary to ensure representative sampling.

With the use of simple hand tools, it is often possible to obtain detailed information regarding the sub-surface structure and hence the likely engineering characteristics of the area under investigation.

Soil Colour Charts

Munsell Soil Colour Charts

Product Code: 23-7150

Munsell Soil Colour Charts are an affordable way to evaluate the type of soil that is present within a given area. The binder is set up to allow users to make soil colour evaluations in the field quickly and easily. The soil classification system that has been developed around the Munsell Colour System is an established and accepted process to assign a soil type. This classification system has been used in the United States for more than 55 years to aid the management and stewardship of natural resources. Through the use of Munsell Soil Colour Charts, practitioners from a wide range of professions can share reliable and consistent information about the colour of soils at a particular site with colleagues anywhere around the world.

Munsell Soil Colour Charts are used by a variety of industries and professions such as universities and high schools, forestry, forensics, environmental and soil science, building and contracting, landscaping, real estate, health departments, geology and archaeology.

The following pages are included in the Munsell Soil Colour Charts:

- Munsell 10R Soil Chart.
- Munsell 10YR Soil Chart.
- Munsell 2.5Y Soil Chart.
- Munsell 2.5YR Soil Chart.
- Munsell 5Y Soil Chart.
- Munsell 5YR Soil Chart.
- Munsell 7.5YR Soil Chart.
- 10Y - 5GY Colours - Olive Greens Soil Chart.
- Gley 1 & 2 (2 - Separate Charts) Soil Charts.
- Munsell 5R Individual Soil Chart.
- Munsell 7.5R Individual Soil Chart.
- New White Page, 7.5R, 10YR and 2.5Y.

Durable binder contains 440 Munsell Colour Standards:

- Featuring ISCC-NBS colour names.
- Munsell alpha-numeric notation.

Colour produced on water resistant substrate.

Features Munsell notations for each colour providing:

- Value (degree of lightness).
- Hue (colour).
- Chroma (degree of saturation).

Used with medium, fine grained and coarse grained rocks.

Pages are cleanable and can be exposed to standard environmental conditions in the field.

Specifications	
Binder Size W x H x D (mm)	150 x 196 x 25
Page Size (mm)	111 x 184
Weight (kg)	0.9

Sample Mixers

A regular laboratory requirement is the mixing of samples with water and/or other constituents to provide a homogeneous mixture prior to subsequent testing. The following range of mixers provide an efficient means of mixing samples.

Bench-Mounting Mixer 4.7 Litre Capacity complete with Bowl, Beater & Whisk

Product Code: 23-6191/01, 23-6191/06

Mixer shown with Isomantle Electric Heater accessory.

Product Standards:

BS 598-107, BS 1377-1, BS 1924-1, EN 12697-35

The mixer has three electrically switched mixing speeds which obviates the need to switch off during speed selection. The mixing head comprises a beater which contra-rotates about a central shaft using planetary gearing. A lever-acting lifting device facilitates the insertion and removal of the bowl. This mixer is suitable for the mixing of soil samples, mortar, bituminous mixtures and associated materials where comparatively small samples are being prepared. Supplied with Stainless Steel bowl, beater and whisk.

Specifications

Dimensions (mm)	545 x 380 x 550
Beater Speeds (rpm)	L 136, M 281, H 580
Central Shaft Speeds (rpm)	L 60, M 124, H 255
Rated Power (W)	500
Weight (kg)	20.2
Product Code	**Power Supply**
23-6191/01	220-240 V AC, 50 Hz, 1 ph
23-6191/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Stainless Steel Bowl 4.7 litres (23-6191/10)

Accessories:

Isomantle Electric Heater (45-5580/01)

Specifications

Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Beater (23-6191/11)

Whisk (23-6191/12)

Hand Boring & Sampling

The items listed provide the engineer with an economic range of equipment for field survey work. Using this equipment it is possible to obtain disturbed or undisturbed samples at reasonable depths, subject to ground conditions. Most items may be inter-connected.

Auger Heads (Soil & Gravel)

Product Standards:

ASTM D1452/D1452M, AASHTO T203

These auger heads are suitable for boring in cohesive soils or sands and gravels. The soil augers are constructed of heavy duty steel plates forming an open tube partly interlocked at the cutting end. Gravel augers comprise a one piece steel casting with a spiral point and two plates designed to close when lifting samples from the borehole. The Dutch Auger is of similar construction to the Soil Augers and is particularly useful in very fine silt-clay sands. This range of durable augers is based on a threaded joint system enabling items to be interchanged and extended to any depth required.

23-1501

23-1504

23-1517

23-1525

Specifications

Product Code	Head Size/Dia. (mm)	Head Type / Suitability	Weight (kg)
23-1501	100	Cohesive Soils	1.5
23-1504	150	Cohesive Soils	2.5
23-1517	150	Gravel and Sand	1.2
23-1525	50	Dutch Soil (Fine Silty Sand)	1.5

In-situ Sampling & Preparation

Extension Rods, Handles & Tools

Product Standards:

ASTM D1452/D1452M, AASHTO T203

Product Code	Product	Weight (kg)
23-1541	Auger Extension Rod 1 m	1.7
23-1543	Stillson Wrench size 14 (2 required)	1.2
23-1547	Auger Handle and T piece	2
23-1577	Sample Tube 38 x 230 mm	-
23-1579	Sample Tube Adaptor	-
23-1587	Jarring Link (for driving Sample Tube)	4
23-1617	Auger one piece fine silty sand 40 mm	1.5

23-1577

23-1579

23-1587

23-1543

Riffle Box Set (Sample Dividers)

Product Standards:

EN 932-1, EN 933-3, BS 1377-2, BS 812-1,
ASTM C136/C136M

Designed for the rapid preparation of samples, the ELE range of riffle boxes are constructed of heavy gauge sheet metal, with particular attention given to reinforcement of the partitions to maintain the accuracy of the slot dimensions. The units offered are supplied in a range of sizes from 7 mm to 64 mm slots.

23045

Individual Riffle Boxes / Specifications

Product Code	No. Slots	Max Particle Size (mm) BS	Max Particle Size (mm) EN	Slot Width (mm)	Approx Capacity (ltrs)	Weight (kg)
23-3000	12	4.5	3.5	7	0.3	1.5
23-3050	12	8.5	6.5	13	2.0	6.0
23-3070	12	10.0	7.5	15	2.0	8.0
23-3100	10	12.5	9.5	19	4.0	9.0
23-3150	10	16.5	12.5	25	4.0	11.5
23-3170	10	20.0	15.0	30	4.0	17.5
23-3200	8	25.0	19.0	38	11.0	17.5
23-3300	8	33.0	25.0	50	14.0	22.5
23-3350	8	42.5	32.0	64	18.0	27.0

Large Sample Splitter

Product Code: 23-3425

Product Standards:

EN 932-1, EN 933-3, BS 1377-2, BS 812-1, ASTM C136/C136M

The splitter is designed for the reduction of test samples which are too large in volume to be conveniently handled. It divides samples so that half is representative of the original total sample and handles material up to 6 inches in particle size. The lever-actuated unit is constructed of heavy gauge welded steel with a hopper which holds up to 1 cu. ft. The single splitter chute provides wide flexibility in sizes of opening and adjustment is provided for chutes of 0.5, 1.5, 2, 3, 4 or 6 inches by positioning of the chute bars. Overall height is approximately 1 metre. Hopper size 735 mm long x 480 mm wide (approx).

Complete with 2 material pans and a bag-loading chute.

Specifications	
Capacity	1 cu. ft. (0.028 m³); for sand sizes up to 4 inches (102 mm)
Hopper	Lever-actuated, clamshell design
Chute Bars	48 aluminium bars, 1/2 inch (13 mm) width
Chute Area	24 inches (610 mm) overall width
Chute Openings	Adjustable; 1/2, 1, 1-1/2, 2, 3, 4, or 6 inches
Frame	Welded, heavy-gauge steel
Chute Attachment (L x W x H)	Replaces pan to allow sample collection in bag; 28-1/4 x 7 x 5-1/2 inches (718 x 178 x 140 mm)
Material Pans (L x W x H)	Two included; 25-3/4 x 9 x 6-1/2 inches (654 x 22 9 x 165 mm)
Overall Dimensions (L x W x H)	29 x 19 x 39 inches (737 x 483 x 999 mm)
Weight	Shipping: 142 lbs (64 kg)

Accessories:

Sample Bag - 10 x 18 inches (254 x 457 mm) (23-1420)

Sample Bag - 17 x 32 inches (432 x 813 mm) (23-1422)

Sample Reduction

The reduction of particles within the soil mass is necessary for a number of tests. For most purposes crushing of individual particles must be avoided. This reduction process is best achieved using a porcelain mortar and rubber headed pestle.

Mortar & Pestle, Porcelain

Product Code: 23-3505

Product Standards:

BS 1924-1, BS 1377-2, ASTM D421

Thick walled porcelain mortar; 107 mm internal diameter and porcelain pestle.

Rubber Headed Pestle

Product Code: 23-3500

Product Standards:

BS 1924-1, BS 1377-2, ASTM D421

Specially made for gently grinding soils without breaking the individual particles.

Specifications	
Weight (kg)	0.12

In-situ Sampling & Preparation

Extruders & Soil Lathes

The removal of soil cores from sampling tubes must be accomplished with the minimum of disturbance, particularly when small specimens have to be prepared in order to carry out laboratory tests. Large extrusion forces used indiscriminately will compress soil resulting in false values of shear strength and consolidation.

Soil Extruders

Hydraulic Sample Extruder Kit 38 mm Hand Operated

Product Code: 23-4090

Product Standards:

BS 1377-4, BS 1924-2, BS 598-107, EN 12697-30, EN 13286-2, EN 13286-47, ASTM D1587/1587M, ASTM D698, ASTM D1557, ASTM D1883

This Sample Extruder comprises a vertically mounted lever action hydraulic jack, with the body extended to form a chamber which accommodates a 38 mm diameter sample tube. Supplied complete with trimming knife, wire saw, 38 mm split former and cutting tool.

Proctor/Core Cutter Extruder Frame & Hydraulic Jack. Extrudes 100 mm/4 inch diameter specimens

Product Code: 23-4200

Product Standards:

BS 1377-4, BS 1924-2, BS 598-107, EN 12697-30, EN 13286-2, EN 13286-47, ASTM D1587/1587M, ASTM D698, ASTM D1557, ASTM D1883

Adaptor plates will be supplied; extrudes samples from BS Compaction Mould, Proctor Mould 100 mm, Core Cutter and Marshall Mould. Maximum extrusion force 20 kN.

Specifications

Product Code	Extrudes samples from:
24-9000	BS Compaction Mould
24-9060	Proctor Mould
29-5300	100 mm Core Cutter
45-6310	Marshall Mould

Accessories:

Steel Block (45-6463)

CBR/Core Cutter Extruder Frame & Hydraulic Jack. Extrudes 150 mm/6 inch diameter specimens

Product Code: 23-4250

Product Standards:

BS 1377-4, BS 1924-2, BS 598-107, EN 12697-30, EN 13286-2, EN 13286-47, ASTM D1587/1587M, ASTM D698, ASTM D1557, ASTM D1883

Comprises a frame and hydraulic jack with adaptor plate supplied. Extrudes samples from BS CBR Mould and ASTM CBR Mould.

Specifications

Product Code	Extrudes samples from:
24-9198	BS CBR Mould
24-9228	ASTM CBR Mould

Accessories:

Adaptor Plate for 23-4250 to extrude 100 mm/4 inch diameter and Marshall Specimens (23-4300)

Product Standards:

BS 1377-1

To be used with 23-4250. Comprising an adaptor plate, retaining screws and a nominal 100 mm ram plunger. Enables extrusion from all ELE 100 mm moulds and core cutters listed in the 100 mm Proctor/Core Cutter Extruder Frame.

Specifications

Weight (kg)	2.2

Soil Lathes

Soil Lathe - Hand Operated for 38 mm diameter specimens up to 100 mm long

Product Code: 23-5800

For producing 38 mm diameter specimens. The lathe platen is adjustable in height and will accept specimens up to 100 mm in length.

- Lightweight frame construction for both laboratory and field use.
- Sturdy plated steel uprights serve as guides for wire saw during final trimming procedure.
- Adjustable upper platen trimming for various sample heights. Wire Saw and other trimming accessories not included; order separately.

Specifications

Max specimen length (mm)	100
Specimen dia (mm)	38

Accessories:

Wire Saw (81-0708)

Straight Edge (24-9010)

Trimming Knife (81-0710)

38 mm Split Former (23-4120)

38 mm Cutting Tool (23-4140)

In-situ Sampling & Preparation

Specimen Trimmer - Hand Operated for 1.4 & 2.8 inch Samples

Product Code: 23-5802

Specimen Trimmers are designed to simplify precision trimming of soil samples for triaxial, shear, unconfined compression, and other tests requiring standard cylindrical specimens. This trimming frame is supplied complete with vane type grips for both 1.4 inches (35 mm) and 2.8 inches (70 mm) diameter specimens, and a narrow wire saw.

- Lightweight frame construction for both laboratory and field use.
- Sturdy plated steel uprights serve as guides for wire saw during final trimming procedure.
- Samples are held securely during trimming through vane type grips.
- Adjustable upper gripper platen for various sample heights.
- Plated steel uprights and gripper assemblies for rust resistance and long life. Includes Wire Saw.

Specifications	
Trim samples to either:	1.4 inches (35 mm) dia
	2.8 inches (70 mm) dia
Uprights	Positioned to guide wire saw to control final sample dia, plated steel
Sample Grips	Vane type; hold sample during trimming, plated steel
Overall Dimensions W x D x H	7 x 5 x 14 inches (178 x 127 x 356 mm)
Weight	Net 16 lbs (7.3 kg)

Soil Sample Trimming Knife

Product Code: 81-0710

Wire Saw

Product Code: 81-0708

Split Former 38 mm

Product Code: 23-4120

Split Former with quick release clamps.

Soil Sample Cutting Tool

Product Code: 23-4140

Used for end preparation of 38 mm samples.

Rapid Method by Speedy Moisture Tester

The new range of Speedy Moisture Testers, which now includes an Electronic Balance and a heavy duty plastic case, uses a technique based on the fact that water will react with calcium carbide to form a gas and that the quantity of gas formed is directly proportional to the water present. The gas pressure is indicated on a built-in pressure gauge. Designed for the most demanding on-site conditions, the new waterproof and durable case offers high levels of protection.

The new model comprises: Speedy Moisture Tester, Electronic Balance, Beaker, Cleaning Cloth, Cap, Washer, Scoop, Steel Pulverising Balls and Cleaning Brushes.

Used to weigh a sample before placing it in the Speedy Moisture Tester, the portable battery powered balance includes an LCD display with a measuring range 0-200 g x 0.1 g. The % moisture content of the sample is read directly from the calibrated pressure gauge.

Product Code	Model	Moisture Range (%)	Gauge div. (%)	Sample Weight	Weight
				(g)	(kg)
23-7462	G2 Large	0 to 50	0.5	8	7.5
23-7502	D2 Small	0 to 20	0.2	6	5.5
23-7452	D2 Large	0 to 20	0.2	20	8.4

Product Standards:

ASTM D4944, AASHTO T217, BS 812-109

- Reliable and accurate moisture measurement in the field.
- Direct reading in percent moisture.
- Rapid results in minutes.
- Carry case and portable electronic balance included.

Accessories:

Calcium carbide powder - 500 g (23-7700)

Calcium carbide powder - 12 x 500 g (23-7702)

Speedy Calibration Unit (23-7600)

Oven Drying Method

The standard method for determining the moisture content of soil is the Oven Drying Method, which is recommended for a Soils Laboratory.

Grouped Product Standards:

BS 2648, EN 932-5, BS 1924-1, BS 1377-1, BS598-107, EN 12697-32, ASTM C127

For full Drying Oven products available see page 270 of the Laboratory Equipment Section

Required Equipment

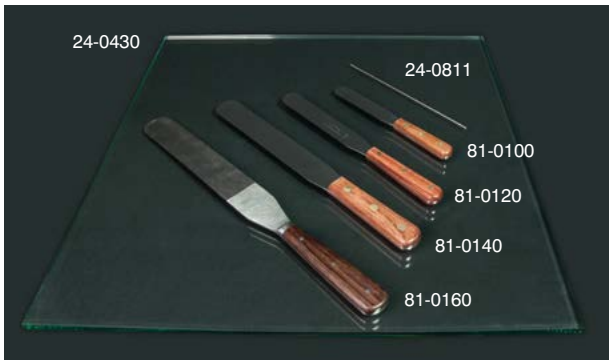
Product Code	Product
78-1250/01	225 ltr Drying Oven
78-1245	Dial Thermometer 0 to 300˚C
78-5456/01	Electronic Balance 4600 x 0.01 g
78-5527/01	Electronic Balance 32 kg x 1 g
81-0220	Aluminium Scoop
81-2979	Unnumbered 90 g Moisture Content Tin 10 required
81-3000	0.5 ltr Sample Container 10 required
81-4020	Sample Tray 306 x 306 x 38 mm 10 required

Soil Index Properties

Soil index properties are used extensively by engineers to discriminate between the different kinds of soil within a broad category, e.g. clay will exhibit a wide range of engineering properties depending on its composition.

Determination of Plastic Limit

The plastic limit is defined as the lowest moisture content of a soil that will permit a sample to be rolled into threads of 3 mm diameter without the threads breaking. The test procedure has remained, in principle, the same since 1932, when Casagrande proposed to define the various limits by relating the moisture content characteristics of soil under certain conditions. The apparatus required is simple yet effective.



Product Standards:

BS 1377-2, ASTM D4318, AASHTO T90

Required Equipment

Product Code	Product	
24-0430	Glass Plate 500 mm² (2 required)	
24-0811	Rod Comparator 3 mm dia to BS 1377	
81-0100	Spatula 100 mm	(2 required)
81-0120	Spatula 120 mm	
81-0140	Spatula 140 mm	
81-0160	Spatula 160 mm	

Determination of Liquid Limit

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

Casagrande Method ASTM

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

BS Liquid Limit Device shown with motor

Liquid Limit Device BS (Motorised)

Product Code: 24-0417/01

Product Standards: BS 1377-2

Complete with revolution counter and motor.

Specifications

Power Supply	220-240 V AC, 50 Hz, 1 ph

Liquid Limit Device ASTM

Product Code: 24-0434

Product Standards: ASTM D4318, AASHTO T89

Complete with revolution counter.

- Rust resistant, brass construction.
- 10 mm gauge block located at end of handle.

Specifications

Weight (kg)	3

Accessories:

ASTM Metal Grooving Tool (24-0453)

Casagrande Grooving Tool AASHTO T89 (24-0461)
Used to control the width of the soil groove in the liquid limit cup.

Liquid Limit Device BS (Hand Operated)

Product Code: 24-0410

Product Standards: BS 1377, EN1997-2

Complete with revolution counter, metal grooving tool and test gauge.

Specifications

Weight (kg)	5

Accessories:

Glass Plate 500 mm² x 10 mm thick (24-0430)
Grooving Tool and Gauge (24-0425)

Cone Penetrometer Method

- Reduces operator error.
- Applicable to a wide range of soils.
- Gives reproducible test results.
- Provides direct measurement of penetration.

The method is fundamentally more satisfactory than the Casagrande method as it is essentially a static test depending on the soil shear strength. The test is based on the relationship between moisture content and the penetration of a cone into the soil sample under controlled conditions. Determines the moisture content at which clay soils pass from a plastic to a liquid state.

Cone Penetrometer (Manual)

Product Code: 24-0540

Product Standards:

BS 1377-2, EN 1997-2

Bench mounted apparatus to determine the liquid limit of soils to BS 1377. This method is applicable to a wide range of soils. The apparatus is fitted with a 150 mm diameter dial indicator for direct reading of penetration. Supplied complete with 30˚, 30 mm long test cone. Manufactured from Stainless Steel and includes adjustable levelling feet.

Specifications	
Dial Indicator	150 mm dia graduated in 400 x 0.1 mm divisions. Indicator point incorporates friction/ gear system.
Height Adjustment	Rapid, using integral clamping mechanism
Cone	1 x 30˚, 35 mm Test Cone
Base	Cast aluminium, adjustable levelling feet
Weight (kg)	7

Cone Penetrometer (Semi-Automatic)

Product Code: 24-0545/01

Product Standards:

BS 1377-2, EN 1997-2

Bench mounted apparatus to determine the liquid limit of soils to BS 1377. This method is applicable to a wide range of soils. The apparatus is fitted with a 150 mm diameter dial indicator for direct reading of penetration. Supplied complete with 30°, 30 mm long test cone. Manufactured from Stainless Steel and includes adjustable levelling feet. Incorporates Digital Automatic controller which releases the plunger head and ensures free falling of the penetration device during the test. The time set is displayed by a bright easy to read display.

Specifications	
Dial Indicator	150 mm dia graduated in 400 x 0.1 mm divisions. Indicator incorporates a friction/gear system.
Height	Adjustable using rapid integral clamping mechanism
Cone	1 x 30°, 35 mm Test Cone
Base	Cast aluminium with adjustable levelling feet
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight	Net 19 lbs (8.64 kg)

Soil Index Properties

Penetration Test Cup

Product Code: 24-0548

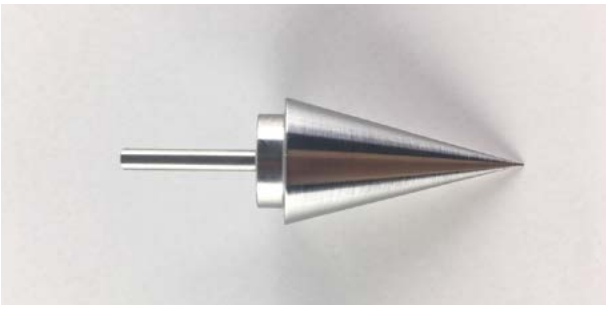
Product Standards:

BS 1377-2

Brass construction 55 mm diameter x 40 mm depth.

Penetration Test Cone

Product Code: 24-0544



Product Standards:

BS 1377-2

Stainless Steel, 35 mm long with smooth surface at an angle of 30˚.

Penetration Test Gauge for Checking Condition of Cone Point

Product Code: 24-0546

Product Standards:

BS 1377-2

40 mm diameter with the rim parallel to the flat base.

Specifications	
Dimensions L x W x H (mm)	40 x 40 x 10

Determination of Shrinkage Characteristics

When the water content of a fine-grained soil is reduced below the plastic limit, shrinkage of the soil mass continues until the shrinkage limit is reached. Shrinkage can be significant in clays but less so in silts and sands. The equipment listed enables the engineer to determine a number of important parameters, including shrinkage ratio, volumetric shrinkage and linear shrinkage.

Volumetric Shrinkage

Product Standards:

BS 1377, ASTM D427, AASHTO T92

This method of test covers the determination of the shrinkage limit, shrinkage ratio, volumetric shrinkage and linear shrinkage.

Prong Plate

Product Code: 24-1500

Product Standards:

ASTM D427, AASHTO T92

Made of acrylic plastic fitted with three metal prongs.

Specifications	
Dimensions	78 mm dia x 6 mm thick
Weight	Net 1 oz (28 g)

Shrinkage Dish

Product Code: 24-1550

Specifications	
Dimensions (mm)	42 dia x 12 deep

Glass Cup

Product Code: 24-1600

Specifications	
Dimensions (mm)	70 dia x 50 deep
Weight (lbs)	0.388

Measuring Cylinder - Glass 100 ml

Product Code: 82-0380

Soda glass, spouted, BS EN 4788.

Evaporating Dish

Product Code: 82-2000

Product Standards:

ASTM D427, AASHTO T92

Shallow form with spout, porcelain.

Specifications	
Dimensions (mm)	150 dia x 45 deep

Linear Shrinkage

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

Shrinkage Mould

Product Code: 24-1800

Product Standards:

BS 1377-2

To produce a specimen 140 mm long x 12.5 mm radius.

Specifications	
Weight (kg)	0.3

Vernier Calipers

Product Code: 81-0588

Range 0-200 x 0.002 mm. Graduated in mm and inches.

Determination of Density, Particle Density & Specific Gravity

Particle density or specific gravity is a measure of the actual particles which make up the soil mass and is defined as the ratio of the mass of the particles to the mass of the water they displace. A knowledge of the particle density is essential in relation to other soil tests. It is used when calculating porosity and voids ratio 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.

Gas Jar Method

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

Gas Jar with Glass Cover & Rubber Bung

Product Code: 24-2830

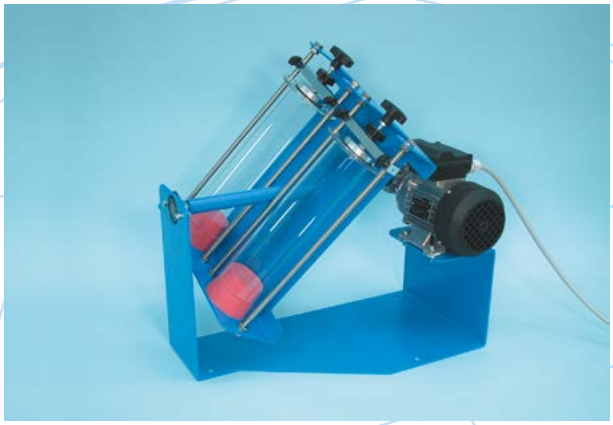
Product Standards:

BS-1377-2, EN 1997-2

Specifications	
Dimensions (mm)	75 dia x 300 deep
Capacity	1 ltr

Mechanical End-Over-End Shaker

Product Code: 24-2854/01



Product Standards: BS 1377-2

Fitted with friction safety device and control panel, capable of rotating two 24-2830 gas jars at approximately 50 rpm to satisfy BS 1377.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph

Accessories:

37.5 mm Sieve 200 mm diameter (79-1640)

Soil Index Properties

Particle Density: Pyknometer Methods

These methods are generally suitable for fine-grained soils. The larger Pyknometers are not usually suitable for clay soils.

Density Bottles with Perforated Stoppers

Product Standards:

ISO 3507, EN 1097-7, ASTM D854, AASHTO T100

Supplied complete with capillary vent stopper. Gay-Lussac type.

Specifications

Product Code	Capacity (ml)
24-2890	25
24-2900	50
24-2950	100

Pyknometer

Product Code: 24-2885

Product Standards:

BS 812-2, BS 1377-2

Glass jar with non-corrodible cone and rubber seal. Capacity: 1 kg

Specifications

Gasket inside dia	2-1/4 inches (57.2 mm)
Gasket outside dia	2-7/8 inches (73 mm)

Accessories:

Pyknometer Gasket (24-2885/11)

Pyknometer Jar Only (24-2885/10)

Pyknometer Top (24-2885/12)

Particle Size Distribution & Sand Equivalent Value

The analysis of soils by particle size provides a useful engineering classification system from which a considerable amount of empirical data can be obtained. Two separate and different procedures are used. Sieving is used for gravel and sand size particles and sedimentation procedures are used for the finer soils. For soil containing a range of coarse and fine particles it is usual to employ a composite test of sieving and sedimentation procedures. The Sand Equivalent Test serves as a rapid field test to show the relative proportions of clay-like or plastic fines and dusts in granular soils and fine aggregates.

Constant Temperature Bath

Product Code: 24-4865/01

Product Standards:

ASTM D422, AASHTO T88

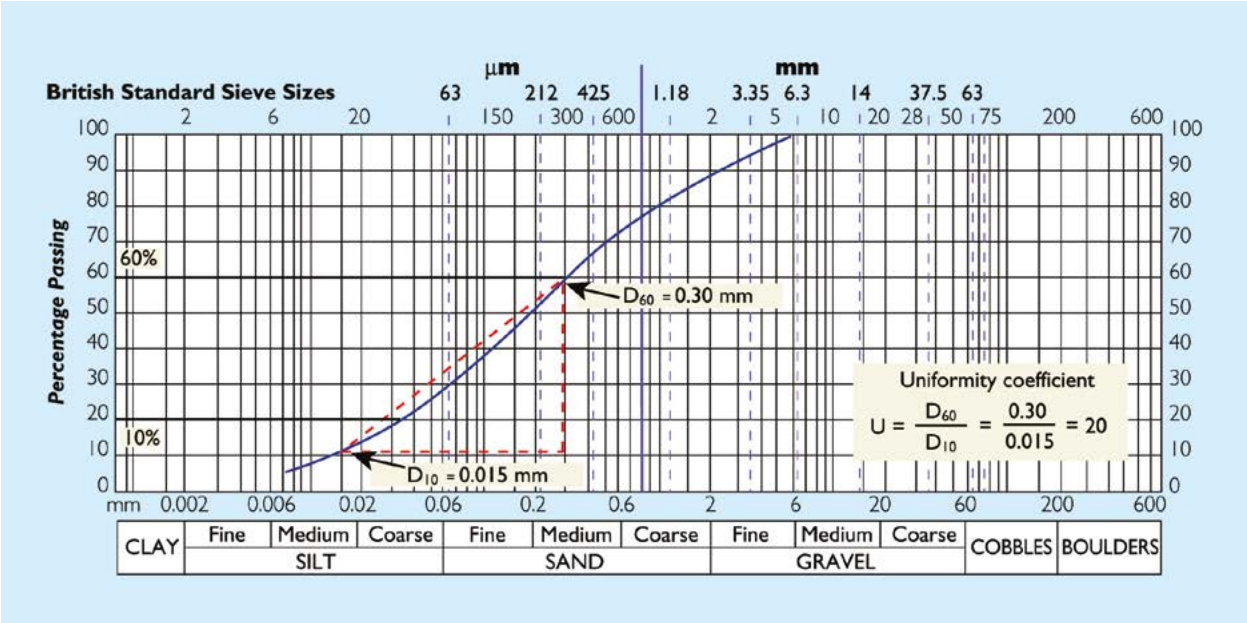
Constant Temperature Bath 5 to 99.9°C x 0.1°C with LED display and false base support.

Specially designed for the sedimentation testing of soils and other fine grained material, the bath is supplied with a false bottom to assist in circulation of the bath liquid. Will accommodate six sedimentation cylinders.

Specifications

External Dimensions L x W x H (mm)	535 x 210 x 610
Capacity	Holds up to 6 sedimentation cylinders
Construction	Stainless Steel with toughened glass front
Temperature Control	Heater/thermostat/circulation with digital controller unit 5 to 99.9°C x 0.1°C
Power (watts)	1500
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	12

Particle Size Distribution & Sand Equivalent Value



Sedimentation by the Hydrometer Method

This method determines particle size distribution in a soil from the coarse sand size down to clay size (about 2 µm). The test does not require the weighing accuracy necessary for pipette sedimentation and is suitable for use in site laboratories.

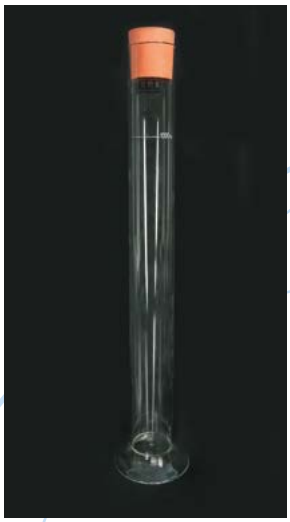
Hydrometer Sedimentation Cylinder

Product Code: 24-4700

Product Standards:

ASTM D422, AASHTO T88

Glass, 1000 ml capacity complete with rubber bung.



Specifications	
Graduations	1,000 ml at 20°C

Nomographic Chart for The Determination of Stoke's Law

Product Code: 24-4800

For the determination of Stoke's Law.

Mechanical Analysis Stirrer

Product Code: 24-4125/01

Product Standards:

ASTM D422, AASHTO T88

High Speed Compact Bench Top Stirrer used for dispersing soil samples in water. Supplied complete with Mixing Paddle and Dispersion Cup with Baffle. Beaker position maintained by column retainer.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	4

Spares/Consumables:

Mixing Paddle for 24-4125 series High Speed Stirrer (24-4125/10)

Soil Dispersion Cup and Baffle (24-4125/11)

Accessories:

Sodium Hexametaphosphate 500 g (24-4145)

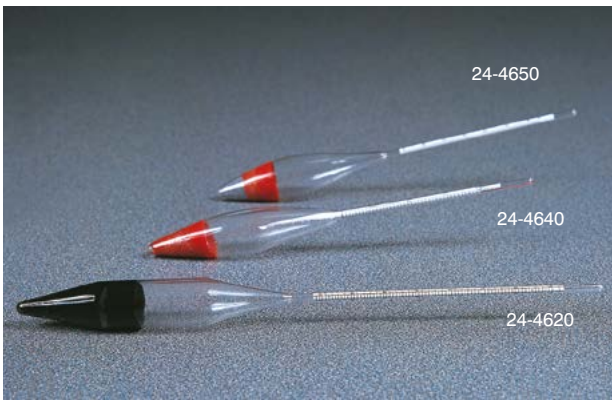
Particle Size Distribution & Sand Equivalent Value

Soil Hydrometers

Product Standards:

ASTM D422, AASHTO T88, ASTM E100

Product Code	Product Standards	Graduation
24-4620	BS/EN DD ENV	0.995 to 1.030 g/ml
24-4640	ASTM/AASHTO	-5 to +60 g/litre
24-4650	ASTM D422 (151H)	0.995 to 1.038 g/ml



Sand Equivalent Value

This test method assigns an empirical value to the relative amount, fineness and character of clay-like material present in the test specimen.

Sand Equivalent Apparatus

Product Code: 24-4919

Product Standards:

ASTM D2419, AASHTO T176, EN 933-8

Sand Equivalent Set Contents	Qty
Glass Measuring Cylinder	4
Rubber Stopper for Cylinder	2
Graduated Rule 500 mm	1
Funnel	1
Measuring Can 200 ml	1
Plastic Bottle	1
Irrigator Tube	1
Weighted Foot Assembly	1
Concentrated Stock Solution 1000 ml	1

Spares/Consumables:

Concentrated Solution (24-4919/10)

Accessories:

Syphon Assembly (24-4925)

Calcium Chloride (24-4930)

Formaldehyde (24-4932)

Glycerol Analar (24-4934)

Mechanical Sand Equivalent Shaker

Product standards:

ASTM D2419, AASHTO T176, EN 933-8

Recommended for use in laboratories performing a large number of tests, motorised shakers provide a consistent and repeatable oscillation, minimising variation in test results.

Specifications

Product Code	Power Supply	Weight (kg)
24-4945/01	220-240 V AC, 50 Hz, 1 ph	3.2
24-4945/06	220-240 V AC, 60 Hz, 1 ph	4.2

Compaction

Compaction tests typically enable the following criteria to be established:

- The relationship between dry density and moisture content for a given degree of compactive effort.
- The moisture content for the most efficient compaction; that is, at which the maximum dry density is achieved under that compactive effort.
- The value of the maximum dry density achieved. There are several different standard laboratory compaction tests, with the most appropriate in each case being based on the nature of the project, the type of soil and the availability of equipment on site.

Applications of Compaction

Soil used as fill

- To refill an excavation or void.
- To provide made-up ground to support a structure.
- As a sub-base for a road, railway or airfield runway.
- As a structure; e.g. an earth dam.

Improvement by compaction

- Higher stability.
- Higher CBR value.
- Lower compressibility.
- Lower permeability.
- Lower frost susceptibility.

Effect on mass of fill

- Greater stability.
- Less settlement.
- Less deformation.
- Less water absorption.
- Less risk of frost heave.

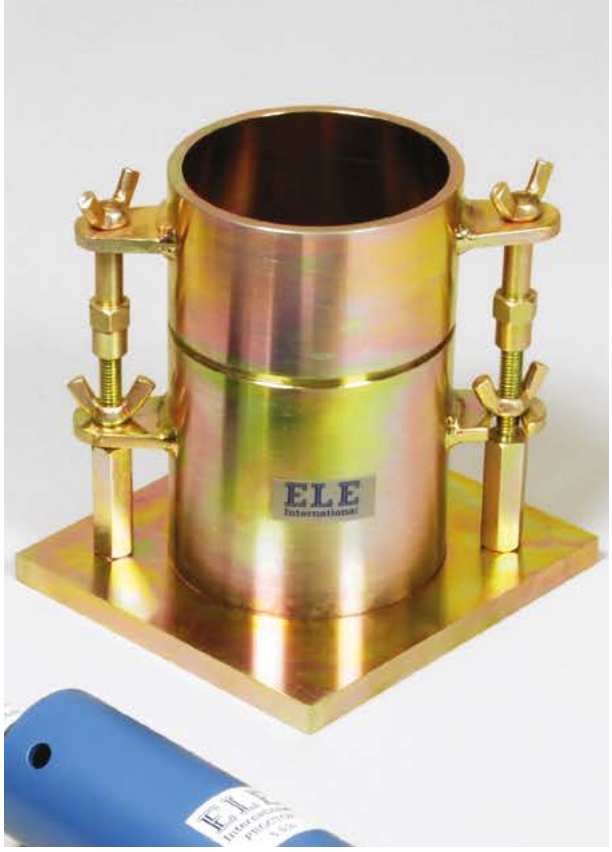
Compaction & CBR

BS/EN Compaction Test 2.5 kg

This test method utilises a 2.5 kg hand compaction rammer and a one litre capacity compaction mould. Often referred to as the 'Proctor' test it is suitable for soils containing particles no larger than 20 mm. The mould and rammer are manufactured from corrosion protected steel components to withstand the heavy usage involved in the test.

Compaction Mould BS Standard

Product Code: 24-9000



Product Standards:

BS 1377-4, BS 1924-2, EN 1997-2

Plated steel standard compaction mould, comprising a collar mould body and base plate with quick release wing nuts for easy dismantling.

Specifications	
Mould Volume	1 ltr
Dimensions (mm)	105 dia x 115.4 high
Construction	All steel, threaded studs with wing nuts, plated
Weight (kg)	5.5

Compaction Rammer 2.5 kg BS Standard

Product Code: 24-9002

Product Standards:

BS 1377-4, BS 1924-2, EN 1997-2

50 mm diameter with 300 mm drop, manufactured from corrosion protected steel.

Specifications	
Rammer Size	50 mm dia, 2.5 kg
Drop (mm)	300
Guide Sleeve	Machined steel tubing with air pressure release holes
Finish	Corrosion resistant
Total Weight (kg)	4.2

BS/EN Compaction Test 4.5 kg

This test method utilises a 4.5 kg hand rammer resulting in a heavier compactive effort than the 2.5 kg test method. Compactive energy some 4.5 times greater is applied to the sample using the heavier rammer. The method is often specified where higher levels of compaction are necessary in a structure, e.g. an airfield sub-base material. Manufactured from corrosion protected steel components the 4.5 kg rammer is designed to withstand heavy usage involved in the test method.

Compaction Rammer 4.5 kg BS Standard

Product Code: 24-9004

Product Standards:

BS 1377-4, BS 1924-2, EN 1997-2

Specifications	
Rammer Size	50 mm dia, 4.5 kg
Drop (mm)	450
Guide Sleeve	Machined steel tubing with air pressure release holes
Finish	Corrosion resistant
Total Weight (kg)	7.5

Proctor Compaction

Proctor Mould ASTM

Product Code: 24-9060

Product Standards:

ASTM D558, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T134, AASHTO T180

Specifications	
Dimensions (mm)	101.6 dia x 116.4 high
Rammer Mould Volume	1/30 ft³
Construction	All steel, threaded studs with wing nuts, plated
Weight (kg)	5.4

Proctor Compaction Rammer 2.49 kg ASTM

Product Code: 24-9063

Product Standards:

ASTM D558, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T134, AASHTO T180

Specifications	
Rammer Size	2 inches dia (50.8 mm) 5-1/2 lbs (2.49 kg)
Drop	12 inches (305 mm)
Guide Sleeve	Machined steel tubing with air pressure release holes
Finish	Corrosion resistant
Total Weight (kg)	2.5

Compaction Mould Modified ASTM

Product Code: 24-9066

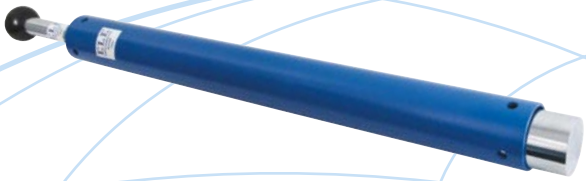
Product Standards:

ASTM D558, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T134, AASHTO T180

Specifications	
Dimensions (mm)	152.4 dia x 116.4 high
Rammer Mould Volume	1/13.33 ft³
Construction	All steel, threaded studs with wing nuts, plated
Weight (kg)	8.3

Proctor Compaction Rammer 4.5 kg (Modified) ASTM

Product Code: 24-9070



Product Standards:

ASTM D558, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T134, AASHTO T180

Specifications	
Rammer Size	2 inches dia. (50.8 mm); 10 lbs (4.5 kg)
Drop	18 inches (457.2 mm)
Guide Sleeve	Machined steel tubing with integrally spun end cap; air pressure release holes
Finish	Corrosion resistant
Total Weight (kg)	6.3

Compaction & CBR

Straight Edge 300 / 455 mm

Product Code: 24-9010, 81-0715

Specifications

Product Code	24-9010	81-0715
Dimensions L x W x D (mm)	300 x 40 x 1.5	455 x 40 x 1.5
Weight (g)	550	900

Automatic Compaction of Soils

The time and effort required to prepare specimens for compaction studies and other test methods can often be costly and time-consuming. The use of an automatic, mechanical compactor will show considerable cost benefits over hand compaction methods. Two models meeting the requirements of BS/EN and ASTM are available.

Automatic Compactors

- Pre-set blow pattern ensures even compaction.
- Solid state controls for reliability and ease of maintenance.
- Automatic re-setting of counter after completion of blow pattern.

These machines automatically compact specimens eliminating the laborious hand compaction method. The height and weight of the rammer are selectable to suit test requirements. An automatic blow pattern ensures optimum compaction for each layer of soil. The rammer travels across the mould and the table rotates the mould in equal steps on a base that is extremely stable. The number of blows per layer can be set at the beginning of the test.

Automatic Soil Compactor BS

Product Codes: 24-8080/01, 24-8080/06

Product Standards:

BS 1377-4, BS 1924-2, EN 13286-2, EN 13286-47

Pre-set blow pattern ensures an even compaction. Includes solid state controls for reliability and maintenance. An automatic digital counter resets to zero on completion of a test. A pre-set number of blows per layer can be set by thumb wheel control. A compaction rate of approximately 26 blows per minute. Accepts BS Standard Compaction and CBR moulds; also meets the requirements of BS 1377.

Specifications		
Dimensions L x W x H (mm)	430 x 240 x 1400	
Rammer BS/EN	Circular faced, 50 mm dia, selectable to 2.5 kg or 4.5 kg weight.	
Drop BS/EN (mm)	Adjustable to 300 or 450	
Weight (kg)	160	
Product Code	**24-8080/01**	**24-8080/06**
Power Supply	220-240 V AC, 50 Hz, 1 ph	220-240 V AC, 60 Hz, 1 ph

Automatic Soils Compactor ASTM

Product Codes: 24-8085/01, 24-8085/06

Product Standards:

ASTM D558, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T134, AASHTO T180

Specifications		
Dimensions L x W x H	10 x 17 x 55 inches (250 x 430 x 1400 mm)	
Rammer	Circular faced, 2 inch (50.8 mm) dia foot; selectable to either 5.5 lb (2.5 kg) or 10 lb (4.5 kg) weight	
Drop	Adjustable to either 12 inches (305 mm) or 18 inches (457 mm)	
Controls	Digital counter system, selector switch for either standard Proctor test or modified Proctor/CBR testing	
Weight (kg)	160	
Product Code:	**24-8085/01**	**24-8085/06**
Power Supply	220-240 V AC, 50 Hz, 1 ph	220-240 V AC, 60 Hz, 1 ph

Compaction & CBR

Compaction BS & CBR Accessories

Grouped Product Standards:

BS 1377-4, BS 1924-2, EN 13286-4

Product Code	Product
24-9200	CBR Extension Collar
24-9204	BS CBR Solid Base
24-9198	CBR Mould Body
24-9000	Standard Compaction Mould

Compaction ASTM Accessories

Grouped Product Standards:

ASTM D558, ASTM D698, ASTM D1557, AASHTO T99, AASHTO T134, AASHTO T180

Product Code	Product
24-9060	Proctor Mould
24-9066	ASTM/Modified Proctor Compaction Mould
24-9228	ASTM CBR Mould

Automatic Soils Compactor Spares Kit BS

Product Code: 24-9090/K1

Spares Kit Includes	Qty
Tongue	1
Compression Spring	1
Tension Spring	2
Guide Pin	1
External Circlip	1
Microswitch Roller	2
Thrust Washer	1
Oilite Bush	1
Compression Spring	2
Tension Spring	1
Clamp Nut	2
Torsion Spring	1
Tension Spring	1
Anti Surge Fuse for Digital Console 240 V	5
A/S Fuse	5
Rammer BS	1
Knockout BS	1

Automatic Soils Compactor Spares Kit ASTM

Product Code: 24-9095/K1

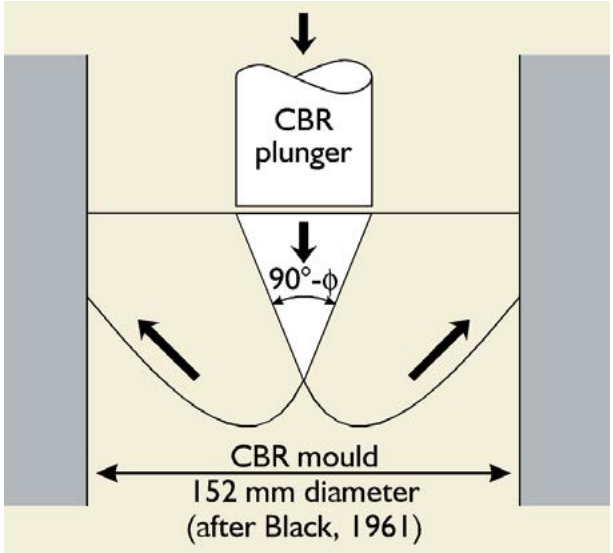
Spares Kit Includes	Qty
Tongue	1
Compression Spring	1
Tension Spring	2
Guide Pin	1
External Circlip	1
Microswitch Roller Lever Short	2
Thrust Washer	1
Oilite Bush	1
Compression Spring	2
Tension Spring	1
Clamp Nut	2
Torsion Spring	1
Tension Spring	1
Anti Surge Fuse for Digital Console 240 V	5
A/S Fuse	5
Rammer ASTM	1
Knockout ASTM	1

California Bearing Ratio

This test can be performed in the laboratory on prepared samples or on location in the field. It is important to appreciate that this test, being of an empirical nature, is valid only for the application for which it was developed.

A number of options are available to collect and analyse data with the ELE CBR-Test 50 or the MultiPlex 50 machines:

- Mechanical, using standard Load Rings and Penetration Dial Gauges.
- Electronic, Load Transducers and Displacement Transducers in conjunction with the ELE DSU Data Logger.
- Electronic, using Electronic measuring devices as above in conjunction with the ELE DS7.2 software that provides full analysis of CBR Test data.



CBR-Test 50 Machine 50 kN capacity BS & ASTM supplied with Stabilising Bar

Product Codes: 24-9150/01, 24-9150/02, 24-9150/06

Product Standards:

EN 13286-47, BS 1377-4, ASTM D1883, AASHTO T193

Designed for performing laboratory CBR tests to BS 1377, EN13286-47 and ASTM D1883, this bench mounting machine comprises a twin column frame incorporating a motorised drive system. Rapid adjustment of the platen is provided, which enables daylight to be taken up quickly and also close control of application of a seating load.

- Single speed machine (BS/EN and ASTM).
- Rapid platen adjustment.
- Complete with stabilising bar.
- Compact, bench-mounting design.
- Options for mechanical or electronic measurement.

Specifications	
CBR Penetration	Yes
Dimensions L x W x H (mm)	550 x 400 x 1220
Max Vertical Clearance (mm)	800
Horizontal Clearance (mm)	255
Platen dia (mm)	133
Platen Travel (mm)	105
Weight (kg)	80
Product Code	**Power Supply**
24-9150/01	220 V AC, 50 Hz, 1 ph
24-9150/02	110-120 V AC, 60 Hz, 1 ph
24-9150/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Stabilising Bar (24-9170)

Compaction & CBR

MultiPlex 50 Load Frame

Product Code: 25-3700/01

Product Standards:

Marshall

EN 12697-34, EN 12697-12, EN 12697-23, BS 598-107, ASTM D6927, ASTM D6931

CBR

EN 13286-47, BS 1377-4, ASTM D1883, AASHTO T193

Triaxial

BS 1377-7, BS 1377-8, ASTM D2166/D2166M, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

Specifications	
CBR Penetration	Yes
Unconfined Compression	Yes
Consolidated Undrained	No
Consolidated Drained	No
Marshall Stability and Flow	Yes
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Dimensions (mm)	550 x 400 x 1470
Max Vertical Clearance (mm)	800
Horizontal Clearance (mm)	265
Platen dia (mm)	133
Platen Travel (mm)	100
Platen Speed Range	0.5 to 50.8 mm/min
Rapid Approach Speed	40 mm/min
Weight (kg)	100 (shipping 113)

Manual Accessories:

Clamped Boss Load Ring - 2 kN (78-0060)

Clamped Boss Load Ring - 3 kN (78-0160)

Clamped Boss Load Ring - 4.5 kN (78-0260)

Clamped Boss Load Ring - 10 kN (78-0460)

Clamped Boss Load Ring - 28 kN (78-0760)

Clamped Boss Load Ring - 50 kN (78-0860)

Penetration Dial Gauge BS (24-9186)

Penetration/Swell Dial Gauge ASTM (24-9184)

Electronic Accessories:

50 kN S-Type Load Cell (27-1559)

CBR Penetration Transducer 50 mm travel fitted with 5-pin DIN plug (27-1705)

DSU 27-1300/01 and 27-1300/02

Alternative frame to product: 24-9150/01

Compact bench mounting load frame designed for performing laboratory CBR, unconfined compression, Quick Undrained Triaxial and Marshall Stability Tests. Has a variable speed of 0.5 to 50.8 mm per minute and features rapid approach of platen.

Penetration Measurement

Penetration Piston

Product Code: 24-9182

1935 mm² (3 inches²) area foot of case hardened steel. Designed to fit all ELE load rings.

Specifications	
Weight (kg)	3.8

CBR Penetration Piston (Adjustable)

Product Code 24-9183

Product Standards:

EN 13286-47, BS 1377-4, ASTM D1883, AASHTO T193

As 24-9182 but with a coarse stem adjustment. This piston is particularly useful for in-situ testing.

Penetration/Swell Dial Gauge ASTM

Product Code: 24-9184

Product Standards:

ASTM D1883, AASHTO T193

1 inch travel x 0.0005 in divisions. Complete with rack extensions and chisel edge anvil.

Penetration Dial Gauge BS

Product Code: 24-9186

Product Standards:

BS 1377, BS 1924, ASTM D4429

25 mm travel x 0.01 mm divisions. Complete with rack extensions and chisel edge anvil.

CBR Penetration Gauge Dual Purpose Mounting Bracket & Adaptor

Product Code: 24-9188

Product Standards:

BS 1377, BS 1924, ASTM D4429

Dual purpose mounting bracket for CBR penetration dial gauges 24-9184/24-9186. Allows gauge to be fixed to penetration piston or load ring.

CBR Penetration Transducer 50 mm Travel fitted with 5-pin DIN Plug

Product Code: 27-1705

Displacement Transducers are used in consolidation, shear, CBR and triaxial test applications for accurate displacement measurements. They are supplied complete with a 5-pin DIN type connector for direct connection to the DSU.

- Ideally suited for use with DSU for accurate displacement measurements.
- Models available for use in consolidation, shear, CBR and triaxial test applications.
- Supplied complete with mounting hardware for specified products.
- Supplied with calibration certificate.

Specifications	
Construction	Fully encapsulated electronics, sealed in a Stainless Steel case
Excitation	14 V DC
Connector	5-pin DIN type
Mounting Bracket	Included as standard
Weight (kg)	0.45

Compaction & CBR

Force Measurement

A range of load rings will be required depending upon the type of material being tested. Detailed below is a selected range of load rings and transducers that are suitable for differing values of CBR.

Clamped Boss Load Rings

ELE Clamped Boss Load Rings are available in the range 1 kN to 50 kN.

The available capacities and performance of ELE load rings satisfy the requirements for accurate load measurement for a wide range of testing applications.

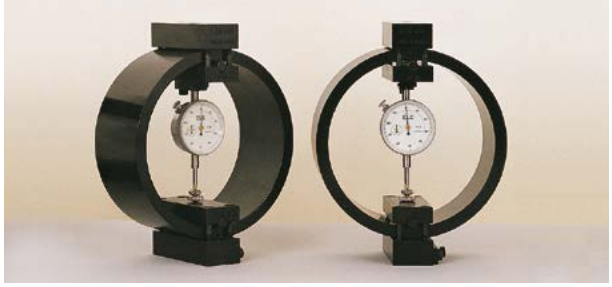
The repeatability and accuracy of all clamped boss rings comply with the requirements of NIS 0415 Accreditation for the Calibration of Force Measuring Rings and Load Cells used in Soil Testing.

The repeatability of all load rings is within 0.2% of indicated load and accuracy is ±1% of indicated load over the upper 80% of the working range, at the calibration loads.

All clamped boss load rings are calibrated in kN and supplied with a calibration chart.

Complete with a detachable nipple, all rings are supplied in a protective foam moulding.

- Repeatability within 0.2% of indicated load.
- Accuracy within ±1% of indicated load.
- Works calibrated.



Product Code	Capacity			Typical Design Sensitivity			Overall Height (mm)	Approx Weight (kg)	Value of CBR
	kN	kgf	lbf	N/div	kgf/div	lbf/div			
78-0060	2.0	200	450	1.3	0.13	0.30	248	3.2	Up to 8%
78-0160	3.0	300	650	2.0	0.20	0.43	248	3.3	N/A
78-0260	4.5	450	1000	3.0	0.30	0.66	248	3.5	N/A
78-0460	10.0	1000	2250	7.7	0.77	1.73	248	4.6	8% - 40%
78-0760	28.0	2800	6000	25.5	2.54	5.45	248	5.4	Average range of CBR
78-0860	50.0	5000	11200	45.5	4.54	10.18	248	7.9	Above 40%

S-type Load Cell 50 kN

Product Code: 27-1559

Product Standards:

EN 12697-34

Maximum working capacity of 50 kN and extension 10 V AC/DC with an output of 2.7 mV/V nominal. Aluminium alloy and Stainless Steel construction with IP65 environmental protection.

Supplied with calibration certificate.

Specifications	
Value of CBR %	ALL
Environmental Protection	IP65
Force Capacity (kN)	50

Automatic Data Acquisition - CBR

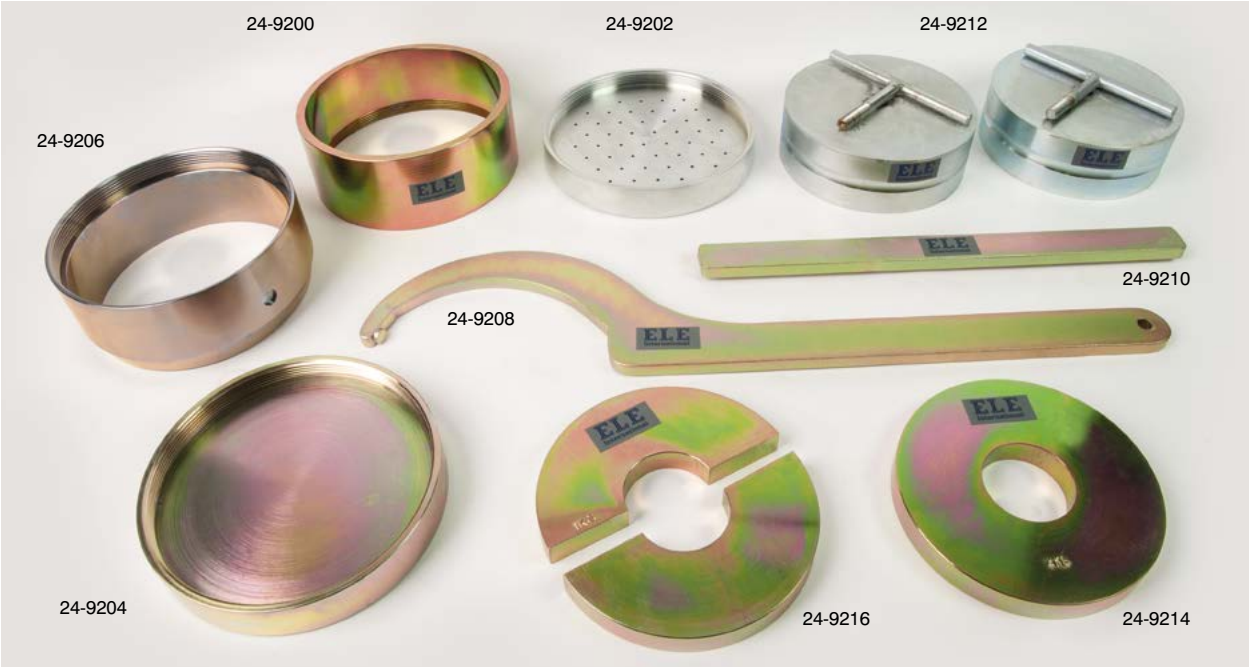
For full details see Data Logging on pages 72-77

Product Code	Product
27-2798 (DS7.2: 27-1798)	DS7.3 California Bearing Ratio (CBR) Penetration Program
27-1500/01	GDU 8 channel data acquisition unit 220-240 V AC, 50-60 Hz, 1 ph
27-1500/02	GDU 8 channel data acquisition unit 110-120 V AC, 50-60 Hz, 1 ph
27-1300/01	DSU 4 channel data acquisition unit 220-240 V AC, 50-60 Hz, 1 ph
27-1300/02	DSU 4 channel data acquisition unit 110-120 V AC, 50-60 Hz, 1 ph

CBR Moulds & Accessories

A range of moulds and accessories designed to meet relevant Standards. The equipment is manufactured from high quality materials and, with regular maintenance, will give years of satisfactory performance.

CBR Mould BS EN



CBR Mould Body BS EN

Product Code: 24-9198

Product Standards:

BS 1377-4, BS 1924-2

Specifications	
Mould (mm)	152 x 127 (inside dia x height)
Collar (mm)	51 height, fits both ends of mould
Base Plate	Solid, fits both ends of mould
Construction	All steel, plated
Weight (kg)	7.3

CBR Mould Accessories BS EN

Product Standards: ASTM D1883, AASHTO T193

Product Code	Product	Weight (kg)
24-9200	CBR Extension Collar To fit to mould body	1.85
24-9204	BS CBR Solid Base To fit to mould body	2.5
24-9202	Perforated Base Plate To fit to mould body for swell tests	1.8
24-9206	CBR Cutting Collar. To fit mould body, with a cutting edge to enable undisturbed samples to be taken from the field	1.4
24-9208	C-spanner for CBR Mould To fit mould body and collars	1.7
24-9210	Base Plate Tool. To fit into base plate to assist removal from mould body	0.7
24-9212	Static Compaction Plug Steel, 150 mm dia x 51 mm depth. Complete with removable handle	7.3
24-9214	Annular Surcharge Weight	2
24-9216	Split Surcharge Weight (4 required)	2
24-9237	Space Disc	7
24-9220	Filter Paper - 150 mm dia Box of 100	0.2

Compaction & CBR

CBR Mould ASTM/AASHTO

CBR Mould ASTM complete with Collar & Perforated Base Plate

Product Code: 24-9228

Product Standards:

ASTM D1883, AASHTO T193

Specifications	
Mould (mm)	152.4 x 177.8 (inside dia x height)
Collar (mm)	50.8 height, fits both ends of mould
Base Plate	Perforated
Construction	All steel, plated
Weight (kg)	9

CBR Mould Accessories ASTM/AASHTO

Grouped Product Standards:

ASTM D1883, AASHTO T193

Product Code	Product	Weight (kg)
24-9234	Solid Base Plate	2.9
24-9236	CBR Cutting Collar To fit mould body, with a cutting edge to enable undisturbed samples to be taken from the field	1.5
24-9238	CBR Spacing Disc 150.8 mm dia x 61.4 mm deep	6.8
24-9240	Filter Screen 150mm dia with 150 μm mesh. Box of 100	0.1
24-9243	10 lb annular Surcharge Weight	4.5
24-9244	5 lb split Surcharge Weight (4 required)	-
24-9245	5 lb annular Surcharge Weight	-
24-9250	Filter Papers Equivalent to Whatman No.5 - 150 mm dia Box of 100	0.2

Swell Expansion Test Equipment

Swell Plate

Product Code: 24-9260

Product Standards:

ASTM D1883, AASHTO T193

With adjustable stem.

Specifications	
Base Plate	5 15/16 inches dia (150.8 mm); perforated.
Contact Head	Adjustable; locks on stem with knurled nut
Construction	Aluminium
Weight (kg)	0.5

Swell Stand (Tripod)

Product Code: 24-9262

Product Standards:

ASTM D1883, AASHTO T193

For mounting Swell Dial Gauge in position on CBR Mould Collar.

Further Information:

Requires dial indicator; not included, order separately.

Specifications	
Construction	Machined, one-piece cast aluminium
Clamp	Integral part of assembly; holds dial indicator
Contact Head	Integral part of assembly; holds dial indicator
Dimensions L x W x H (mm)	190 x 190 x 170
Weight (kg)	0.9

Accessories:

Mechanical Dial Indicator - 25 mm Range Clockwise Movement (88-4110).

Small Curing Tank for Small Cubes

Product Code: 34-6755/01

Small cube curing tank can hold 16 x 150 mm cubes or 105 x 70.7 mm cubes. Comes complete with stand, internal tray, immersion heater designed to maintain the temperature at 20°C, +/- 2°C and thermostat.

Curing Tank Heater Unit to be used with Small Curing Tank

Product Code: 34-6755/10

Alternative Large Curing Tank (34-6575/01) please see page 126.

Penetration/Swell Dial Gauge BS & ASTM

Dial Gauge Back Bracket Mount Positions

Specifications				
Product Code	Application	Travel (mm)	Divisions (mm)	Standard
24-9184	Penetration/Swell	25	0.01	ASTM
24-9186	Penetration	25	0.01	BS
24-9275	Penetration/Swell	25	0.01	BS

Compaction & CBR

In-situ CBR

The use of in-situ CBR apparatus on road construction contracts enables the bearing capacity of soils to be determined quickly and efficiently with minimum delay. The BS 1377, BS 1924 and ASTM D4429 standards describe in-situ test procedures.

In-situ/CBR Mechanical Jack 45 kN (10000 lb) Capacity

Product Code: 24-9290

Product Standards:

BS 1377-9, BS 1924-2, ASTM D4429

The body is corrosion protected and houses an enclosed worm and wheel gear. The gear ratio has been carefully selected to provide a handwheel speed that can be comfortably maintained, particularly with soils of high CBR value. A quick-release device in the screwjack allows the plunger to be rapidly adjusted prior to the test.

Specifications	
Weight (kg)	8.2

In-situ Land Rover Bracket to attach 29-200 Jack. For Land Rover Models 90 & 110 from 1983 onwards

Product Code: 24-9298

Product Standards:

BS 1377-9, BS 1924-2, ASTM D4429

Fits all models in Land Rover series 90 and 110.

Ball Seating for 45 kN Jack 24-9290

Product Code: 24-9300

Product Standards:

BS 1377-9, BS 1924-2, ASTM D4429

For fitting between the mechanical jack and reaction point. The ball seating is used when testing on undulating ground to ensure that the jack, load measuring ring and penetration piston are truly vertical. Non-axial loading of the load ring will give false results and will eventually damage the ring itself.

Specifications	
Weight (kg)	1.8

In-situ Set of Extension Rods

Product Code: 24-9308

Product Standards:

BS 1377-9, BS 1924-2, ASTM D4429

Made from high quality steel with large section thread for quick assembly.

Spares/Consumables:

Adaptor for Extension Rod Set (24-9308/10)

In-situ Datum Bar Assembly

Product Code: 24-9312

Product Standards:

BS 1377-9, BS 1924-2, ASTM D4429

Comprising 2 tripod stands and a datum bar.

CBR Annular Surcharge Weight

Product Code: 24-9320

Product Standards:

BS 1377-9, BS 1924-2

Specifications	
Weight lb / kg	10 / 4.5

CBR Slotted Surcharge Weight

Product Code: 24-9322

Product Standards:

ASTM D4429

Specifications	
Weight lb / kg	10 / 4.5

CBR Slotted Surcharge Weight

Product Code: 24-9248

Product Standards:

ASTM D4429

Specifications	
Weight lb / kg	20 / 9.1
Construction	Machined steel
Finish	Plated

Accessories:

5 lb (2.27 kg) Annular Surcharge Weight ASTM (24-9245)

5 lb (2.27 kg) Split Surcharge Weight ASTM (24-9244)

CBR Penetration Piston (Adjustable)

Product Code: 24-9183

Product Standards:

BS 1377-9, BS 1924-2, ASTM D4429

As 24-9182 but with a coarse stem adjustment. This piston is particularly useful for in-situ testing.

For full specification see page 37

Penetration Gauge Bracket & Adaptor. Dual Purpose Mounting Bracket for CBR Penetration Gauges 24-9184/24-9186

Product Code: 24-9188

For full specification details see page 37

Penetration/Swell Dial Gauge BS & ASTM

Dial Gauge Back Bracket Mount Positions

Specifications

Product Code	Application	Travel (mm)	Divisions (mm)	Standard
24-9184	Penetration/Swell	25	0.01	ASTM
24-9186	Penetration	25	0.01	BS
24-9275	Penetration/Swell	25	0.01	BS

Clamped Boss Load Rings

Product Code	Capacity			Overall Height (mm)	Approx Weight (kg)
	kN	kgf	lbf		
78-0460	10.0	1000	2250	248	4.6
78-0760	28.0	2800	6000	248	5.4

For full specifications on the above Load Rings see page 38

Compaction & CBR

In-situ Conversion to Laboratory CBR

The in-situ CBR jack assembly can be mounted in a simple conversion frame to measure CBR values in the laboratory. The frame is used with the jack, a suitable load ring, CBR mould and penetration piston.

CBR Conversion Frame

Product Code: 24-9341

Product Standards:

BS 1377-9, BS 1924-2, ASTM D4429

50 kN conversion frame to adapt to mechanical jack for laboratory CBR tests. The frame is of a two-column construction with an overhead beam to accept the mechanical jack 24-9290 and is supplied complete with stabilising bar.

Specifications	
Weight (kg)	25

In-situ/CBR Mechanical Jack 45 kN (10000 lb) Capacity

Product Code: 24-9290

Product Standards:

BS 1377, BS 1924, ASTM D4429

Clamped Boss Load Ring 28.0 kN

Product Code: 78-0760

Repeatability shall be within 0.2% of indicated load. Accuracy will be +/- 1% of indicated load over the upper 80% of the working range at the calibration loads.

Penetration Piston (Adjustable) for CBR

Product Code: 24-9183

As 24-9182 but with a coarse stem adjustment. This piston is particularly useful for in-situ testing.

For full specification see page 37

Penetration Gauge Bracket & Adaptor. Dual Purpose Mounting for CBR Penetration Gauges

Product Code: 24-9188

Product Standards:

BS 1377, BS 1924, ASTM D4429

Dual purpose mounting bracket for CBR penetration dial gauges 24-9184/24-9186. Allows gauge to be fixed to penetration piston or load ring.

Penetration/Swell Dial Gauge ASTM

Product Code: 24-9184

For full specification see page 37

Penetration Dial Gauge BS

Product Code: 24-9186

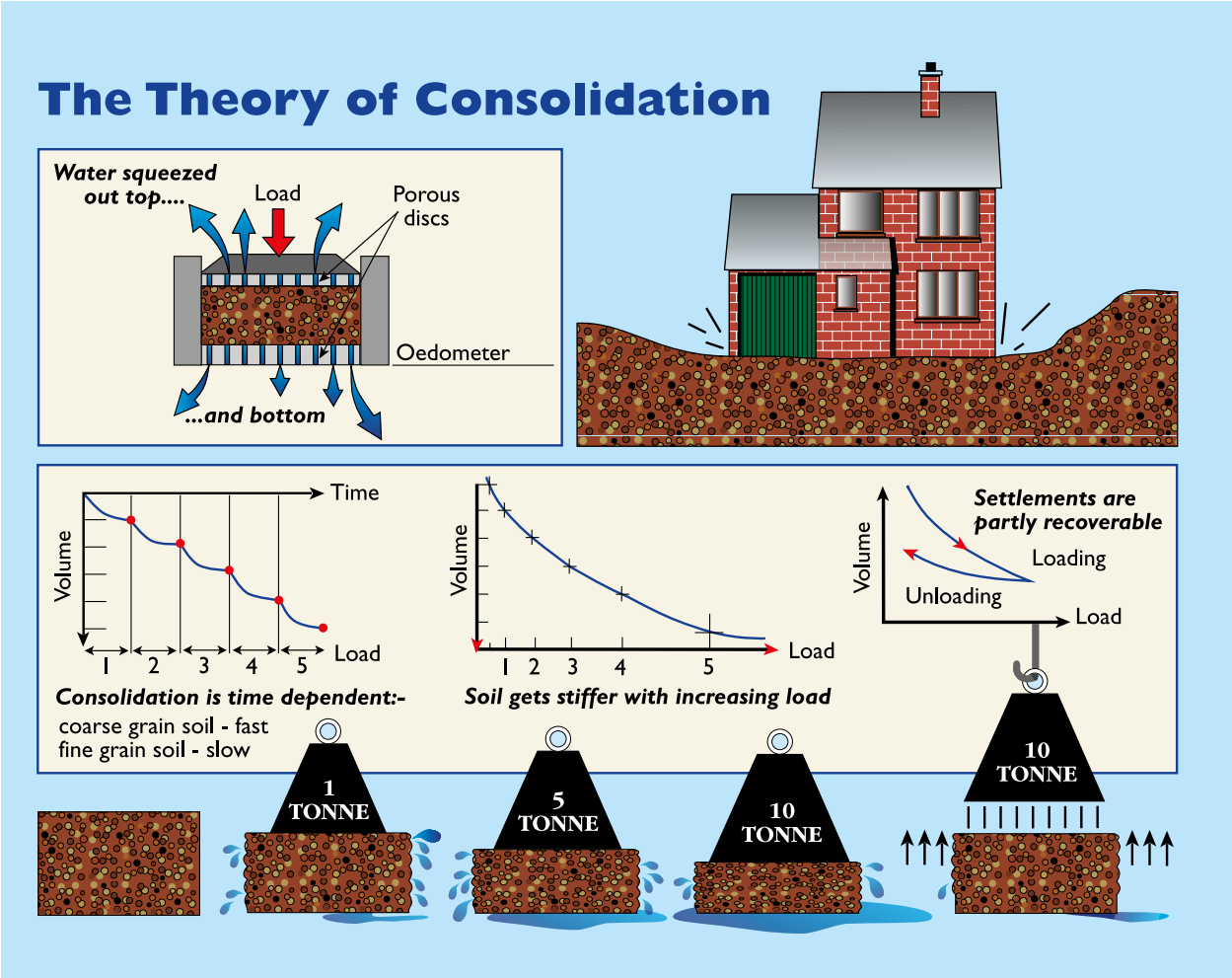
For full specification see page 37

Consolidation

It is generally understood that clays and other compressible soils can be subject to long-term consolidation under the loads imposed by foundations and above ground structures, also that settlement may occur even if the applied pressure is within the safe bearing capacity of the soil.

One-Dimensional Consolidation

The One-dimensional Consolidation test is used to determine the consolidation characteristics of soils of low permeability. 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 behaviour of foundations under load.



Consolidation

Consolidation/Oedometer Apparatus

Consolidation Frame

Product Code: 25-0402

Product Standards:

ISO 17892-5, BS 1377-5, ASTM D2435, ASTM D3877, ASTM D4546, AASHTO T216

The ELE Oedometer is rigidly constructed to ensure minimum frame distortion. The frame is designed to load the specimen through a yoke assembly and one of three alternative beam ratios. The beam is fitted with a counterbalance weight and beam support jack. The cell platform will accept the complete range of ELE consolidation cells and is fitted with a central spigot to ensure accurate centring of the cell under the loading yoke.

- High capacity - 8800 kPa on 50 mm diameter specimens using 11:1 beam ratio.
- Triple beam ratio, 9:1, 10:1, 11:1.
- Compact unit ensures maximum space saving.

Further Information:

Supplied without dial gauge and weights.

Spares/Consumables:

Weight hanging spindle assembly (1563B0010)

Specifications	
Load Capacity	48 tons/ft^2 (5,14 8 kPa) on 2.5 inches (63 mm) dia samples
Loading Beam	Cast aluminium; counterbalanced; 9:1,10:1 and 11:1 ratios
Frame	Cast aluminium; integral beam support jack; plated steel and platform
Dimensions L x W x H	711 x 203 x 508 mm (28 x 8 x 20 inches) excluding weight hanger
Weight	(Net 30 lbs) 13.6 kg; Shipping 40 lbs (18.1 kg)

Consolidation Weight Sets 100 kg / 50 kg

Product Code: 25-0408, 26-2132

Specifications	Set A	Set B
Product Code	25-0408	26-2132
Weight Set (kg)	100 Total	50 Total
Set Includes	9 x 10 kg 1 x 5 kg 2 x 2 kg 1 x 1 kg	4 x 10 kg 1 x 5 kg 2 x 2 kg 1 x 1 kg

Consolidation Floor Mounting Stand

Product Code: 25-0429

A versatile modular steel stand. Holes in the shelf are provided for securing up to three 25-0402 Consolidation Frames. Dimensions 610 x 915 x 865 mm (L x W x H).

Specifications	
Table Dimensions (mm)	980 x 950

Consolidation Cells & Accessories

High Pressure Application Consolidation Cells & Accessories

Grouped Product Standards:

ISO 17892-5, BS 1377-5, ASTM D2435, ASTM D3877, ASTM D4546, AASHTO T216

Product Code	Product	Sample Dia (mm)
25-0455	Consolidation Cell 50 mm	50
25-0458	Cutting Ring	50
25-0461	Calibration Disc	50
25-0455/13	Upper and lower Porous Stones	50

Spares/Consumables:

Top cap for 50 mm Consolidation Cell (1037A0006)

BS EN Consolidation Cells & Accessories

Grouped Product Standards:

ISO 17892-5, BS 1377-5

Product Code	Product	Sample Dia (mm)
25-0503	Consolidation Cell 75 mm	75
25-0506	Cutting Ring	75
25-0509	Calibration Disc	75
25-0503/13	Upper and lower Porous Stones	75

ASTM/AASHTO Consolidation Cells & Accessories

Grouped Product Standards:

AASHTO T216, ASTM D2435, ASTM D3877, ASTM D4546

Product Code	Product	Sample Dia (inches)
25-0479	Consolidation Cell	2.5
25-0482	Cutting Ring	2.5
25-0485	Calibration Disc	2.5
25-0479/13	Upper and lower Porous Stones	2.5

Vertical Settlement Measurement

Various methods of measuring vertical settlement can be supplied. These range from dial gauges to displacement transducers. All devices comply with the accuracy specified in BS 1377, ASTM D2435 and D4546. Displacement transducers are supplied with a calibration certificate. The table below shows the range of devices available for fitting to the 25-0402 Consolidation Frame. Transducers are supplied complete with mounting brackets as required.

Product Code	Product
25-0440	Dial Gauge 10 mm travel x 0.002 mm divisions
27-1649	Consolidation Transducer 15 mm travel

Automatic Data Acquisition - Consolidation

Geotechnical laboratories make extensive use of computers and automated testing, and we offer specially written software packages designed to record and analyse test data. Presentation of results is in test report format, giving geotechnical engineers total control over all areas of analysis where an engineering judgement is required.

Product Code	Product
27-2773 (DS7.2: 27-1773)	DS7.3 One-Dimensional Consolidation Software
27-1300/01	DSU

For full details see Data Logging on page 72-77.

Consolidation

Permeability

Knowledge of the permeability characteristics of soil is essential for construction projects where drainage is an important element. In particular, permeability is a key parameter for the design and assessment of landfill sites, the investigation of contaminated ground, the design of earth dams and sheet pile walls, and in assessing the potential for lowering groundwater levels.

Combination Permeameter, 2.5 inches (63.4 mm); Constant & Falling Head Methods

Product Code: 25-0623

This combination permeameter has a transparent plastic chamber for soil specimens of either fine-grained or coarse-grained soils. Generally, soils containing 10% or more particles passing a 75 μm sieve are tested using the falling head assembly. More granular soils, containing 90% or more particles retained on the 75 μm sieve, are tested using the constant head assembly. The cell is sealed at the top so that a vacuum may be used to saturate the specimen. Porous stones located at the top and bottom of the cell prevent sample flaking or washout. For constant head tests, a plastic funnel reservoir is mounted on an upright attached to the cell, providing a maximum head of 550 mm. Falling head tests are performed using the graduated pipette falling head reservoir, which gives a maximum head of 1000 mm and is graduated 0.2 ml.

- Plated steel chamber head assembly.
- Corrosion-resistant cast aluminium base assembly.
- Includes accessories for conducting both constant and falling head permeability studies.

Specifications	
Chamber	Transparent plastic, single section
Base	Cast aluminium
Top Seal	Plated steel with gaskets
Constant Head	Plastic, funnel reservoir, 550 mm max head
Falling Head	Graduated pipette, 100 ml x 0.2 ml, 1000 mm max head
Specimen Size (dia x length max)	63.5 x 63.5 mm when using lower chamber only 63.5 x 140 mm when using both lower and extension chambers
Capacity	Clear lucite; 1/4 inch (6.3 mm) wall; single section
Porous Stones (dia x thickness)	Mounts at top and bottom; 62.7 x 12 .7 mm; 105-120 permeability rating; 300 micron, average pore size
Weight	Net 11 lbs (5 kg)

Spares/Consumables:

Porous Stone 62.7 x 12.7 mm (T-308)

Products Standards:

BS 1377-5

Permeameters

These Permeameters are designed for performing either constant head or falling head permeability tests on undisturbed, remoulded or compacted soils.

Compaction Permeameter

Product Code: 25-0607

Product Standards:

ASTM D5856

Specifications	
Mould	Machined seamless steel tubing, plated
Capacity (mm)	101.6 x 116.4 (inside dia x h) 1/30 ft³
Collar (mm)	50.8 high, machined
Top	Overflow valve assembly and water connection
Base	Cast aluminium, with inlet/outlet fitting
Porous Stone	(4 inches) 101.6 x 12.7 mm (dia x thickness)
Weights (kg)	7.9

Standpipe Panel

Product Code: 25-0609

Complete with three glass tubes of 1.5, 3 and 5 mm diameter bore, approximately 1.4 metres long. Supplied with metre scale and thick-walled flexible tubing. The glass tubes are fitted to a panel for wall mounting and connected to a 3-way outlet valve.

De-Airing Tank

Product Code: 25-0611

Manufactured from transparent plastic with de-airing jet inlet and a flow outlet connection with flexible tubing. The tank is manufactured to withstand a reduced pressure and is suitable for direct wall mounting.

Specifications	
Weight (kg)	6

Soaking Tank

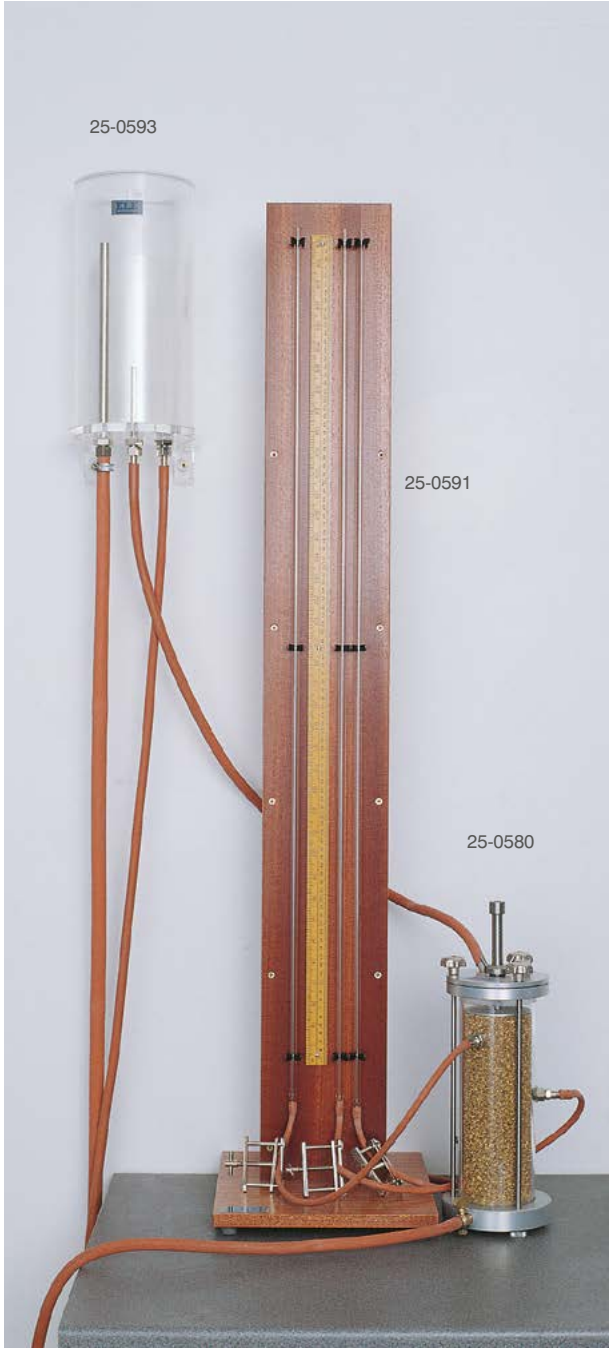
Product Code: 25-0613

With fixed overflow. Used for containing permeability cell during test.

Specifications	
Weight (kg)	4

Permeability

Constant Head Apparatus



This equipment is used for testing the permeability of granular soils (sands and gravels). The specimen is formed in a permeability cell and water is passed through it from a constant level tank. Take-off points located along the sides of the permeability cell are connected to three manometer tubes mounted on a panel complete with a metre scale. Water passing through the specimen is collected and measured, either for a specific quantity or over a period of time. The reduction of head is noted from the variation of water level in the manometer tubes.

Constant Head Permeability Cell

Product Standards:

BS 1377-5

Specifications		
Product Code	25-0580	25-0585
Nominal Cell inside dia (mm)	75	114
Cell Wall	Transparent plastic	Transparent plastic
Take-off Points	3	3
End Plates	Anodised aluminium	Anodised aluminium
Weight (kg)	4.5	8

Manometer Tubes & Stand

Product Code: 25-0591

Product Standards:

BS 1377-5

Comprising three glass tubes of constant bore, metre scale and connecting tubing for cell pressure take-off points, all mounted on a free-standing panel.

Permeability Cell Requirements:

75 mm Permeability Cell: 1 x set of tubes, 1 x stand

114 mm Permeability Cell: 2 x sets of tubes, 2 x stands

Specifications	
Weight (kg)	9.5

Constant Level Tank

Product Code: 25-0593

Product Standards:

BS 1377-5

Manufactured from transparent plastic with attachment for wall mounting. The inlet, outlet and overflow pipes are fitted to the base of the tank and can be adjusted for height within the tank. Supplied complete with connecting tubing.

Specifications	
Weight (kg)	2.4

Spares/Consumables:

75 mm Gauze Disc - 0339A0016

114 mm Gauze Disc - 0342A0016

Falling Head Apparatus

Clays and silts are tested using the falling head technique. Flow of water through the specimen is observed by monitoring the rate of fall of water in the tube. It is essential that soils of very low permeability are sealed inside the cylinder to prevent seepage along the sides of the specimen. Before testing, the specimen must be completely saturated with water as the presence of air will restrict the flow of water.

Falling Head Permeability Cell

Product Code: 25-0605

Specifications	
Cell (mm)	Plated seamless tube 100 dia x 130 height
Base	Porous plate with three tie rods
Top Plate	Machined to accept smaller tubes
Weight (kg)	3.4

Spares/Consumables:

Standpipe 1.5 mm (0345A0002)

Standpipe 3.0 mm (0345A0003)

Standpipe 5.0 mm (0345A0004)

Standpipe Panel

Product Code: 25-0609

Complete with three glass tubes of 1.5, 3 and 5 mm diameter bore, approximately 1.4 metres long. Supplied with metre scale and thick-walled flexible tubing. The glass tubes are fitted to a panel for wall mounting and connected to a 3-way outlet valve.

De-Airing Tank

Product Code: 25-0611

Manufactured from transparent plastic with de-airing jet inlet and a flow outlet connection with flexible tubing. The tank is manufactured to withstand a reduced pressure and is suitable for direct wall mounting.

Specifications	
Weight (kg)	6

Soaking Tank

Product Code: 25-0613

With fixed overflow. Used for containing permeability cell during test.

Specifications	
Weight (kg)	4

Accessories:

Measuring Cylinder 100 ml (82-0380)

Permeability

Guelph Permeameter

The Guelph Permeameter is used to obtain accurate measurements of hydraulic conductivity, soil sorptivity and soil matrix flux potential. These three factors govern how liquids will move through an unsaturated soil profile.

Guelph Permeameter supplied complete with Extension Kit

Product Code: 25-0650

Product Standards:

ASTM D5126

Recent significant advances in both the theoretical and practical techniques of measuring soil hydraulic conductivity have been made by the University of Guelph, Canada. This has resulted in the development of the Guelph Permeameter, utilising the Constant Head Well principle.

- Lightweight and portable.
- Robust construction.
- Requires only 2.5 litres of water.
- Results usually within 2 hours.

Further Information:

Guelph Permeameter Set Includes:-

- 1 Field Tripod.
- 1 Well Auger.
- 1 Well Tripod.
- 1 Preparation Tool.
- 1 Hand Pump.
- 1 Extension Kit (extends depth by 800 mm).
- 1 Collapsible Water Container.
- 1 Set of Instructions and Carrying Case.

Specifications	
Cell (mm)	Plated seamless tube 100 dia x 130 height
Capacity (ltrs)	3.18
Base	Porous plate with three tie rods
Top Plate	Machined to accept smaller tubes
Overall Weight (kg)	111
Permeameter	High impact polycarbonate, molded elastomers
Auger	2 inches (50.8 mm) dia; machined steel
Carrying Case	Die-cut foam for parts storage
Test Time	1/2 - 2 hours
Test Depth	150 to 750 mm (0.5 to 2.5 ft)
Hydraulic Conductivity Range	10-4 to 10-8 m/sec (10-2 to 10-6 cm/sec)
Weight	Net 30 lbs (13.6 kg)

Spares/Consumables:

Permeameter Extension Kit (25-0655)

Vacuum Hand Pump with Gauge (25-0650/10)

Guelph Permeameter (25-0650/80)

1) Auger and prepare hole

2) Install Permeameter and fill with water

3) Record changing water level and calculate results

Soil Strength (Triaxial)

The measurement of total stress or effective stress requires different procedures and therefore different equipment.

Total stresses are normally measured in a triaxial cell where the sample is subject to an all round confining pressure (σ_3). A load is applied (σ_1) through a piston onto a pressure pad, with the sample being confined within a rubber membrane so that no drainage in or out of the specimen is allowed. Pore water pressures are not normally measured and the undrained test is often referred to as the QU-TXL test.

By comparison, effective stresses when measured in a triaxial cell are more complex in their nature, as numerous parameters can be measured. These include back pressure, pore water pressure and volume change; all of which can be used to calculate the required engineering properties.

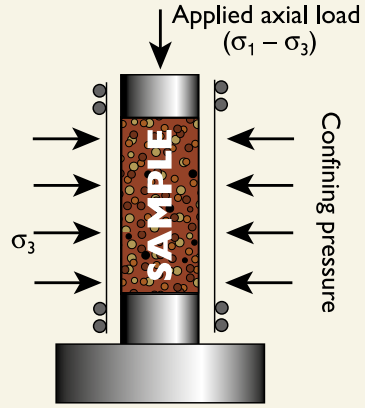
Effective stress tests are usually referred to as consolidated drained (CD) or consolidated undrained (CU). Generally the CD test is applicable to sands, while both the CU or CD test can be used with clays. There are many special test variations within these basic test groupings.

Our range of triaxial cells and accessories, used in conjunction with other equipment such as load frames, pressure sources and measurement devices, have been specifically designed to meet the wide ranging requirements of modern soil mechanics laboratories. Each system is easy to set up and use, providing accurate and repeatable measurements.

Types of Test

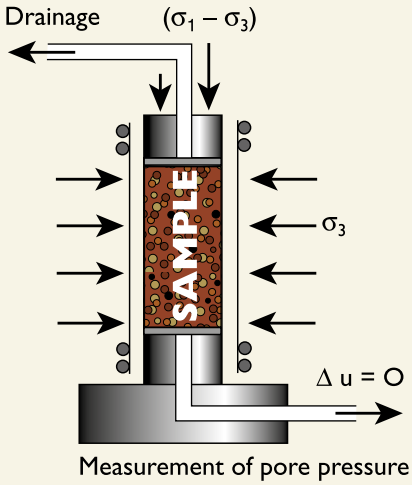
Total Stress Measurement

Quick undrained (QU) and Unconsolidated Undrained (UU)

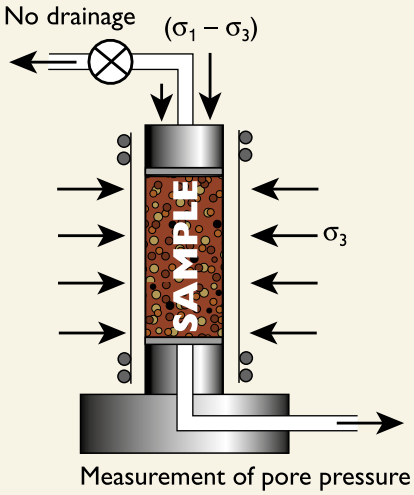


Effective Stress Measurement

Consolidated Drained (CD)



Consolidated Undrained (CU)



Soil Strength (Triaxial)

Triaxial Requirement Guide

There are various Triaxial tests that can be carried out ranging from the Total Stress to the more complex Effective Stress.

We ask the following simple questions to determine accurately your requirements when you are looking for a full system.

Once you determine your requirements from the questions on the right we can determine the exact set of equipment required.

See below example sets for Triaxial requests created using the Triaxial Sets Buyers Guide Chart.

Example Sets

ES	38	AU	PN	03
PE	70	AU	OW	01
TS	100	MA	OW	01
UNCONFINED		50	MA	
UNCONFINED		70	AU	

Triaxial Sets Buyers Guide — Please choose from the following:

	What type of test?		Choose
A)	1	Effective Stress CU/CD	ES
	2	Permeability	PE
	3	Total Stress QU/UU	TS
	4	Unconfined Compression	UNCONFINED

	What sample size?		Choose
B)	1	38 mm	38
	2	50 mm	50
	3	70 mm	70
	4	100 mm	100

	What type of system?		Choose
C)	1	Manual – Dial Gauges	MA
	2	Automatic – Transducers, Data Logging and Software	AU

	What pressure system?		Choose
D)	1	Oil and Water	OW
	2	Pneumatic	PN

	How many cells?		Choose
E)	1	1 cell	01
	2	2 cells	02
	3	3 cells	03

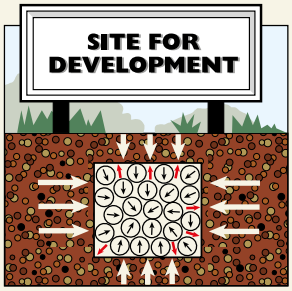
Effective Stress

Effective Stress = Total Stress - Pore Water Pressure

Effective Stress is drainage dependent (time and permeability dependent)

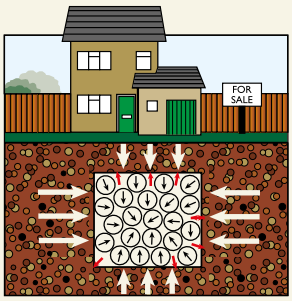
TIME = 0

Total Stress	= 100
Pore Water Pressure	= 40
Effective Stress	**= 60**



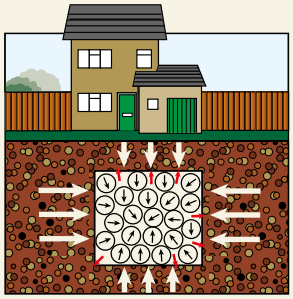
TIME = 8 Months

Total Stress	= 200
Pore Water Pressure	= 140
Effective Stress	**= 60**



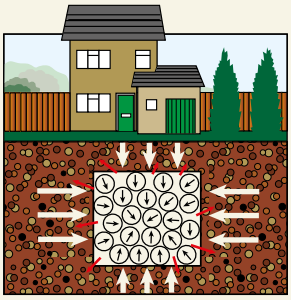
TIME = 12 Months

Total Stress	= 200
Pore Water Pressure	= 90
Effective Stress	**= 110**



TIME = 20 Months

Total Stress	= 200
Pore Water Pressure	= 40
Effective Stress	**= 160**



Strength depends on Effective Stress NOT Total Stress

Triaxial Load Frames

The range of ELE designed and manufactured load frames is the most modern of its kind available to the discerning test laboratory. The range comprises capacities of 50 kN incorporating the latest microprocessor control systems, clear on-board screen displays and a range of other high quality features.

Digital Tritest 50 Load Frame

Product Code: 25-3518/01, 25-3518/02

Product Standards:

BS 1377-7, BS 1377-8, ASTM D2166/D2166M, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

This 50 kN capacity machine, designed primarily for triaxial testing of soil specimens up to 100 mm diameter x 200 mm long, comprises a rigid twin column construction with an integral fully variable microprocessor controlled drive unit and LCD display with a touch sensitive keyboard. The machine is normally bench mounted for ease of installation and operation. The use of a microprocessor controlled drive system and keyboard entry provides the Digital Tritest 50 with a wide variety of features which include pause and speed reset during test, RS 232C, operator programming of speed and control functions, self test diagnostics and many other features. A robustly constructed steel case houses the motor drive system with careful attention being given to the prevention of ingress of water or grit. All operating controls are mounted on the front panel of the machine, which is angled and recessed to prevent physical and environmental damage.

- Microprocessor control.
- Large on-board LED screen display.
- Direct entry via a touch sensitive keyboard.
- Rapid approach and return to datum of platen.
- Fully variable speed, 0.00001 to 9.99999 mm/min.
- Samples up to 100 mm diameter.

Further Information:

Complete with RS 232C interface.

Specifications	
CBR Penetration	Yes
Unconfined Compression	Yes
Consolidated Undrained	Yes
Consolidated Drained	Yes
Capacity	50 kN (11,200 lbf)
Speed Range	English mode: 0.000001 to 0.399999 in/min. Metric mode: 0.00001 to 9.99999 mm/min
Rapid Approach Speed	1.0 inch/min (25 mm/min)
Platen Travel	100 mm (3.9 inches); limit switch protection
Platen dia	133 mm (5.2 inches)
Vertical Clearance	910 mm (36.8 inches) max; 305 mm (12 inches) min
Horizontal Clearance	364 mm (15.3 inches)
Serial Interface	RS 232C; programmable baud rate and protocol
Overall Dimensions W x D x H	500 x 500 x 1470 mm (19.7 x 19.7 x 57.8 inches)
Weight	100 kg (220 lbs)
Product Code	**Power Supply**
25-3518/01	220-240 V AC, 50-60 Hz, 1 ph
25-3518/02	110-120 V AC, 50-60 Hz, 1 ph

Accessories:

Adaptor Kit to perform CBR on the Tritest 50 load frame (25-3518/10)

Frame and Drive Assembly (1884B0043)

PCB Stepper Control and Spring (1884B0036)

Tritest Motor Assembly (1884A0038)

Tritest Input Filter (6012X0351)

Tritest Transformer (6012X0351)

Keyboard Assembly (1884B0032)

LCD (1895A0063)

Spares/Consumables:

220 V Spares Kit (25-3518/K1)

110 V Spares Kit (25-3518/K2)

Soil Strength (Triaxial)

MultiPlex 50 Load Frame

Product Code: 25-3700/01

Product Standards:

BS 1377-7, BS 1377-8, ASTM D2166/D2166M, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

Compact bench mounting load frame designed for performing laboratory CBR, unconfined compression, Quick Undrained Triaxial and Marshall Stability Tests. Has a variable speed of 0.5 to 50.8 mm per minute and features rapid approach of platen.

Specifications	
CBR Penetration	Yes
Unconfined Compression	Yes
Consolidated Undrained	No
Consolidated Drained	No
Marshall Stability and Flow	Yes
Dimensions L x W x H (mm)	550 x 400 x 1470
Max Vertical Clearance (mm)	800
Horizontal Clearance (mm)	265
Platen dia (mm)	133
Platen Travel (mm)	100
Platen Speed Range	0.5 to 50.8 mm/min
Rapid Approach Speed	40 mm/min
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	100 (shipping 113)

Accessories For Unconfined Compression Test:

Unconfined Compression Platens (25-3650)

4.5 kN Clamped Boss Load Ring, complete with dial gauge and calibration certificate (78-0260)

2-Part Split Mould - 100 mm (25-7655)

2-Part Split Mould - 70 mm (25-6530)

2-Part Split Mould - 50 mm (25-5530)

2-Part Split Mould - 38 mm (25-5130)

2-Way Split Former - 100 mm diameter (25-7650)

2-Way Split Former - 70 mm diameter (25-6500)

2-Way Split Former - 50 mm diameter (25-5500)

2-Way Split Former - 38 mm diameter (25-5120)

Spares/Consumables:

Tacho Assembly (1895A0048)

Belt (8447X0645)

Micro PCB Assembly (1873PL0038)

DC Drive 508 (6023X0025)

DC Motor (6018A0054)

Triaxial Cells

Grouped Product Standards:

BS 1377-7, BS 1377-8, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

This range of precision made triaxial cells has been designed to meet the requirements of the modern soils laboratory. The cells have been treated to minimise corrosion. Particular attention has been paid to the quality of finish between the piston and the head. Final assembly includes the fitting of an O-ring seal and the use of special lubricant to reduce friction to a minimum and eliminate water leakage. The piston load capacity is designed to accept high horizontal forces which may be present during the final stages of a test. Each cell has five take-off positions drilled in the base for top drainage/back pressure, pore water pressure and bottom drainage.

Two no-volume change valves and an anvil for strain gauge/transducer datum are supplied for fitting to the cell. A feature of these cells is that they all accept a single diameter piston. The internal height is such that a range of submersible load transducers can be fitted without any modification. Each cell will accept a range of base adaptors and various accessories for testing a wide range of specimens.

- Working pressure up to 1700 kPa.
- All round visibility.
- Sample sizes 38 to 100 mm diameter.
- Rapid assembly and dismantling.
- Accepts a range of interchangeable submersible load transducers.
- Maximum piston load 45 kN.

Product Code	Cell Size (mm)	Weight (kg)	Max Specimen Size (mm)	Vertical Clearance (mm)	Horizontal Clearance (mm)
25-4157	100	14.3	100 x 200	515	255
25-4117	70	7.3	70 x 140	430	180
25-4047	50	4	50 x 100	380	155

Note: 38 mm samples are tested in the 50 mm cell.

Soil Strength (Triaxial)

Accessories for Triaxial Cells

Aggressive Materials

Although all products are treated to inhibit corrosion, certain aggressive materials may attack the metal components. Examples of this are samples obtained from the seabed or containing high concentrations of sulphates or chlorides. Where aggressive materials are to be tested, ELE will be pleased to offer advice on any special requirements.

Triaxial Cell Specimen Base Adaptors

Grouped Product Standards:

BS 1377-7, BS 1377-8, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

Each cell will require the correct size of specimen base adaptor relative to the diameter of the sample tested. All base adaptors are double perforated for bottom drainage/pore pressure measurement. They are supplied complete with a solid disc for use in tests where no drainage is required.

Specifications

	Cell Model Product Code		
	25-4047	25-4117	25-4157
	Max Specimen Dia		
Specimen Size	50 mm	70 mm	100 mm
38	25-4166	-	-
50	25-4168	25-4174	-
70	-	25-4176	-
100	-	-	25-4186

Load Measurement

Various methods of axial displacement and load can be supplied. All devices comply with the accuracy specified in BS 1377, ASTM D2850, D4767. All transducers are supplied with a calibration certificate.

Product Code	Type	Capacity (kN)
78-0260	Load Ring	4.5
78-0760	Load Ring	28
78-0860	Load Ring	50
27-1553	S-Type Load Cell	10
27-1555	S-Type Load Cell	25
27-1573	Submersible Load Cell	5
27-1575	Submersible Load Cell	10
27-1551	S-Type Load Cell	5
27-1293	Stainless Steel distance piece for use with submersible Load Cells	-

Piston Restraint Clamp for Triaxial Cells

Product Code: 25-4200

Product Standards:

BS 1377-7, BS 1377-8, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

For ELE Triaxial Cells manufactured from July 1996.

Holds the piston or submersible load cell away from the sample whilst loading and unloading the cell.

Specifications

Weight (lbs)	1.075

Silicon Grease Lubricant

Product Code: 25-8090

Product Standards:

BS 1377-7, BS 1377-8, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

Silicon Grease Lubricant (Tube).

Automatic Data Acquisition - Triaxial

Product Code	Product
27-2753 (DS7.2: 27-1753)	DS7.3 Undrained Traxial Shear Strength Software
27-2763 (DS7.2: 27-1763)	DS7.3 CU/CD Triaxial Shear Strength Software
27-2768 (DS7.2: 27-1768)	DS7.3 Permeability in a Triaxial Cell Software
S2160 (DS7.2: S1160)	DS7.3 Full Software Suite - All Triaxial, CBR, Direct Shear, Consolidation
27-1500/01	GDU 8 Channel Data Acquisition Unit
27-1505	GDU 8 Channel Expansion Card

For full specification see page 72-77

Axial Displacement

Various methods of axial displacement and load can be supplied. All devices comply with the accuracy specified in BS 1377, ASTM D2850, D4767. All transducers are supplied with a calibration certificate.

Axial Dial Gauge 25 mm Travel x 0.01 mm Divisions

Product Code: 25-4210

25 mm travel x 0.01 mm divisions.

Specifications	
Dial Indicator	25 mm range

Axial Strain Transducer

Product Code: 27-1617

Axial Strain Transducer Assembly 50 mm travel fitted with 5-pin DIN Plug.

Soil Strength (Triaxial)

Sample Preparation

Various methods of measuring load can be supplied, these include load rings, S-type and submersible load transducers. The capacity of the load measurement device will invariably be selected with reference to the type of specimen and its size.

As a general guide, suggested load measurement capacities are as follows:

Type of Soil	Capacity (kN)
Clays	4.5
Frictional Materials	20
Soft Rocks, frictional soils at high cell pressures	50

	Sample Dia Size			
Product	38 mm	50 mm	70 mm	100 mm
Membrane Placing Tool	25-4290	25-5470	25-6470	25-7610
Suction Membrane Device	25-5100	25-5480	25-6480	25-7640
Two-part Split Former (non-cohesive soils)	25-5120	25-5500	25-6500	25-7650
Two-part Split Mould (cohesive soils)	25-5130	25-5530	25-6530	25-7655
BSP Valve complete with 6 mm Connector and integral Sealing Ring	25-4520	25-4520	25-4520	25-4520
10 ml single-tube Drainage Burette	25-4540	25-4540	25-4540	–

Accessories for Consolidated Drained & Undrained Tests

Grouped Standards:

BS 1377-7, BS 1377-8, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

Filter Paper Drain

Specifications

Product Code	Dia (mm)	Qty
25-5200	38	Supplied in packs of 50
25-5580	50	
25-6580	70	
25-7670	100	

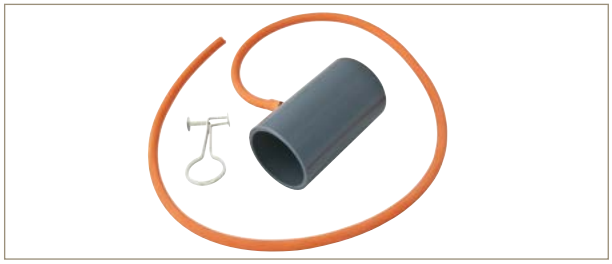
Porous Disc

Specifications

Product Code	Dia (mm)	Qty
25-5181	38	Supplied in packs of 2
25-5561	50	
25-6561	70	
25-7661	100	

Membrane Placing Tools

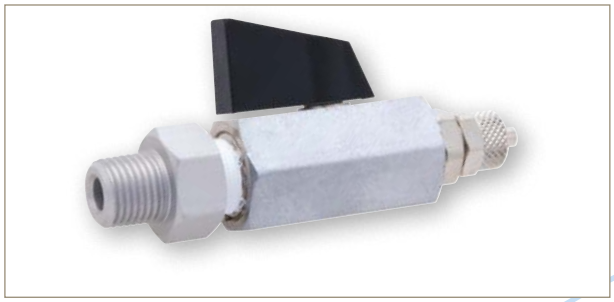
Suction Membrane Devices



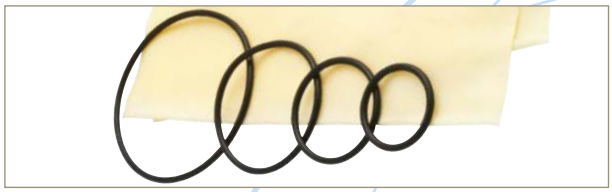
Two-part Split Formers

Two-part Split Moulds

BSP Valve complete with 6 mm Connector



Membrane Sealing Rings



Specifications

Product Code	Dia (mm)	Qty
25-5081	38	Supplied in packs of 10
25-5461	50	
25-6461	70	
25-7631	100	

Rubber Membranes

Specifications

Product Code	Dia (mm)	Qty
25-5061	38	Supplied in packs of 10
25-5441	50	
25-6441	70	
25-7621	100	

Pressure Pads & Internal Tubing

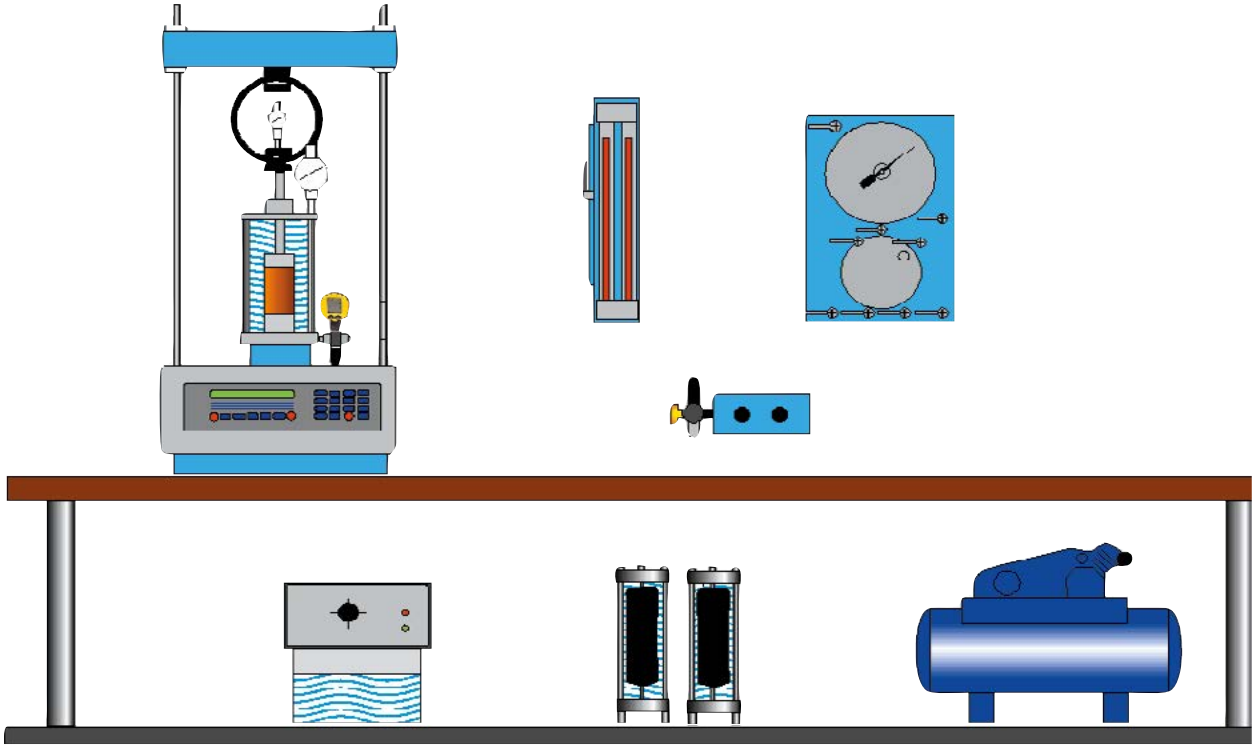
Specifications

Product Code	Product	Dia (mm)
25-5050	Pad	38
25-5050/10	Tubing	-
25-5430	Pad	50
25-5430/10	Tubing	-
25-6430	Pad	70
25-6430/10	Tubing	-
25-7590	Pad	100
25-7590/10	Tubing	-

Soil Strength (Triaxial)

De-Aired Water

It is particularly important that water from which dissolved air has been removed is used in the pore pressure measurement system and saturation procedures. Any dissolved air in the water will lead to errors in the measurement of pore pressure, particularly at low pressures, and also give slow or incorrect saturation results.



De-Aired Water Apparatus

Product Code: 25-1833/01

This compact self-contained unit will de-air water quickly and efficiently down to levels of dissolved oxygen acceptable for geotechnical test methods. Air is removed from the water by a vacuum system, which continuously circulates the water in the tank. The unit is supplied with a clear water container, which will hold a maximum of 15 litres of water. Input and output lines are formed using standard 6 mm tube connectors.

Specifications	
Self-Contained	Yes
Capacity (ltrs)	15
Dimensions L x W x H (mm)	380 x 356 x 470
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	13

Spares/Consumables:

Pump (5020X0073)

Tank (9004A0073)

Gasket (1617B0012)

Pressure Systems

We offer a range of products designed to supply and monitor all those parameters necessary for the successful testing of geotechnical materials. Two types of constant pressure systems are available:

- Air/water system operated by a pneumatic compressor.
- A motorised oil/water system.

Air/Water Pressure Systems

Where a laboratory requires a number of constant but independent and variable pressure sources, the use of a pneumatic compressor is recommended. Depending on the capacity and volume of the unit, a series of pressure sources can be provided to various test stations around the laboratory. Compressed air must be delivered to a system designed to transfer the controlled pressure to the fluid (usually water), which applies the various test pressures, e.g. a confining pressure in a triaxial test. The pressure reducing panel is used in conjunction with a bladder-type air/water interface assembly. Each individual pressure take off from the reducing panel will require a bladder interface assembly. Connection of the reducing panels to the compressor/water trap outlet and to other reducing panels requires the use of nylon tubing.

Air/Water Bladder-Type Pressure Assembly

Product Code: 26-1746

With transparent plastic chamber for operating continuously at pressures up to 1000 kPa. A length of tubing is provided for connecting the air/water cylinder outlet to a pressure measuring system.

- Used to supply hydraulic pressure from a pneumatic pressure source.
- Prevents air entering the hydraulic pressure system.
- Maximum working pressure 1000 kPa.
- Supplied with connectors and tubing for fitting to pressure measuring systems.

Specifications	
Weight (kg)	5.6

Spares/Consumables:

Plastic Hose Clip (8412X0260)

'O' rings for upper + lower 5 inch cell (8447X1143)

Replacement Bladder (38 mm internal dia) (26-1746/10)

Air Compressor Unit 1000 kPa

Product Code: 83-1735/01

Specifications	
Dimensions L x W x H (mm)	1321 x 457 x 914
Free Air Delivery	6.0 cfm
Receiver Capacity (ltrs)	116
Max Pressure	1380 kPa
Continuous Working Pressure	1000 kPa
Power Supply	220-240 V AC, 50 Hz, 1 ph
Water Trap	Yes
Weight (kg)	149

Soil Strength (Triaxial)

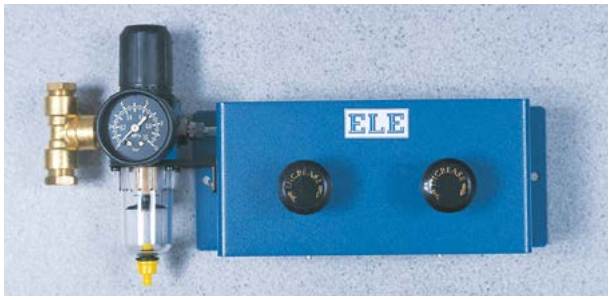
Air Compressor Unit 700 kPa

Product Code: 83-1730/01

Specifications	
Dimensions L x W x H (mm)	483 x 457 x 864
Free Air Delivery	2.0 cfm
Receiver Capacity (ltrs)	50
Max Pressure	1000 kPa
Continuous Working Pressure	700 kPa
Power Supply	220-240 V AC, 50 Hz, 1 ph
Water Trap	No
Weight (kg)	57

Pneumatic Pressure Reducing Panel. Provides Two Independent Pressure Outlets 1000 kPa Maximum.

Product Code: 26-1760

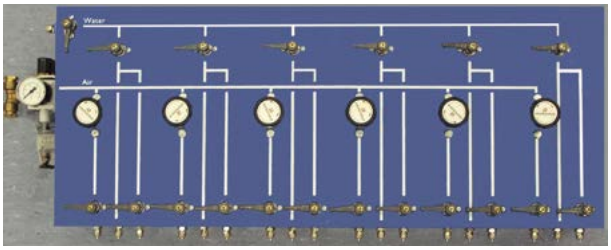


Comprising two constant pressure reducing valves with inlet water trap and pressure indicator. The unit allows a maximum output pressure of 1000 kPa. Maximum input pressure should not exceed 1400 kPa. The panel has an inlet connector to accept nylon tubing from the air compressor and two 6 mm outlets for connecting Bladder type Air/Water Pressure Assemblies. An outlet connector is fitted for the connection of an additional panel using nylon tubing to increase the total capacity of the system. This outlet is blanked off when not required.

Specifications	
Weight (kg)	4

Six-Way Pneumatic Pressure Control Panel

Product Code: 26-1872



The six-way pressure control systems have been designed specifically for the monitoring of up to six independent pressures. They are particularly useful for setting up and controlling a 3-cell effective stress system using three independent back pressures. The panel is used in conjunction with the Universal Pump and Pressure Indicating Panel which provides pressure monitoring and facilities for filling and de-airing the system. Comprising six pneumatic control valves mounted in a housing for controlling six independent outlets. Supplied with connection ports for coupling panel to 26-1880. Maximum inlet pressure 1400 kPa, maximum outlet pressure 1000 kPa.

Nylon Tubing 1700 kPa (30 m)

Product Code: 26-1769

30 metre length. For pressures up to 1700 kPa. Used for connecting Air Compressors to Pneumatic Pressure Reducing Panels, or for connecting two Pressure Reducing Panels together.

Further Information:

Nylon tubing 30 metres with pressure fittings.

Specifications	
Pressure (kPa)	1700
Weight (kg)	2
Dia	1/2 inch

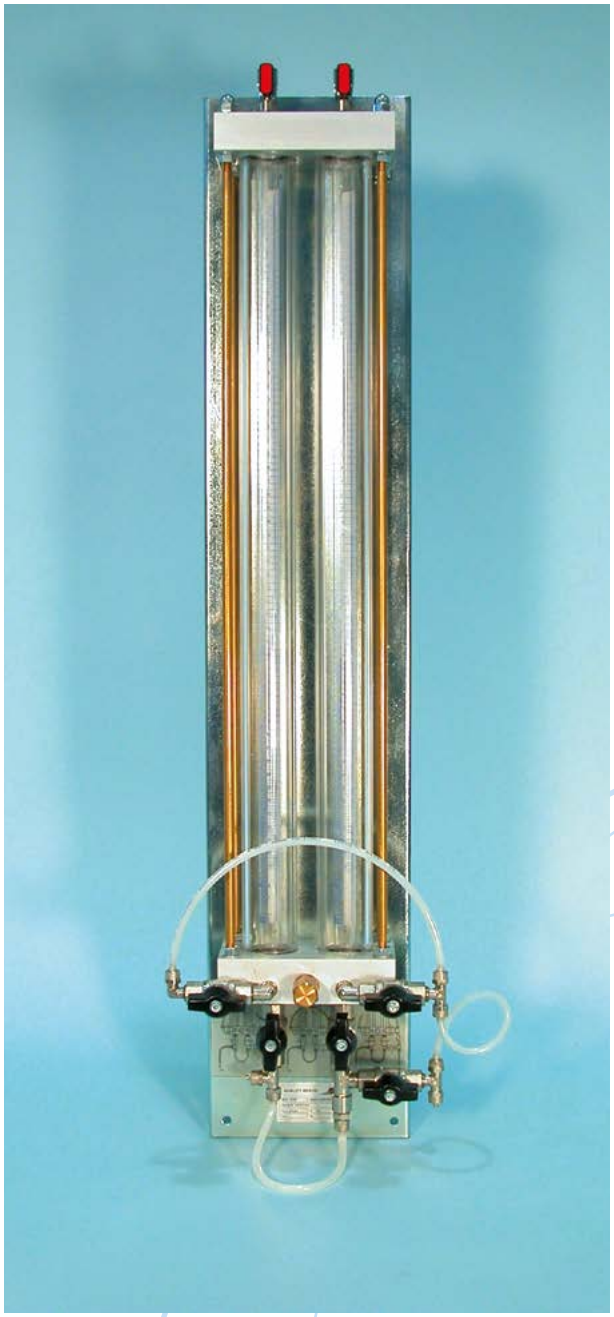
Measurement Instrumentation

Various methods of measuring axial displacement, load, pressure and volume change can be supplied. All devices comply with the accuracy specified in BS 1377; ASTM D2850, D4767. All transducers are supplied with a calibration certificate.

Volume Change Measurement

Twin Burette Volume Change Unit

Product Code: 26-1892



Fitted with reversing valve and by-pass valve. The unit is fitted with burettes graduated 0 to 100 ml x 0.2 ml and is mounted on a solid panel for wall or bench mounting.

Connector 1/4 BSP (6 mm)

Product Code: 26-1922

With sealing washer.

Nylon Tubing 3500 Kpa

Product Code: 26-1926

Specifications	
Pressure (kPa)	3500
Outside dia (mm)	6
Inside dia (mm)	4

For use up to a pressure of 3500 kPa. Priced per metre.

Elbow Connector (6 mm)

Product Code: 26-1928

T Connector (6 mm)

Product Code: 26-1930

Soil Strength (Triaxial)

Oil/Water Constant Pressure System

The ELE oil/water constant pressure system, PressureTest 1700, is extremely versatile and can be used in conjunction with a wide range of test equipment. The unit provides continuous variable pressure up to 1700 kPa. Pressure is increased or decreased simply by turning a control wheel. The apparatus is supplied without a gauge for those customers who have suitable pressure monitoring equipment. A digital pressure gauge is offered as an accessory. The machine features a clear hydraulic/water interface reservoir and up to one litre capacity of water is available under pressure.

Pressure Test 1700 Oil/Water Constant Pressure System 0 to 1700 kPa

Product Code: 26-1800/01

- 0 to 1700 kPa (250 lbf/in²) fully variable.
- Continuous constant pressure control.
- One litre capacity.

Specifications	
Dimensions L x W x H (mm)	240 x 400 x 500 (without gauge)
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	17

Digital Pressure Gauge 1700 kPa for ELE Triaxial Cells

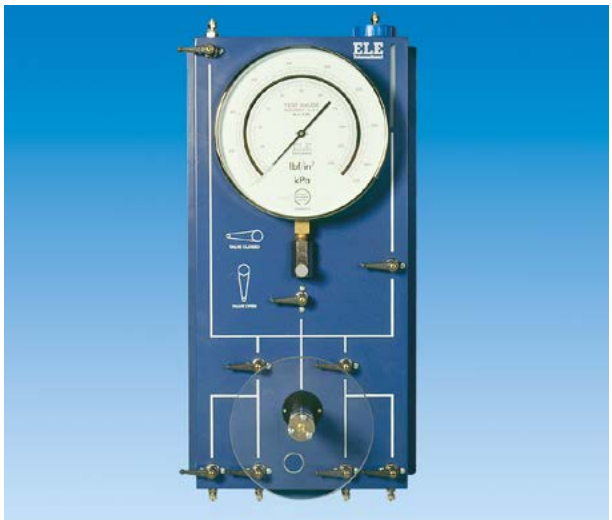
Product Code: 26-1820

Oil 2 Litres T46

Product Code: 26-1800/10

Universal Pump & Pressure Indicating Panel 1700 kPa

Product Code: 26-1880



This is the main pressure display in the system for monitoring various pressures and also provides fine control of the pressure within the system using the rotary hand pump. The unit is fitted with a dual calibrated 250 mm diameter pressure gauge, four inlet/outlet no-volume change valves, screw controlled rotary hand pump, water reservoir and isolating valves. The unit is housed in a hinged case for wall or bench mounting. By using an isolating valve the panel may be used to monitor cell or back pressure. 1700 kPa and 250 lbf/in².

Specifications	
Weight (kg)	12

- Modular system for flexibility.
- Wall mounting.
- Four outlets.
- 6 mm diameter pipework for quick filling and draining.
- Standard type valves on all units - on/off with no volume change.
- Ideal system for geotechnical laboratories.

This modular system provides flexibility and cost saving by enabling only those units that are relevant to the particular testing requirements to be selected. It is simple to update the system with the addition of other units, which can be quickly connected together. The units may be used with a variety of pressure systems, such as pneumatic and oil/water and are designed to accept pressures of up to 1700 kPa where appropriate.

Volume Change Transducer Assembly 80 cm³ Maximum Working Pressure 1700 kPa

Product Code: 27-1641

The Volume Change Transducer provides continuous measurements of volume change during the triaxial test. The assembly includes a valve to reverse the flow through the unit, providing increased capacity.

- Reversing valves to increase capacity.
- Steel case for wall mounting and access to piping.
- Supplied complete with calibration certificate.

Specifications	
Max Pressure	250 psi (1700 kPa)
Excitation	10 V DC
Output	1.25 Volts full range
Capacity	80 cc x 0.1 cc sensitivity
Case	Steel; hinged for access to piping
Connector	5-pin DIN type
Overall Dimensions W x D x H	9 x 7 x 14 -1/2 inches (229 x 178 x 368 mm)
Weight	Net 11 lbs (5 kg)

Submersible Load Transducers

Product Code: 27-1573

Axial Strain Transducer

Product Code: 27-1617

Axial Strain Transducer Assembly 50 mm travel fitted with 5-pin DIN Plug.

Direct Shear & Vane Tests

Direct Shear & Vane Tests

Every building or structure that is built in or on the earth imposes loads on the soil supporting the foundations. The stresses set up in the soil cause deformation of the soil with stress failure being caused by slippage of soil particles, which may lead to sliding of one body of soil relative to the surrounding mass.

Direct/Residual Shear Apparatus

Digital Direct/Residual Shear Apparatus complete with Lever Loading Assembly

Product Codes: 26-2114/01, 26-2114/02

The ELE Direct Shear Apparatus accepts specimens up to 100 mm² or 63 mm diameter. The use of a microprocessor controlled drive system and keyboard entry gives the apparatus a wide range of features that include pause and speed reset during test, RS 232C interface, operator programming of speed and control functions, self test diagnostics and many other features. A return to start datum provides a positive means of reversing the shearbox when either preparing for a new test or continuing with residual testing procedures. Safety forward/reverse travel limit switches are fitted as standard and monitored through the electronics system control. The electronics are housed in a modern moulded shroud, which includes a large LCD display and keyboard entry. The apparatus is enclosed in a robustly constructed case, has been designed for floor mounting and is supplied complete with carriage, loading hanger and 10:1 lever loading device.

Product Standards:

ASTM D3080, AASHTO T236, BS 1377, EN 1997-2

- Microprocessor control.
- Large on-board LCD screen display.
- Direct entry via touch sensitive keyboard.
- Rapid approach and return to start datum.
- Fully variable speed, 0.00001 to 9.99999 mm/minute.
- Accepts specimens up to 100 mm² or 63 mm diameter.

Specifications	
Sample Size	Accepts up to 100 mm² or 63 mm dia samples using accessory shear box assemblies, not included
Speed Range	Variable in either English or Metric units between 0.000001 inches (0.00001 mm) to 0.399999 inches (9.99999 mm) per minute
Shear Force	1,100 lbf (5.0 kN) max
Vertical Load	2,200 lbf (10.0 kN) using 10:1 lever ratio
Dimensions L x W x H	44.7 x 12.6 x 49.6 inches (1135 x 320 x 1260 mm)
Weight	Net 181 lbs (82 kg)
Product Code	**Power Supply**
26-2114/01	220-240 V AC, 50-60 Hz, 1 ph
26-2114/02	110-120 V AC, 50-60 Hz, 1 ph

Spares/Consumables:

Digital Head (1885PL0044)

Membrane Keyboard (1885B0031)

Stepping Motor Assembly (1885A0038)

Gear Box Assembly (1885B0037)

LCD Display (1895A0063)

Swan Neck (1627C0018)

Stepper Motor (6018X0110)

Shear Box Assemblies

All shearbox assemblies are designed to fit the carriage of the Direct/Residual Shear Apparatus. They are supplied complete with three porous plates, one retaining plate and a loading pad. The three sizes supplied comply with the relevant requirements of BS 1377 and ASTM D3080. All assemblies can be used for quick shear tests or drained/residual shear tests. Optional accessories are available including specimen cutters and extrusion tools. The table shows the complete range of shearbox assemblies and accessories.

Shear Box Assembly 100 mm²

Product Code: 26-2197

Product Standards:

BS 1377-7, ASTM D3080/D3080M, AASHTO T236

- Manufactured from corrosion resistant materials.
- Sample size 100 x 100 x 25 mm high meeting BS 1377.
- Incorporates PTFE faced box separation screws to reduce friction.
- Supplied complete with upper and lower porous plates and loading pad.
- Suitable for quick undrained or drained/residual tests.

Specifications	
Specimen Area/Size (mm)	100 x 100
Specimen Thickness (mm)	25
Weight (kg)	5.22

Spares/Consumables:

Porous Plate 100 mm² (26-2197/10)

Specimen Cutter 100 mm² (26-2201)

Specimen Extrusion Tool 100 mm² (26-2205)

Bottom Pad or Grooved Plates 100 mm (1627A0097)

Shear Box Assembly 60 mm²

Product Codes: 26-2181

Product Standards:

BS 1377-7, ASTM D3080/D3080M, AASHTO T236

- Manufactured from corrosion resistant materials.
- Sample size 60 x 60 x 25 mm high meeting BS 1377.
- Incorporates PTFE faced box separation screws to reduce friction.
- Supplied complete with upper and lower porous plates and loading pad.
- Suitable for quick undrained or drained/residual tests.

Specifications	
Specimen Area/Size (mm)	60 x 60
Specimen Thickness (mm)	25
Weight (kg)	2

Spares/Consumables:

Porous Plate 60 mm² (26-2181/10)

Specimen Cutter 60 mm² (26-2185)

Specimen Extrusion Tool 60 mm² (26-2189)

Bottom Pad or Grooved Plates 60 mm (1627A0094)

Shear Box Assembly 2.5 inch Diameter

Product Code: 26-2213

Product Standards:

ASTM D3080/D3080M, AASHTO T236

- Manufactured from corrosion resistant materials.
- Sample size 2.5 inch diameter x 1 inch high meeting ASTM D3080.
- Incorporates PTFE faced box separation screws to reduce friction.
- Supplied complete with upper and lower porous plates and loading pad.
- Suitable for quick undrained or drained/residual tests.

Specifications	
Specimen Area/Size (inches)	2.5 dia
Specimen Thickness (inches)	1
Weight (kg)	2.8

Spares/Consumables:

Porous Plate 2.5 inch diameter (26-2213/10)

Specimen Cutter 2.5 inch diameter (26-2217)

Specimen Extrusion Tool 2.5 inch diameter (26-2221)

Bottom Pad or Grooved Plates 2.5 inch diameter (1627A0099)

Direct Shear & Vane Tests

Measurement of Horizontal & Vertical Movement

Vertical Dial Gauge 10 mm Travel x 0.002 mm Divisions

Product Code: 25-0440

Horizontal Dial Gauge 10 mm Travel x 0.01 mm Divisions

Product Code: 83-5456

Measurement of Load (Shear Stress)

Product Code	Product	Capacity (kN)
78-0060	Load Ring - 2 kN	2
78-0160	Load Ring - 3 kN	3
78-0260	Load Ring - 4.5 kN	4.5
27-1561	S-Type Load Cell	5

For full specification see page 38

Application of Normal Stress

Product Code	Product	Weight (kg)
26-2132	Set of weights - 4 x 10 kg, 1 x 5 kg, 2 x 2 kg, 1 x 1 kg	50
26-2137	Slotted surcharge weight	10
26-2139	Slotted surcharge weight	5
26-2141	Slotted surcharge weight	2
26-2143	Slotted surcharge weight	1
26-2145	Slotted surcharge weight	0.5
26-2147	Slotted surcharge weight	0.25

Horizontal Displacement Transducer Assembly 15 mm Travel 5-pin DIN Plug Mounting Pillar

Product Code: 27-1697

Vertical Displacement Transducer Assembly 15 mm Travel with 5-pin DIN Plug Bracket for Shear Box

Product Code: 27-1689

Software & Data Logging

Product Code	Product
27-2793 (DS7.2: 27-1793)	DS7.3 Direct and Residual Shear Strength Software
27-1300/01	DSU Electrical Data Acquisition and Control System

For full specification see page 72-77

DSU Electrical Data Acquisition & Control System

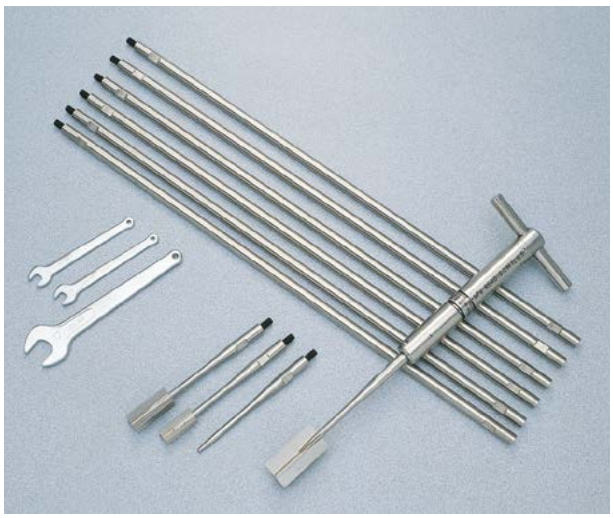
Product Code: 27-1300/01

For full specification see page 72

Inspection Vane

Inspection Vane

Product Code: 26-3335



Product Standards:

BS 1377-7, ASTM D4648/D4648M

This instrument is an essential tool for civil engineers involved in site investigation work. The unit is supplied in kit form with a carrying case incorporating the measuring head, extension rods, vanes, etc. The measuring head comprises a T-handle that is spring-loaded against the extension rod adaptor. Weight 3 kg. Range 0-260 kPa.

Spares/Consumables:

H605 Extension Rod (26-3335/11)

Laboratory Vane Apparatus

Product Code: 26-2270, 26-2275/01

Product Standards:

BS 1377-7,
ASTM D4648/D4648M

The equipment is based on a design by the Transport Research Laboratory, England, and is available in hand or motorised versions. Stress is applied through the 12.7 x 12.7 mm vane by means of any one of four calibrated springs. The motorised version produces a shearing rate of 10° per minute.

Product Code	Product
26-2270	Hand Operated Vane Apparatus
26-2275/01	Motorised Vane Apparatus

Spares/Consumables:

Set of 4 Calibrated Springs for Laboratory Vane Apparatus (26-2275/10)

Drive Belt (26-2275/11)

Accessories:

Vane 12.7 mm diameter x 12.7 mm long (26-2279)

Vane 12.7 mm diameter x 19 mm long (26-2281)

Vane 12.7 mm diameter x 25.4 mm long (26-2283)

Attachment Clamp for 38 mm and 100 mm sample tubes (26-2289)

Pocket Shearmeter

Pocket Shearmeter with 3 Vanes 0 to 1 kgf/cm² x 0.5 kgf/cm²

Product Code: 26-2261

The Shearmeter can be used on tube samples, on the sides of pits, cuttings etc. It is an invaluable tool for initial site investigation work.

Further Information:

Complete with sensitive vane, standard vane and high-capacity vane. Range 0 to 1 x 0.05 kgf/cm².

Specifications	
Vane Driver	1.6 inch (41 mm) dia x 3.2 inches (81 mm) long with vane attached
Dial Scale	1 kg/cm² (tons/ft²) x 0.05 sub-divisions
Carrying Case W x D x H	Plastic; 6 x 4 x 2 inches (152 x 102 x 51 mm)
Weight	Net 10.5 oz (300 g)

Spares/Consumables:

Sensitive Vane 0 to 0.2 kg/cm² (26-2261/10)

Standard Vane 0 to 1 kg/cm² (26-2261/12)

High-Capacity Vane 0 to 2.5 kg/cm² (26-2261/14)

Data Logging, Software & Electronic Instrumentation

At ELE we have long specialised in the development of intelligent processing and recording systems. Over the years, our knowledge, skills and resources have enabled us to help customers move from the early stages of simple digital readout units, through dedicated computer control, to the latest intelligent stand-alone data acquisition systems. In each case our expertise in both hardware and software allows us to deliver dedicated condition monitoring and software solutions that meet the exact needs of our customers, while retaining optimum system performance, functionality and reliability.

- Multi-tasking.
- Stand-alone systems.
- Digital readout units.
- Total solutions.
- Systems consultancy service.
- Wide range of PC compatibility.

DSU Electronic Readout & Control System

The Data System Unit (DSU) is a versatile instrument designed to accommodate the general logging requirements of geotechnical and materials testing engineers. Its intelligent interface allows the user to work with a range of different sensors.

- 4 channel automatic control and data-logging unit.
- Automatic, dual-frame control.
- Performs CBR, Marshall, Unconfined Compression, Direct and Residual Shear, One-Dimensional Consolidation and Unconsolidated Undrained tests.
- LAN connection - software can be running anywhere on your server.
- Never lose data from power failures.
- 2 GB of non-volatile memory.
- 2 year warranty.

The DSU has two distinct modes of operation. The first is referred to as DS mode (DataSystem) for operation with ELE International's established DS7 geotechnical testing software.

- DS Mode.
- Up to four one-dimensional Consolidation tests.
- Up to two CBR tests.
- One Direct/Residual Shear test.
- One triaxial quick Undrained test.
- DU Mode.
- Up to two Marshall tests.
- Up to two Unconfined Compression tests.
- Automatic frame control.

Overview:

- Touch Screen data entry for stand-alone operation, Marshall/CBR/Quick Undrained.
- Automatic single and dual frame control (with Multiplex 50 frame).
- Log memory of 2 GB.
- Non-volatile memory.
- Ethernet TCP/IP link and serial comms support.
- Market leading signal stability.
- Certificate and manual calibration features.
- Easy update firmware RS 232 connection.

Specifications

Product Code	Power Supply
27-1300/01	220-240 V AC, 50-60 Hz, 1 ph
27-1300/02	110-120 V AC, 50-60 Hz, 1 ph

Dual Frame Comms Cable

Product Code: 27-1300/10

This item is required if you wish to control two Multiplex-50 load frames for CBR and Marshall tests.

Cable, Safety/ID

Product Code: 27-1300/11

This is required for every CBR Test 50, Marshall Test 50 and Multplex 50 load frame that you wish to control.

Please note, one of these is included with the DSU as standard. An additional cable will be required if you wish to connect to a second frame.

PC Cable

Product Code: 27-1300/12

This item is required to connect the Multiplex frame or a link to the PC when using the DSU with DS7 Software.

GDU 8 Channel Data Acquisition Unit

Product Code: 27-1500

The GDU is a stand-alone, multi-tasking, multi-channel data logger that is reliable and powerful, enabling it to co-ordinate test data from the range of ELE transducers required for various test methods. The ELE Geotechnical software packages (DS7), in conjunction with the GDU and a range of transducers, are the two central components required to create a modern turnkey soil testing system. Being fully modular it can be adapted to a wide range of soil testing laboratory configurations.

- For performing CBR, Consolidation, Direct/Residual Shear and Total and Effective Stress Triaxial tests.
- 8 Channels expandable to 32 for performing multiple, concurrent tests for cost savings.
- Independent signal conditioning on each channel to maintain data accuracy.
- Field-upgradeable software, meaning no downtime for future software and functionality upgrades.
- 2 year warranty.

Specifications

Case	Aluminium, free standing; houses power supply, analogue to digital conversion module and an 8-channel analogue input module with transducer energization
Sockets	Standard 5-pin DIN type
Input Range	± 5 volts to ± 10 mV full scale
Transducer Supply	10 V DC
Dimensions W x D x H	12.8 x 14.3 x 6.1 inches (325 x 363 x 155 mm)
Weight	Net 14.08 lbs (6.4 kg)
Product Code	**Power Supply**
27-1500/01	220-240 V AC, 50-60 Hz, 1 ph
27-1500/02	100-120 V AC, 60 Hz, 1 ph

Accessories:

8-Channel Expansion Analog Input Module (27-1505)

USB to Serial Adaptor (27-1701)

RS 232 to USB Cable for GDU (27-1510)

S-Type Load Cell for Triaxial Testing

S-Type Load Cell for Triaxial Tests. Fitted with 5-pin DIN Plug.

Ideally suited for a wide range of applications, ELE S-type load cells provide high accuracy and minimum deformation. Various models are available, with the necessary adaptors, for use with ELE Triaxial Load Frames, Multiplex 50/Marshall Test 50/CBR Test 50 and Direct Shear machines.

- Repeatability better than ± 0.02% of rated output.
- Non-linearity better than ± 0.03% of rated output.
- Supplied complete with 5-pin DIN type connector for connection to DSU and GDU.

Specifications

Load Device Type		S-Type
Environmental Protection		IP65
Product Code	**Force Capacity**	**Test Type**
27-1562	1 kN	Triaxial
27-1563	3 kN	Triaxial
27-1551	5 kN	Triaxial
27-1553	10 kN	Triaxial
27-1555	25 kN	Triaxial
27-1559	50 kN	CBR and Marshall
27-1561	5 kN	Direct Shear

Spares/Consumables:

Ball Nipple 1/2 bsf (0117A0007)

Ball Nipple M16 (1274A0152)

Calibration Adaptor (1274A0153)

Load Cell Adaptor (1274A0164)

Data Logging, Software & Electronic Instrumentation

Submersible Load Transducer Assembly Capacity in Compression

Submersible Load Transducers are used to measure accurately the axial loads applied to triaxial test specimens. Consisting of a load cell and piston assembly these units replace the standard triaxial cell loading piston.
A major advantage is that these transducers measure loads directly on top of the specimen. All transducers are supplied complete with a 5-pin DIN type connector and calibration certificate.

- Eliminates effects of piston friction on readings.
- Unaffected by cell confining pressures.
- Easily installed in triaxial cell.
- Supplied complete with calibration certificate and 5-pin DIN type connector for use with GDU or DSU.

Specifications

Load Device Type	Submersible	
Overload Capacity	150%	
Non-linearity	0.1% max	
Hysteresis Deflection	0.1% max 0.05 mm at full load	
Side Force	50% full scale max without effect	
Connector	5-pin DIN plug	
Weight (g)	850	
Product Code	**27-1573**	**27-1575**
Force Capacity (kN)	5	10
Dimensions Dia x H (mm)	75 x 50	75 x 50
	Excluding piston and adaptor	
Output	26 mv full range	
Excitation	10 V DC (15 V DC max)	
Compensated Temperature Range	0 to 50°C	1 to 50°C

Accessories:

Distance Piece required for Submersible Transducer (27-1293)

Displacement Transducers

Displacement Transducers are used in Consolidation, Shear, CBR and Triaxial test applications for accurate displacement measurements. They are supplied complete with a 5-pin DIN type connector for direct connection to the DSU and GDU.

- Ideally suited for use with GDU or DSU for accurate displacement measurements.
- Models available for use in consolidation, shear, CBR and triaxial test applications.
- Supplied complete with mounting hardware for specified products.
- All supplied with calibration certificate.

Specifications

Construction	Fully encapsulated electronics sealed in a Stainless Steel case
Excitation	10 V DC
Connector	5-pin DIN type
Weight (kg)	0.45

Specifications

Product Code	Product	Range (mm)	For Use With
27-1617	Axial Strain Transducer	0 to 50	Triaxial Cells
27-1649	Consolidation Displacement Transducer	0 to 10	One-dimensional Consolidation Apparatus
27-1689	Vertical Displacement Transducer	0 to 10	Direct/Residual Shear Machines
27-1697	Horizontal Displacement Transducer	0 to 10	Direct/Residual Shear Machines
27-1705	CBR Displacement Transducer	0 to 50	CBR Tritest and Multiple Series Load Frames

Accessories for Transducers

Extension Cables

Wired with a 5-pin DIN plug at one end and 5-pin DIN type socket at the other, these extension cables are used to increase the length of any DSU and GDU transducer cable.

Transducer Extension Cable

Specifications	
Product Code	Length (m)
27-1715	1.5
27-1717	3.0
27-1719	4.5
27-1710/10	10

Pressure Measurement

Digital Pressure Gauge 1700 kPa for ELE Triaxial Cells

Product Code: 26-1620

The Digital Pressure Gauge offers highly accurate pressure measurement and digital readout for ELE triaxial cells.

Specifications	
Capacity	250 psi (1700 kPa)
Display	LCD
Display Units	Psi, kPa, mPa
Accuracy	Better than 1% of indicated pressure
Read Rate	Two samples per second
Power Supply	3 volt battery, CR 2340 type
Battery Life	1400 hours continuous operation
Dimensions W x D x H	2.30 x 1.25 x 3.75 inches (59 x 32 x 95 mm)
Weight	Net 1/4 lb (125 g)

Pressure Transducer Assembly 1700 kPa Fitted with 5-pin DIN Plug

Product Code: 27-1633

Pressure Transducers are used to measure the cell, pore and back pressures during triaxial testing. Assemblies are supplied complete with a de-airing block, valve, 5-pin DIN plug connector and calibration certificate.

Specifications	
Construction	Stainless Steel
Excitation	10 V DC
Output	143 mV full range
Thread	1/4 inch BSP

De-Airing Block for Pressure Transducer

Product Code: 27-1625/10

Data Logging, Software & Electronic Instrumentation

Geotechnical Testing Software

DS7 Software

ELE International is pleased to present a NEW version of its geotechnical data acquisition and analysis testing software, DS7 (DataSystem 7). The software currently has two versions, DS7.2 and the new DS7.3.

DS7.2 supports Windows 7 and Windows XP Service Pack 3.

DS7.3 supports Windows 10 and Office 2016/Office 365.

- Now supports Ethernet communications in conjunction with the DSU.
- Programs available for Triaxial, Permeability Consolidation, Direct/Residual Shear and CBR tests.
- Accurate and repeatable test procedures.
- 72 hour unsupervised logging.
- Eliminate the possibility of errors while taking manual readings.
- Tests are run with step-by-step instructions selectable between BS and ASTM/AASHTO standards.
- Automatic report generation in accordance with the above standards.
- Real-time graphical outputs to both screen and printer as required.

DS7.3 Software-UU/CU/CD Triaxial, Permeability, Consolidation, Direct/Residual Shear, CBR

Product Code: S2160 (DS7.2 Windows 7, XP: S1160)

- Programs available for Triaxial, Permeability Consolidation, Direct/Residual Shear and CBR tests.

DS7.3 Undrained Triaxial Shear Strength Program for Windows 10, 32/64 bit

Product Code: 27-2753 (DS7.2 Windows 7, XP: 27-1753)

Options are available for a single test on one sample, standard three-sample procedure with linking of the results, or for a multi-stage test on one sample. Load and strain are monitored through transducers. Various printouts and graphical plots are available including basic sample data, moisture content and density. The program tabulates shearing data and plots stress against strain. Mohr circles are produced for graphical analyses.

- Options for single or multi-stage testing on a sample.
- Mohr circles produced for graphical analysis.

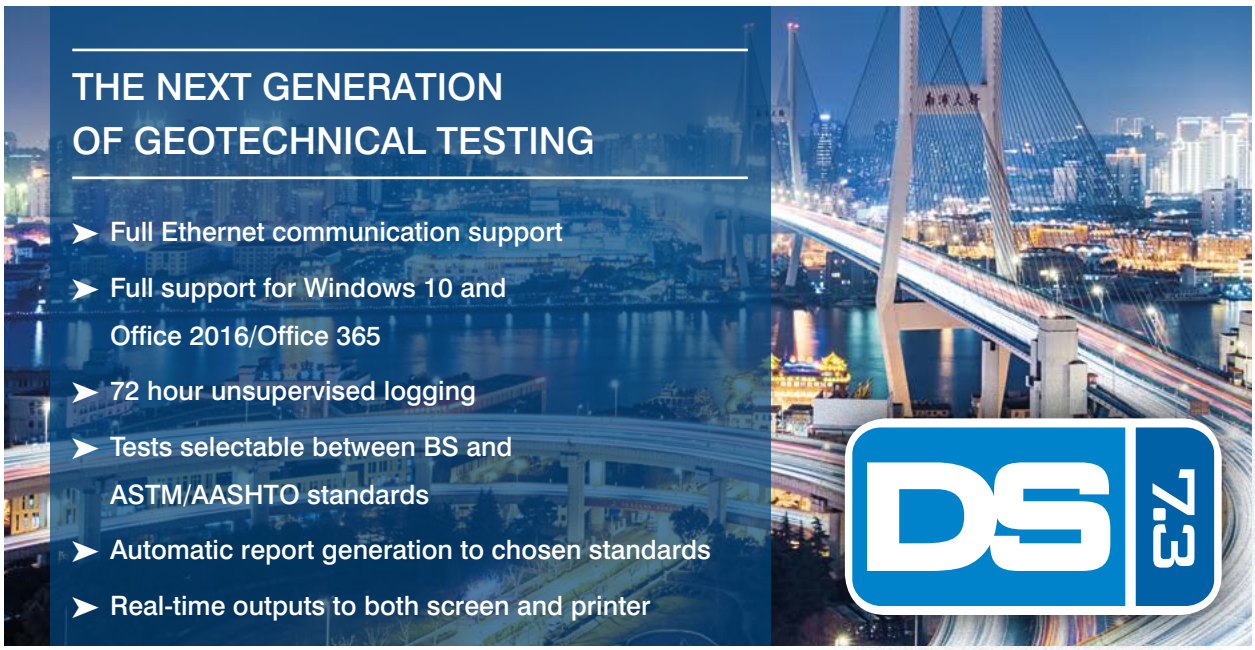
Specifications	
GDU Compatibility	Yes
DSU Compatibility	Yes

DS7.3 Direct & Residual Shear Strength Program for Windows 10, 32/64 bit

Product Code: 27-2793 (DS7.2 Windows 7, XP: 27-1793)

This unique package provides test options for quick undrained or drained shear tests with the user selectable option of residual testing. Individual test results can be linked together to produce the Coulomb Envelope. Printouts and plots are available for sample description and basic test data such as moisture content, etc. Realtime plots of settlement, shear versus displacement and vertical displacement during shearing is readily available via the PC screen or printer.

Specifications	
GDU Compatibility	Yes
DSU Compatibility	Yes



DS7.3 CU/CD Triaxial Shear Strength Program for Windows 10, 32/64 bit

Product Code: 27-2763 (DS7.2 Windows 7, XP: 27-1763)

This advanced package includes procedures for consolidated drained and consolidated undrained tests. Standard options are available for saturation, consolidation and shearing with automatic monitoring of the various parameters through transducers linked to the system. Load, strain, volume-change, pore-pressure, cell pressure and back pressure can all be monitored. Various prints and graphical plots are available to the engineer and include saturation data such as pore pressure build-up and B values, consolidation, volume change against time, shearing load versus strain with pore pressure monitoring.

➤ Complete package for consolidated drained and consolidated undrained triaxial tests.

Specifications	
GDU Compatibility	Yes
DSU Compatibility	No

DS7.3 One-Dimensional Consolidation Program for Windows 10, 32/64 bit

Product Code: 27-2773 (DS7.2 Windows 7, XP: 27-1773)

DS7.3 Consolidation Software provides all basic functions needed to record and analyse consolidation test data. Options are available for monitoring settlement on a log time or square-root time basis. Printouts and graphical plots are available for all stages including MV and CV moisture content, voids ratio plots, and initial sample conditions.

Specifications	
GDU Compatibility	Yes
DSU Compatibility	Yes

DS7.3 California Bearing Ratio (CBR) Penetration Program for Windows 10, 32/64 bit

Product Code: 27-2798 (DS7.2 Windows 7, XP: 27-1798)

This program provides the classical data for the CBR test. Load and penetration are monitored simultaneously. The program tabulates the results and provides a graphical presentation report.

Specifications	
GDU Compatibility	Yes
DSU Compatibility	Yes

DS7.3 Permeability in a Triaxial Cell Program for Windows 10, 32/64 bit

Product Code: 27-2768 (DS7.2 Windows 7, XP: 27-1768)

This program provides data for the determination of permeability of soil specimens using a triaxial cell and two volume change units in accordance with BS 1377.

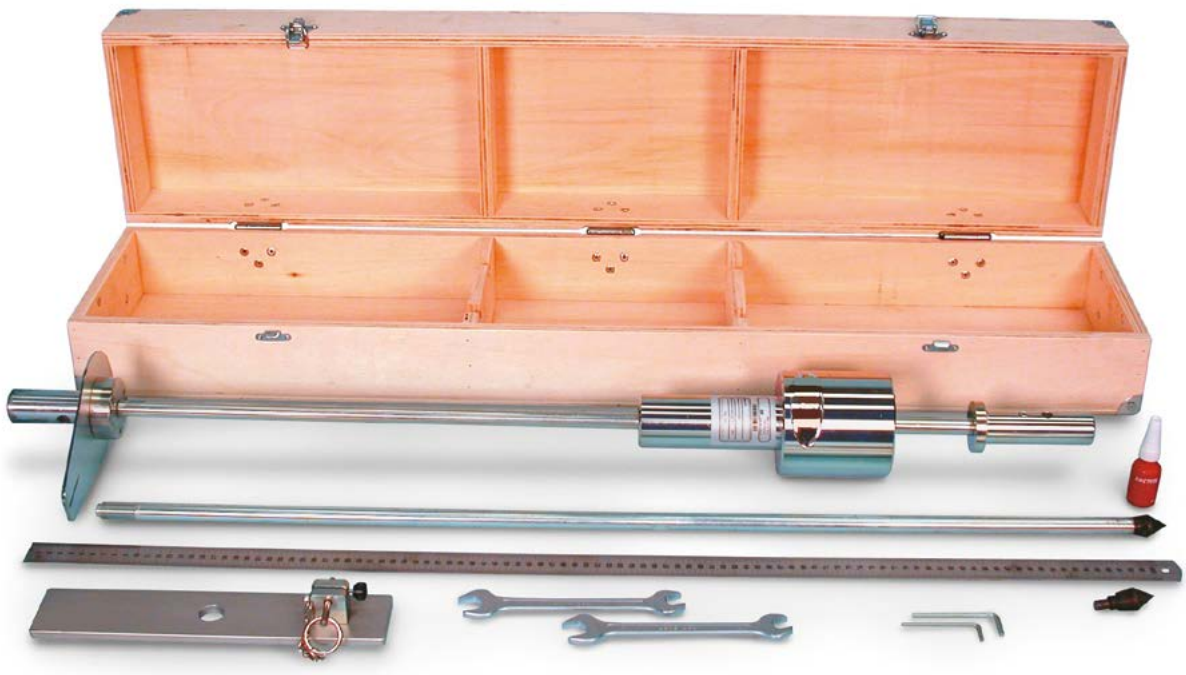
Specifications	
GDU Compatibility	Yes
DSU Compatibility	No

The design of foundations is a prerequisite of economic design and construction. In order to guard against shear failure and unacceptable ground movements due to loading, it is often necessary to determine the ground bearing capacity.

In-situ Testing

Dynamic Cone Penetrometer 8 kg Hammer (TRL Design)

Product Code: 29-3720



Product Standards:

ASTM D6951/D6951M

The TRL (Transport Research Laboratory) Dynamic Cone Penetrometer (DCP) is used for rapid in-situ measurement of the structural properties of existing pavements constructed with unbound materials. The unit incorporates an 8 kg weight with a drop of 575 mm, and a 20 mm diameter cone fitted to the end of the shaft, allowing measurements to be made to a depth of approximately 850 mm. Readings are usually taken after a set number of blows, changing the number according to the strength of the layer being penetrated. For good granular bases, readings every five to ten blows are satisfactory, but for weaker sub-base layers and subgrades, readings every one to two blows may be appropriate.

The DCP requires three operators, one to hold the instrument in a vertical position, one to raise the hammer and let it fall and one to record the results. A typical test takes only a few minutes, providing a very efficient method of obtaining information which would otherwise require the excavation of test pits. Where pavement layers have different strengths, boundaries can be identified and layer thickness determined.

Further Information:

Supplied complete with all necessary tools, assembly and operating instructions.

Specifications	
Weight (kg)	25

Spares/Consumables:

Spare Cone for Dynamic Cone Penetrometer (29-3720/10)

Hammer Shaft 815 mm (29-3720/11

Extension Rod 400 mm (29-3720/12)

Penetration Rod 900 mm (29-3720/13)

Base Plate (29-3720/14)

Pocket Penetrometer

Product Code: 29-3729

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 clay soils against the penetrometer readings to develop the scale.

- Direct-reading scale in tons/ft² and kg/cm².
- 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 Adaptor Foot for testing very soft materials.

Specifications	
Range	0.25 to 4.5 tons/ft² (kg/cm²)
Scale Divisions	0.25 tons/ft² (kg/cm²)
Load Piston	1/4 inch (6 mm) dia; Stainless Steel
Carrying Case	Canvas; belt-loop style
Dimensions	3/4 inch dia x 6-3/8 inches long (19 x 162 mm)
Weight (g)	216

Accessories:

Adaptor Foot increases surface area x 16 (29-3729/10)

Further Information:

IMPORTANT: The readings obtained from the Pocket Penetrometer do not replace laboratory test results due to the fact that a small area penetration test is inherently liable to give misleading results. The instrument should not be used for obtaining foundation design data.

Plate Bearing Apparatus Complete, 500 kN Capacity

Product Code: 29-3800

Plate Bearing Apparatus Comprises of:

- Hydraulic Jack 500 kN capacity.
- Pressure system.
- Datum bar.
- 4 x Dial Gauges 50 mm travel x 0.01 mm divisions.
- 4 x Bearing Plates: 150 mm, 305 mm, 455 mm and 760 mm diameter.

Product Standards:

ASTM D1194, ASTM D1195/D1195M, ASTM D1196/D1196M, BS1377, EN1997-3

Applications include the determination of bearing capacity of the soil in-situ, designing for static loads on spread footings, and repetitive and non-repetitive plate loading tests of soils and flexible pavements. Manufactured from machined steel plate with a finished thickness exceeding 25 mm. The plate has concentric markings on one face. All plates are supplied with two lifting eyes except for the 150 mm diameter plate. NOTE: to successfully perform the test, a reaction load is required. IMPORTANT: The equipment is used in conjunction with a reaction beam. This is not supplied with the equipment.

Specifications	
Loading Jack	500 kN capacity with integral ball seating
Pump	Hand operated, single speed with integral oil reservoir
Hose	3 m long. Max pressure 70 mPa with quick release couplings
Gauge	100 mm dia with quick release couplings and graphs to convert readings to kN, kgf and lbf
Weights	Loading jack 24 kg Pressure system 12.5 kg

Spares/Consumables:

Hand Operated Pressure System for 500 kN Jack (29-3808)

500 kN/700 Bar Pressure Gauge (29-3808/10)

Datum Bar Assembly (29-3818)

Dial Gauge 50 mm Travel x 0.01 mm Divisions complete with Adjustable Clamp Assembly (29-3822)

Adjustable Clamp Assembly for Dial Gauge 29-3822 (29-3822/10)

Bearing Plates:

150 mm diameter (29-3826) 305 mm diameter (29-3834)

455 mm diameter (29-3838) 760 mm diameter (29-3846)

In-situ Density

In-situ Density

Many civil engineering projects require the use of fill material. Whenever soil is placed as an engineering fill, it is usually compacted to a dense state to obtain satisfactory engineering properties. Compaction on site is usually effected by mechanical means such as rolling, ramming or vibrating. Control of compaction is necessary to achieve a satisfactory result at a reasonable cost. Laboratory compaction tests provide the basis for control procedures used on site.

Proctor Penetrometer

This spring-type penetrometer can be used in the field to control soil compaction. The stem is calibrated to 150 lbf x 2 lbf divisions, and a sliding collar indicates the applied load. A rapid estimate of the moisture content of soil can be obtained by comparing the amount of penetration of the needle for a corresponding load, with a laboratory determined moisture/density curve for a similar soil.

Proctor Penetrometer (Spring Type) with Adaptor Stem

Product Code: 29-3925

Product Standards:

ASTM D1558

Supplied without needle points.

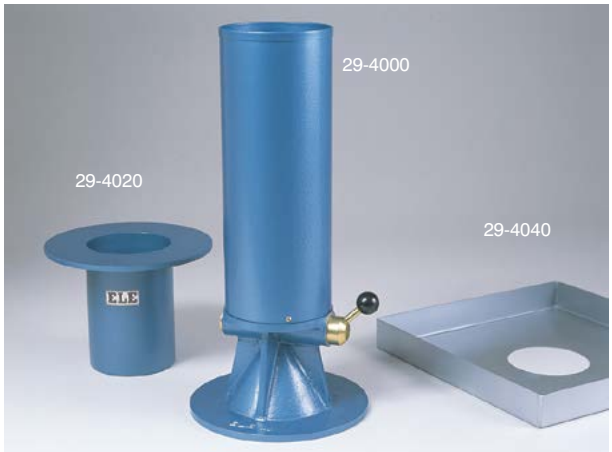
Specifications	
Weight (kg)	2

Accessories:

Case for Proctor Penetrometer (29-3933)

Set of Needle Points (34-0810)
1, 3/4, 1/2, 1/3, 1/5, 1/10, 1/20, 1/30, 1/40 square inch area.

Sand Replacement



This equipment is used to determine the dry density of in-situ soils. Apparatus is included which satisfies BS, ASTM and AASHTO specifications.

Sand Pouring Cylinder (100 mm)

Product Code: 29-4000

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Dia (mm)	100
Weight (kg)	3.2

Calibrating Container (100 mm)

Product Code: 29-4020

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Internal dia (mm)	100
Depth (mm)	150
Rim dia (mm)	200
Weight (kg)	2.75

Sand Pouring Cylinder (150 mm)

Product Code: 29-4100

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Dia (mm)	150
Weight (kg)	8.7

Calibrating Container (150 mm)

Product Code: 29-4120

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Internal dia (mm)	150
Depth (mm)	150
Rim dia (mm)	250
Weight (kg)	4.4

Sand Pouring Cylinder (200 mm)

Product Code: 29-4200

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Dia (mm)	200
Weight (kg)	14

Calibrating Container (200 mm)

Product Code: 29-4220

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Internal dia (mm)	200
Depth (mm)	250
Rim dia (mm)	350
Weight (kg)	8.2

Metal Tray 300 mm² x 40 mm deep with a 100 mm diameter hole

Product Code: 29-4040

Product Standards:

BS 1377-9, EN 1924-2

Metal Tray 300 mm² x 40 mm deep with a 150 mm diameter hole

Product Code: 29-4140

Metal Tray 500 mm² x 50 mm deep with a 200 mm diameter hole

Product Code: 29-4240

Sand Cone 6 inches

Grouped Product Standards:

ASTM D1556/D1556M, AASHTO T191

Product Code	Product
29-4300	6 inch (152 mm) Sand Cone
29-4320	Plastic Container for Sand Cone
29-4340	Density Plate
82-7401	Standard Sand - 600/300 μm

In-situ Density

Core Cutter Apparatus

In this method of determining the dry density of in-situ soil, a Core Cutter of known volume is driven into the soil by a rammer. The Core Cutter is removed, trimmed and the soil obtained is weighed and dried for a moisture/density check.

Core Cutter

Product Code: 29-5300

Product Standards:

BS 1377

Specifications	
Internal dia x length (mm)	100 x 130

Driving Dolly for 29-5300

Product Code: 29-5320

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Weight (kg)	0.34

Driving Rammer for 29-5320

Product Code: 29-5340

Product Standards:

BS 1377-9, EN 1924-2

Specifications	
Weight (kg)	13

Field Density Tools

Density Spoon

Product Code: 29-5000

For removing soil from the hole.

Specifications	
Weight (kg)	0.11

Soft Headed Mallet

Product Code: 29-5020

Specifications	
Weight (kg)	0.62

Density Chisel

Product Code: 29-5060

With hardened tip.

Specifications	
Weight (kg)	0.75

Metal Dibber Tool

Product Code: 29-5080

For excavating hole.

Specifications	
Weight (kg)	0.27

Density Hand Pick

Product Code: 29-5120

For excavating in difficult ground.

Specifications	
Weight (kg)	0.76

Steel Pointed Rod

Product Code: 29-5140

Steel pointed rod with plastic handle.

Specifications	
Weight (kg)	0.25

Sieving, Wet & Dry Method

Sieve method is applicable to soils with less than 10% fines.

Standard(s)	EN 17892-4	
Product Code	**Product**	**Qty**
24-4145	Sodium Hexametaphosphate 500 g	1
79-0010	200 mm dia Lid	1
79-0020	200 mm dia Receiver	1
79-0070	200 mm dia BS Sieve 63 Mic Stainless Steel Mesh	1
79-0120	200 mm dia BS Sieve 150 Mic Stainless Steel Mesh	1
79-0140	200 mm dia BS Sieve 212 Mic Stainless Steel Mesh	1
79-0160	200 mm dia BS Sieve 300 Mic Stainless Steel Mesh	1
79-0180	200 mm dia BS Sieve 425 Mic Stainless Steel Mesh	1
79-0200	200 mm dia BS Sieve 600 Mic Stainless Steel Mesh	1
79-0240	200 mm dia BS Sieve 1.18 mm Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1
79-0280	200 mm dia BS Sieve 2.36 mm Stainless Steel Mesh	1
79-2010	300 mm dia Lid	1
79-2020	300 mm dia Receiver	1
79-2300	300 mm dia BS Sieve 3.35 mm Stainless Steel Mesh	1
79-2515	300 mm dia BS Sieve 5 mm Perforated Plate	1
79-2525	300 mm dia BS Sieve 6.3 mm Perforated Plate	1
79-2555	300 mm dia BS Sieve 10 mm Perforated Plate	1
79-2575	300 mm dia BS Sieve 14 mm Perforated Plate	1
79-2595	300 mm dia BS Sieve 20 mm Perforated Plate	1
79-2615	300 mm dia BS Sieve 28 mm Perforated Plate	1
79-2640	300 mm dia BS Sieve 37.5 mm Perforated Plate	1
79-2655	300 mm dia BS Sieve 50 mm Perforated Plate	1
79-2670	300 mm dia BS Sieve 63 mm Perforated Plate	1
79-2680	300 mm dia BS Sieve 75 mm Perforated Plate	1
79-7200	Sieve Brush Double Ended Brass and Nylon Bristle	1
79-7210	Sieve Brush Double Ended Nylon	1
81-0220	Aluminium Scoop Large	2
81-0375	Red Rubber Tubing 6.5 mm Bore x 5 mm Wall thickness price per metre	2
81-3545	22 ltr Transport/Storage Container complete with Snap-on Lid and Handle	3
81-4080	Sample Tray 610 x 610 x 63 mm	2
81-4700	Stainless Steel Tray 305 mm dia	6
82-0220	Glass Beaker 1000 ml capacity Squat Form with Spout	3
82-2000	Evaporating Dish 150 mm dia x 45 mm depth	6

Continued on page 84

Buyer's Guide

Continued: Sieving, Wet & Dry Method

Product Code	Product	Qty
23-3000	Riffle Box 7 mm slot width complete with 3 Containers	1
23-3070	Riffle Box 15 mm slot width complete with 3 Containers	1
23-3170	Riffle Box 30 mm slot width complete with 3 Containers	1
23-3300	Riffle Box 50 mm slot width complete with 3 Containers	1
78-1215/01	Drying Oven 50 ltr capacity 1 Year Warranty 220-240 V AC, 50-60 Hz, 1 ph	1
78-6020/01	Electronic Top Loading Balance 6 kg x 0.1 g with below balance hanger	1
78-6050/01	Upright Loading Balance 50 kg x 10 g	1
80-0200/01	ELE Sieve Shaker complete with separate Control Panel 220-240 V AC, 50 Hz, 1 ph	1
82-2110	Desiccator Cabinet Non-Vacuum	1
82-7091	Silica Gel 2.5 to 6 mm Self Indicating 500 g	1

Sedimentation by Hydrometer Method

This method is applicable to soils with more than 10% fines.

Standard(s)	EN 17892-4	
Product Code	**Product**	**Qty**
24-2854/01	Mechanical End-Over-End Shaker complete with Friction Safety Device and Control Panel 220-240 V AC, 50 Hz, 1 ph	1
24-4145	Sodium Hexametaphosphate 500 g	1
24-4620	Long Stem Soil Hydrometer	1
24-4700	1000 ml Glass Cylinder with Rubber Bung	2
24-4865/01	Constant Temperature Bath 0 to 99.9°C x 0.1°C with LED Display and False Base Support	1
34-0140	300 mm Stainless Steel Rule	1
81-0375	Red Rubber Tubing 6.5 mm Bore x 5 mm Wall thickness price per metre	2
81-0518	Timer Clock	1
82-0200	Glass Beaker 600 ml Squat Form with Spout	1
82-0260	Beaker Cover 100 mm dia	
82-0380	Measuring Cylinder 100 ml	1
82-1300	Bulb Pipette 50 ml capacity	1
82-2000	Evaporating Dish 150 mm dia x 45 mm depth	5
82-2100	Non-Vacuum Desiccator 200 mm internal dia	1
82-2200	Buchner Funnel No. 5	1
82-2350	1000 ml Filter Flask Polypropylene with Side Arm	1
82-2500	Wash Bottle Polythene 500 ml	1
82-4005	Glass Rods 7 mm dia x 200 mm. Pack of 10	1
82-5420	Digital Pocket Thermometer -49.9˚C to +199.9˚C	1
82-7091	Silica Gel 2.5 to 6 mm Self Indicating 500 g	1
82-7700	Filter Pump	1
82-7931	Filter Paper No. 95 equivalent to Whatman No. 50. 110 mm dia. Box of 100	1

Continued: Sedimentation by Hydrometer Method

Product Code	Product	Qty
78-1215/01	Drying Oven 50 ltr capacity 1 Year Warranty 220-240 V AC, 50-60 Hz, 1 ph	1
78-6020/01	Electronic Top Loading Balance 6 kg x 0.1 g with below balance hanger	1
79-0020	200 mm dia Receiver	1
79-0070	200 mm dia BS Sieve 63 Mic Stainless Steel Mesh	1
79-0140	200 mm dia BS Sieve 212 Mic Stainless Steel Mesh	1
79-0200	200 mm dia BS Sieve 600 Mic Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1

Incremental Loading Oedometer Test — Manual Recording

The Oedometer Consolidation test method determines the compression, swelling and consolidation properties of soils. Available sample sizes: 50 mm and 75 mm consolidation cells. Options for manual or automatic recording/analysis of results.

One-Dimensional Consolidation

Standard(s)	EN 17892-5	
Product Code	**Product**	**Qty**
24-0430	Glass Plate	1
24-9010	Straight Edge 300 mm	1
25-0402	Consolidation Frame One-Dimensional Consolidation Incremental Loading Device	1
25-0408	Set of Weights 100 kg total weight	1
25-0429	Floor Mounting Stand	1
25-0440	Dial Gauge 10 mm Travel x 0.002 mm Divisions	1
78-6010/01	Electronic Top Loading Balance 1200 g at 0.01 g	1
81-0100	Spatula 100 mm Blade	1
81-0518	Timer Clock	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-0710	Trimming Knife	1
81-0805	Engineer's Steel Rule 300 mm	1
82-5310	Max-Min Thermometer (Mercury Free) Range -40˚C to +50˚C	1

50 mm Sample

25-0455	Consolidation Cell complete 50 mm dia Sample	1
25-0461	Calibration Disc 50 mm Cell	1

75 mm Sample

25-0503	Consolidation Cell complete 75 mm dia Sample	1
25-0509	Calibration Disc 75 mm Cell	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Also required Part 2 Determination of Density of Fine Grained Soil - Page 113.

Buyer's Guide

Incremental Loading Oedometer Test | Automatic Recording

The Oedometer Consolidation test method determines the compression, swelling and consolidation properties of soils. Available sample sizes: 50 mm and 75 mm consolidation cells. Options for manual or automatic recording/analysis of results.

One-Dimensional Consolidation

Standard(s)	EN 17892-5	
Product Code	**Product**	**Qty**
24-0430	Glass Plate	1
24-9010	Straight Edge 300 mm	1
25-0402	Consolidation Frame One-Dimensional Consolidation Incremental Loading Device	1
25-0408	Set of Weights 100 kg total weight	1
25-0429	Floor Mounting Stand	1
78-6010/01	Electronic Top Loading Balance 1200 g at 0.01 g	1
81-0100	Spatula 100 mm Blade	1
81-0518	Timer Clock	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-0710	Trimming Knife	1
81-0805	Engineer's Steel Rule 300 mm	1
82-5310	Max-Min Thermometer (Mercury Free) Range -40˚C to +50˚C	1
27-1500/01	GDU 8 Channel Data Acquisition Unit	1
27-1649	Consolidation Transducer Assembly 15 mm Travel fitted with 5-pin DIN plug	1
50 mm Sample		
25-0455	Consolidation Cell complete 50 mm dia Sample	1
25-0461	Calibration Disc 50 mm Cell	1
75 mm Sample		
25-0503	Consolidation Cell complete 75 mm dia Sample	1
25-0509	Calibration Disc 75 mm Cell	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Also required Part 2 Determination of Density of Fine Grained Soil - Page 113.

Determination of Unconfined Compressive Strength. 38 mm Dia Samples.

The unconfined test is useful to derive the undrained shear strength of soil.
This test provides an approximate value of the unconfined compressive strength of a water saturated homogenous specimen of undisturbed or remoulded cohesive soil.

Standard(s)	EN 17892-7	
Product Code	**Product**	**Qty**
23-4090	38 mm Hand Operated Hydraulic Sample Extruder with Trimming Knife 38 mm Split Former and Cutting Tool	1
23-4120	38 mm Split Former	1
23-4140	Cutting Tool for end preparation of 38 mm samples	1
24-9010	Straight Edge 300 mm	1
25-3650	Unconfined Compression Platens complete with Dial Gauge	1
34-0140	300 mm Stainless Steel Rule	1
78-0260	4.5 kN Clamped Boss Load Ring	1
81-0140	Spatula 200 mm	1
81-0518	Timer Clock	1
81-0588	Vernier Caliper Range 0 to 200 mm x 0.02 mm	1
81-0708	Wire Saw	1
81-0710	Trimming Knife	1
Load Frame also required.		
24-9150/01	CBR-Test 50 Machine 50 kN capacity Two Speeds BS and ASTM supplied with Stabilising Bar	1
Alternative(s)		
25-3700/01	Multiplex 50 Machine 50 kN capacity supplied with Stabilising Bar	1
25-3518/01	Digital Tritest 50 Triaxial Load Frame for use on 220-240 V AC, 50-60 Hz, 1 ph	1

Also recommended, but not mandatory
Part 1 Moisture Content Determination Oven Method - Page 112.
Part 2 Determination of Density of Fine Grained Soil - Page 113.

Determination of Compressive Strength. Undrained Triaxial. Oil/Water Pressure System. 38 mm Samples.

Manual Recording

Available sample sizes: 38 mm, 50 mm, 70 mm and 100 mm dia. Options for Oil/Water or Pneumatic pressure systems and choice of Manual or Automatic recording/analysis of test results.

This test determines the compressive strength of a water saturated cylindrical specimen of undisturbed or remoulded cohesive soil without allowing any drainage from the specimen.

Standard(s)	EN 17892-8	
Product Code	**Product**	**Qty**
25-3518/01	Digital Tritest 50 Triaxial Load Frame for use on 220-240 V AC, 50-60 Hz, 1 ph	1
25-4047	50 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports, supplied with 2 Valves	1
25-4166	38 mm/1.5 inch Base Adaptor with Twin Pore Pressure Ports for 50 mm Cells	1
25-4210	Dial Gauge 25 mm Travel x 0.01 mm Divisions	1
25-4290	Membrane Placing Tool for 35 mm and 38 mm samples	1
25-5050	Pressure Pad 38 mm/1.5 inch dia	1
25-5061	Rubber Membrane 38 mm/1.5 inch dia. Pack of 10	1
25-5081	Membrane Sealing Ring 38 mm/1.5 inch dia. Pack of 10	1
25-5100	Suction Membrane Device 38 mm/1.5 inch dia	1
25-5120	Two-Way Split Former 38 mm/1.5 inch dia	1
26-1800/01	Pressure Test 1700 Oil/Water Constant Pressure System 0 to 1700 kPa 220-240 V AC, 50-60 Hz, 1 ph	1
26-1820	Digital Pressure Gauge 1700 kPa for use with 26-1800 Series Oil/Water Constant Pressure System	1
26-1926	Nylon Tubing 6 mm outside dia, 3500 kPa	10
78-0260	4.5 kN Clamped Boss Load Ring	1
Also required option		
25-1833/01	De-Aired Water Apparatus 15 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1

Also required:
Part 1 Moisture Content Determination Oven Method - Page 112.
Part 2 Determination of Density of Fine Grained Soil - Page 113.
Part 3 Determination of Particle Density, Pyknometer Method - Page 113.

Determination of Compressive Strength. Undrained Triaxial. Pneumatic Pressure System & DataSystem 7. 38 mm Samples.

Automatic Recording

This test determines the compressive strength of a water saturated cylindrical specimen of undisturbed or remoulded cohesive soil without allowing any drainage from the specimen.

Standard(S)	EN 17892-8	
Product Code	**Product**	**Qty**
25-3518/01	Digital Tritest 50 Triaxial Load Frame for use on 220-240 V AC, 50-60 Hz, 1 ph	1
25-4047	50 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4166	38 mm/1.5 inch Base Adaptor with Twin Pore Pressure Ports for 50 mm Cells	1
25-4290	Membrane Placing Tool for 35 mm and 38 mm samples	1
25-5050	Pressure Pad 38 mm/1.5 inch dia	1
25-5061	Rubber Membrane 38 mm/1.5 inch dia. Pack of 10	1
25-5081	Membrane Sealing Ring 38 mm/1.5 inch dia. Pack of 10	1
25-5100	Suction Membrane Device 38 mm/1.5 inch dia	1
25-5120	Two-Way Split Former 38 mm/1.5 inch dia	1
26-1746	Bladder-Type Air/Water Pressure Assembly 1000 kPa Max Working Pressure	2
26-1760	Pneumatic Pressure Reducing Panel provides 2 independent pressure outlets 1000 kPa max	1
26-1769	Nylon Tubing 30 m length	1
26-1880	Universal Pump and Pressure Indicating Panel 1700 kPa	1
26-1926	Nylon Tubing 6 mm outside dia 3500 kPa price per metre	4
27-1293	Distance Piece Stainless Steel for use with Submersible Load Cells and Axial Strain Transducers	1
27-1500/01	GDU 8 Channel Data Acquisition Unit	1
27-1551	S-Type Load Cell 5 kN for Triaxial Tests fitted with 5-pin DIN plug	1
27-1617	Axial Strain Transducer Assembly 50 mm Travel fitted with 5-pin DIN plug	1
27-1633	Pressure Transducer Assembly 1700 kPa fitted with 5-pin DIN plug	1
27-1753	DS7.3 Undrained Triaxial Shear Strength Program	1
83-1730/01	Air Compressor Unit 700 kPa Working Pressure 220-240 V AC, 50 Hz, 1 ph	1
Also required option		
25-1833/01	De-Aired Water Apparatus 15 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1

Also required:
Part 1 Moisture Content Determination Oven Method - Page 112.
Part 2 Determination of Density of Fine Grained Soil - Page 113.
Part 3 Determination of Particle Density, Pyknometer Method - Page 113.

Part 8: Determination of Compressive Strength. CU/CD Effective Stress Triaxial. 38 mm Samples.

Manual Recording

Available sample sizes: 38 mm, 50 mm, 70 mm and 100 mm dia. Options for Oil/Water or Pneumatic pressure systems and choice of Manual or Automatic recording/analysis of test results.

This test determines the stress-strain relationship and effective stress paths of a water saturated specimen of undisturbed, remoulded or reconstituted soil when subjected to an isotropic or anisotropic stress under undrained or drained conditions.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
25-1833/01	De-Aired Water Apparatus 15 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1
25-3518/01	Digital Tritest 50 Triaxial Load Frame for use on 220-240 V AC, 50-60 Hz, 1 ph	1
25-4047	50 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4166	38 mm/1.5 inch Base Adaptor with Twin Pore Pressure Ports for 50 mm Cells	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4210	Dial Gauge 25 mm Travel x 0.01 mm Divisions	1
25-4290	Membrane Placing Tool for 35 mm and 38 mm samples	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-5050	Pressure Pad 38 mm/1.5 inch dia	1
25-5061	Rubber Membrane 38 mm/1.5 inch dia. Pack of 10	1
25-5081	Membrane Sealing Ring 38 mm/1.5 inch dia. Pack of 10	1
25-5100	Suction Membrane Device 38 mm/1.5 inch dia	1
25-5120	Two-Way Split Former 38 mm/1.5 inch dia	1
25-5181	Porous Disc 38 mm/1.5 inch dia. Pack of 2	1
25-5200	Filter Paper Drain 38 mm/1.5 inch dia. Pack of 50	1
26-1800/01	Pressure Test 1700 Oil/Water Constant Pressure System 0 to 1700 kPa 220-240 V AC, 50-60 Hz, 1 ph	2
26-1820	Digital Pressure Gauge 1700 kPa for use with 26-1800 Series Oil/Water Constant Pressure System	1
26-1880	Universal Pump and Pressure Indicating Panel 1700 kPa	1
26-1892	Twin Burette Volume Change Unit	1
26-1900	Red Dye Kerosene Soluble 10 g Phial for colouring Kerosene	1
26-1926	Nylon Tubing 6 mm outside dia 3500 kPa price per metre	10
27-1620	Digital Pressure Gauge 1700 kPa for ELE Triaxial Cells	1
78-0260	4.5 kN Clamped Boss Load Ring	1

Part 8: Determination of Compressive Strength. CU/CD Effective Stress Triaxial. 38 mm Samples.

Automatic Recording

This test determines the stress-strain relationship and effective stress paths of a water saturated specimen of undisturbed, remoulded or reconstituted soil when subjected to an isotropic or anisotropic stress under undrained or drained conditions.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
25-1833/01	De-Aired Water Apparatus 15 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1
25-3518/01	Digital Tritest 50 Triaxial Load Frame for use on 220-240 V AC, 50-60 Hz, 1 ph	1
25-4047	50 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4166	38 mm/1.5 inch Base Adaptor with Twin Pore Pressure Ports for 50 mm Cells	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4290	Membrane Placing Tool for 35 mm and 38 mm samples	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-5050	Pressure Pad 38 mm/1.5 inch dia	1
25-5061	Rubber Membrane 38 mm/1.5 inch dia. Pack of 10	1
25-5081	Membrane Sealing Ring 38 mm/1.5 inch dia. Pack of 10	1
25-5100	Suction Membrane Device 38 mm/1.5 inch dia	1
25-5120	Two-Way Split Former 38 mm/1.5 inch dia	1
25-5181	Porous Disc 38 mm/1.5 inch dia. Pack of 2	1
25-5200	Filter Paper Drain 38 mm/1.5 inch dia. Pack of 50	1
26-1800/01	Pressure Test 1700 Oil/Water Constant Pressure System 0 to 1700 kPa 220-240 V AC, 50-60 Hz, 1 ph	2
26-1880	Universal Pump and Pressure Indicating Panel 1700 kPa	1
26-1926	Nylon Tubing 6 mm outside dia 3500 kPa price per metre	10
27-1293	Distance Piece Stainless Steel for use with Submersible Load Cells and Axial Strain Transducers	1
27-1500/01	GDU 8 Channel Data Acquisition Unit	1
27-1573	Submersible Load Transducer Assembly 5 kN capacity in Compression	1
27-1617	Axial Strain Transducer Assembly 50 mm Travel fitted with 5-pin DIN plug	1
27-1633	Pressure Transducer Assembly 1700 kPa fitted with 5-pin DIN plug	3
27-1641	Volume Change Transducer Assembly 80 cm^3 capacity Max Working Pressure 1700 kPa	1
27-2753	DS7.3 Undrained Triaxial Shear Program (DS7.2: 27-1753)	1
27-2763	DS7.3 CU/CD Triaxial Shear Strength Program (DS7.2: 27-1763)	1

Buyer's Guide

Direct/Residual Shear Test — Manual Recording

Available sample sizes: 60 mm² and 100 mm² samples and 63.5 mm round samples. Options for Manual or Automatic recording/analysis of results.

Direct shear tests are used in earthworks and foundation engineering.
This test determines the effective shear strength parameter for soils.

Standard(s)	EN 17892-10	
Product Code	**Product**	**Qty**
25-0440	Dial Gauge 10 mm Travel x 0.002 mm Divisions	1
26-2114/01	Digital Direct/Residual Shear Apparatus complete with Lever Loading Assembly. 220-240 V AC, 50-60 Hz, 1 ph	1
26-2132	Set of Weights 50 kg Slotted	1
26-2181	Shear Box Assembly 60 mm²	1
26-2185	Specimen Cutter 60 mm²	1
26-2189	Specimen Extrusion Tool 60 mm²	1
78-0260	4.5 kN Clamped Boss Load Ring	1
83-5456	Dial Gauge 10 mm Travel x 0.01 mm Divisions	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Direct/Residual Shear Test with DataSystem 7. 60 mm² Specimen. — Automatic Recording

This test determines the effective shear strength parameter for soils.

Standard(s)	EN 17892-10	
Product Code	**Product**	**Qty**
26-2114/01	Digital Direct/Residual Shear Apparatus complete with Lever Loading Assembly 220-240 V AC, 50-60 Hz, 1 ph	1
26-2132	Set of Weights 50 kg slotted	1
26-2181	Shear Box Assembly 60 mm²	1
26-2185	Specimen Cutter 60 mm²	1
26-2189	Specimen Extrusion Tool 60 mm²	1
27-1500/01	GDU 8 Channel Data Acquisition Unit	1
27-1561	S-Type Load Cell 5 kN for use with Direct/Residual Shear Machine fitted with 5-pin DIN plug	1
27-1689	Vertical Displacement Transducer Assembly 10 mm Travel with 5-pin DIN plug and Bracket for Shear Box	1
27-1697	Horizontal Displacement Transducer Assembly 10 mm Travel 5-pin DIN plug Mounting Pillar	1
27-2793	DS7.3 Direct and Residual Shear Strength Program (DS7.2: 27-1793)	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Permeability of Soil Constant Head Permeameter

Permeability tests in this standard are intended for use in earthworks and foundation engineering.
This test determines the coefficient of permeability through water saturated soils.

Standard(s)	EN 17892-11	
Product Code	**Product**	**Qty**
25-0580	Constant Head Permeability Cell 75 mm dia Specimen	1
25-0591	Manometer Tubes and Stand	1
25-0593	Constant Level Tank	1
42-4580	Tamping Rod 8 mm dia x 300 mm long	1
81-0200	Aluminium Scoop Small	1
81-0375	Red Rubber Tubing 6.5 mm Bore x 5 mm Wall thickness price per metre	1
81-0518	Timer Clock	1
82-0380	Measuring Cylinder 100 ml	1
82-0460	Measuring Cylinder 500 x 5 ml Soda Glass Spouted BS 604	1
82-1060	Volumetric Flask 1000 ml capacity with Stopper	1
82-2660	Polythene Funnel 200 mm dia	1
82-7720/01	Vacuum Pump 220-240 V AC, 50-60 Hz, 1 ph	1
82-7720/12	Water Trap Filtering Kit	1

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Part 6: Permeability in a Triaxial Cell. 100 mm Sample.

Manual Recording

Available sample sizes: 38 mm, 50 mm, 70 mm and 100 mm dia. Options for Oil/Water or Pneumatic pressure systems and choice of Manual or Automatic recording/analysis of test results.

This test determines the coefficient of permeability through water saturated soils.

Standard(s)	BS 1377

Product Code	Product	Qty
25-1833/01	De-aired Water Apparatus 15 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1
25-4157	100 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4186	100 mm Base Adaptor with Twin Pore Pressure Ports for 100 mm Triaxial Cell	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-7590	Pressure Pad 100 mm dia	1
25-7610	Membrane Placing Tool 100 mm/4 inch dia	1
25-7621	Rubber Membrane 100 mm/4 inch dia. Pack of 10	1
25-7631	Membrane Sealing Ring 100 mm dia. Pack of 10	1
25-7640	Suction Membrane Device 100 mm/4 inch dia	1
25-7650	Two-Way Split Former 100 mm dia	1
25-7661	Porous Disc 100 mm dia. Pack of 2	1
25-7670	Filter Paper Drain, 100 mm/4 inch dia. Pack of 50	1
26-1746	Bladder-Type Air/Water Pressure Assembly 1000 kPa Max Working Pressure	3
26-1769	Nylon Tubing 30 m length	1
26-1872	Six-Way Pneumatic Pressure Control Panel	1
26-1880	Universal Pump and Pressure Indicating Panel 1700 kPa	1
26-1892	Twin Burette Volume Change Unit	2
26-1900	Red Dye Kerosene Soluble 10 g Phial for colouring Kerosene	1
26-1926	Nylon Tubing 6 mm outside dia 3500 kPa price per metre	20
27-1620	Digital Pressure Gauge 1700 kPa for ELE Triaxial Cells	1
83-1730/01	Air Compressor Unit 700 kPa Working Pressure 220-240 V AC, 50 Hz, 1 ph	1

Part 6: Permeability in a Triaxial Cell. 100 mm Sample.

Automatic Recording

This test determines the coefficient of permeability through water saturated soils.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
25-1833/01	De-Aired Water Apparatus 15 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1
25-4157	100 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4186	100 mm Base Adaptor with Twin Pore Pressure Ports for 100 mm Triaxial Cell	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-7590	Pressure Pad 100 mm dia	1
25-7610	Membrane Placing Tool 100 mm/4 inch dia	1
25-7621	Rubber Membrane 100 mm/4 inch dia. Pack of 10	1
25-7631	Membrane Sealing Ring 100 mm dia. Pack of 10	1
25-7640	Suction Membrane Device 100 mm/4 inch dia	1
25-7650	Two-Way Split Former 100 mm dia	1
25-7661	Porous Disc 100 mm dia. Pack of 2.	1
25-7670	Filter Paper Drain, 100 mm/4 inch dia. Pack of 50	1
26-1746	Bladder-type Air/Water Pressure Assembly 1000 kPa Max Working Pressure	3
26-1769	Nylon Tubing 30 m length	1
26-1872	Six-way Pneumatic Pressure Control Panel	1
26-1880	Universal Pump and Pressure Indicating Panel 1700 kPa	1
26-1926	Nylon Tubing 6 mm outside dia 3500 kPa price per metre	20
27-1300/01	DSU Electronic Data Acquisition and Control System	1
27-1633	Pressure Transducer Assembly 1700 kPa fitted with 5-pin DIN plug	1
27-1641	Volume Change Transducer Assembly 80 cm^3 capacity Max Working Pressure 1700 kPa	2
27-2768	DS7.3 Permeability in a Triaxial Cell (DS7.2: 27-1768)	1
83-1730/01	Air Compressor Unit 700 kPa Working Pressure 220-240 V AC, 50 Hz, 1 ph	1

Determination of Liquid & Plastic Limit

"Atterberg" limits of soil comprise the Liquid Limit and Plastic Limit test methods. These limits are also known as the Consistency Limits.

The liquid limit is the water content at which soil changes from a liquid to a plastic state. The plastic limit of soil is the lowest water content at which it is plastic.

Standard(s)	EN 17892-12	
Product Code	**Product**	**Qty**
23-3500	Rubber Headed Pestle	1
23-3505	Mortar and Pestle Porcelain	1
24-0430	Glass Plate	1
24-0540	Cone Penetrometer complete with Stainless Steel Test Cone	1
24-0546	Test Gauge for Checking Condition of Cone Point	1
24-0548	Penetration Test Cup	1
24-0811	Rod Comparator	1
79-0175	200 mm dia ISO: 565 3310/1 Sieve 400 Mic Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1
81-0140	Spatula 200 mm	2
81-0518	Timer Clock	1
81-3500	Plastic Sample Container 1 dm^3 capacity complete with Lid	10
82-2000	Evaporating Dish 150 mm dia x 45 mm depth	1
82-2500	Wash Bottle Polythene 500 ml	1
78-6010/01	Electronic Top Loading Balance 1200 g at 0.01 g	1
Also required Part 1 Moisture Content Determination Oven Method - Page 112.		

Hand Boring & Sampling Kit for In-situ Sampling

Product Code	Product	Qty
23-1501	100 mm dia Soil Auger Head	1
23-1517	150 mm dia Gravel Auger Head	1
23-1504	150 mm dia Soil Auger Head	2
23-1577	38 mm dia Sample Tube 230 mm long complete with End Caps	5
23-1525	50 mm dia Dutch Soil Auger Head	2
23-1579	Adaptor for 23-1577 to fit Extension Rods	1
23-1541	Extension Rod 27 mm dia x 1 m long for use with Auger Heads	10
23-1547	Handle and T Piece for use with 23-1541	1
23-1587	Jarring Link for driving Sample Tubes	1
23-1617	Spiral Auger 40 mm dia. One Piece Model	1
23-1543	Stillson Wrench Size 14	2

Riffle Boxes (Sample Dividers) Set

Product Code	Product	Qty
23-3050	Riffle Box 13 mm slot width complete with 3 Containers	1
23-3070	Riffle Box 15 mm slot width complete with 3 Containers	1
23-3100	Riffle Box 19 mm slot width complete with 3 Containers	1
23-3150	Riffle Box 25 mm slot width complete with 3 Containers	1
23-3170	Riffle Box 30 mm slot width complete with 3 Containers	1
23-3200	Riffle Box 38 mm slot width complete with 3 Containers	1
23-3300	Riffle Box 50 mm slot width complete with 3 Containers	1
23-3350	Riffle Box 64 mm slot width complete with 3 Containers	1
23-3000	Riffle Box 7 mm slot width complete with 3 Containers	1

Part 2: Determination of Shrinkage Limit — Volumetric Method

Shrinkage due to drying is significant in clays but less so in silts and sands.
This test enables the shrinkage limit of clays to be determined.

Standard(s) BS1377

Product Code	Product	Qty
24-1500	Prong Plate	1
79-7210	Sieve Brush Double-Ended Nylon	1
81-0100	Spatula 100 mm Blade	2
81-4700	Stainless Steel Tray 305 mm dia	1
24-1550	Shrinkage Dish	1
39-1100/10	Glass Plate for 3 Gang Prism Moulds	1
24-1600	Glass Cup	1
82-0380	Measuring Cylinder 100 ml	1
82-2000	Evaporating Dish 150 mm dia x 45 mm depth	2
78-6010/01	Electronic Top Loading Balance 1200 g at 0.01 g	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Also requires Mercury not supplied by ELE.

Buyer's Guide

Part 2: Determination of Linear Shrinkage

This test determines the linear shrinkage of the fraction of a soil passing a 425 μm test sieve. The filtered soil is put into a mould and then into the drying oven for determination of shrinkage.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-1800	Shrinkage Mould to BS 1377	2
81-0100	Spatula 100 mm Blade	2
81-0588	Vernier Caliper Range 0 to 200 mm x 0.02 mm	1
24-0430	Glass Plate	1
25-8090	Silicon Grease Lubricant 100 g	1
78-1215/01	Drying Oven 50 ltr capacity	1

Part 4: Determination of Dry/Density Moisture Content Relationship

Compaction of soil is the process by which the solid particles are packed more closely together thereby increasing the dry density of the soil.

Standard(s)	BS 1377

Part 4: Dry Density/Moisture Relationship (for up to Medium Gravel Size) — 2.5 kg Rammer Method

This test is for the determination of the dry density of soil passing a 20 mm sieve when it is compacted in a specified manner over a range of moisture contents.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9000	BS Standard Compaction 1000 mm capacity	1
24-9002	Standard Compaction Rammer 2.5 kg	1
79-0020	200 mm dia Receiver	1
79-1595	200 mm dia BS Sieve 20 mm Perforated Plate	1
79-1640	200 mm dia BS Sieve 37.5 mm Perforated Plate	1
81-0100	Spatula 100 mm Blade	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4200	Proctor/Core Cutter Extruder Frame and Hydraulic Jack extrudes 100 mm/4 inch dia Specimens	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Part 4: Dry Density/Moisture Relationship (for Soils with some Coarse Gravel) — 2.5 kg Rammer Method

This test is for the determination of the dry density of soils containing no more than 30% by mass of material retained on a 20 mm sieve when it is compacted in a specified manner over a range of moisture contents.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9002	Standard Compaction Rammer 2.5 kg	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	2
24-9208	C-Spanner for BS CBR Mould. 2 Required	2
24-9210	Base Plate Tool for BS Mould	1
79-0020	200 mm dia Receiver	1
79-1595	200 mm dia BS Sieve 20 mm Perforated Plate	1
79-1640	200 mm dia BS Sieve 37.5 mm Perforated Plate	1
81-0100	Spatula 100 mm Blade	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
81-0220	Aluminium Scoop Large	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4250	CBR/Core Cutter Extruder Frame and Hydraulic Jack extrudes 150 mm/6 inch dia Specimens	1

Part 4: Dry Density/Moisture Relationship (for up to Medium Gravel Size) — 4.5 kg Rammer Method

This test is for the determination of the dry density of soil passing a 20 mm sieve when it is compacted in a specified manner over a range of moisture contents.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9000	BS Standard Compaction Mould 1 ltr capacity	1
24-9004	BS Compaction Rammer 4.5 kg	1
79-0020	200 mm dia Receiver	1
79-1595	200 mm dia BS Sieve 20 mm Perforated Plate	1
79-1640	200 mm dia BS Sieve 37.5 mm Perforated Plate	1
81-0100	Spatula 100 mm Blade	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
81-0220	Aluminium Scoop Large	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4200	Proctor/Core Cutter Extruder Frame and Hydraulic Jack extrudes 100 mm/4 inch dia Specimens	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Part 4: Dry Density/Moisture Relationship (for Soils with some Coarse Gravel) — 4.5 kg Rammer Method

This test is for the determination of the dry density of soils containing no more than 30% by mass of material retained on a 20 mm sieve when it is compacted in a specified manner over a range of moisture contents.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9004	BS Compaction Rammer 4.5 kg	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	2
24-9208	C-Spanner for BS CBR Mould. 2 Required	2
24-9210	Base Plate Tool for BS Mould	1
79-0020	200 mm dia Receiver	1
79-1595	200 mm dia BS Sieve 20 mm Perforated Plate	1
79-1640	200 mm dia BS Sieve 37.5 mm Perforated Plate	1
81-0100	Spatula 100 mm Blade	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
81-0220	Aluminium Scoop Large	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4200	Proctor/Core Cutter Extruder Frame and Hydraulic Jack extrudes 100 mm/4 inch dia Specimens	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Part 4: Determination of Minimum Density of Gravelly Soils

This test determines the minimum density at which a gravel or sandy gravel can be placed. The method is suitable for gravelly soils passing the 37.5 mm sieve and containing no more than 10% of fine material passing the 63 μm sieve.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	1
79-0020	200 mm dia Receiver	1
79-1640	200 mm dia BS Sieve 37.5 mm Perforated Plate	1
81-0220	Aluminium Scoop Large	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
81-3540	Plastic Sample Container 10 dm^3 capacity complete with Lid	10
81-5100	Rubber Bucket 9 ltrs (3 gallons) capacity	1
78-1250/01	Drying Oven 225 ltrs capacity Fan-Circulated. Supplied with 3 Shelves	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1

Part 4: Determination of the California Bearing Ratio (CBR)

Sample preparation for CBR by static compression.

The following laboratory test methods are used to determine the California Bearing Ratio (CBR) of compacted or undisturbed samples of soil. The test methods are suitable for soils having a max particle size of 20 mm.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9202	BS Perforated Base Plate	1
24-9204	BS Solid Base or Top Plate	2
24-9208	C-Spanner for BS CBR Mould. 2 Required	2
24-9210	Base Plate Tool for BS Mould	1
24-9212	Static Compaction Plug	3
34-0130	Tamping Rod 16 mm dia x 600 mm long Hemispherical at Both Ends	1
79-2020	300 mm dia Receiver	1
79-2515	300 mm dia BS Sieve 5 mm Perforated Plate	1
79-2595	300 mm dia BS Sieve 20 mm Perforated Plate	1
81-0140	Spatula 200 mm Blade	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-3540	Plastic Sample Container 10 dm^3 capacity complete with Lid	10
24-9220	Filter Papers 150 mm dia equivalent to Whatman No 1. Box of 100	1
24-9150	CBR Test Machine 50 kN complete with stabilising bar 220-240 V AC, 50 Hz, 1 ph	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1

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Part 4: Sample Preparation for CBR by Dynamic Compaction — 2.5 kg Rammer Method

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9002	Standard Compaction Rammer 2.5 kg	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	2
24-9208	C-Spanner for BS CBR Mould. 2 Required	2
24-9210	Base Plate Tool for BS Mould	1
79-0020	200 mm dia Receiver	1
79-1595	200 mm dia BS Sieve 20 mm Perforated Plate	1
79-1640	200 mm dia BS Sieve 37.5 mm Perforated Plate	1
81-0100	Spatula 100 mm Blade	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
81-3540	Plastic Sample Container 10 dm^3 capacity complete with Lid	10
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4250	CBR/Core Cutter Extruder Frame and Hydraulic Jack extrudes 150 mm/6 inch dia Specimens	1

Part 4: Sample Preparation for CBR by Dynamic Compaction — 4.5 kg Rammer Method

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9004	BS Compaction Rammer 4.5 kg	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	2
24-9208	C-Spanner for BS CBR Mould. 2 Required	2
24-9210	Base Plate Tool for BS Mould	1
79-0020	200 mm dia Receiver	1
79-1595	200 mm dia BS Sieve 20 mm Perforated Plate	1
79-1640	200 mm dia BS Sieve 37.5 mm Perforated Plate	1
81-0100	Spatula 100 mm Blade	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
81-3540	Plastic Sample Container 10 dm^3 capacity complete with Lid	10
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4250	CBR/Core Cutter Extruder Frame and Hydraulic Jack extrudes 150 mm/6 inch dia Specimens	1

Part 4: Sample Preparation for CBR by obtaining an Undisturbed Sample

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	2
24-9202	BS Perforated Base Plate	1
24-9204	BS Solid Base or Top Plate	2
24-9206	CBR Cutting Collar	1
24-9208	C-Spanner for BS CBR Mould. 2 Required	2
24-9210	Base Plate Tool for BS Mould	1
24-9010	Straight Edge 300 mm	1
81-0590	Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm	1
81-3540	Plastic Sample Container 10 dm^3 capacity complete with Lid	10
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4250	CBR/Core Cutter Extruder Frame and Hydraulic Jack extrudes 150 mm/6 inch dia Specimens	1
Also required Part 1 Moisture Content Determination Oven Method - Page 112.		

Part 4: Soaking (Swell) Test

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9275	Dial Gauge 25 mm Travel x 0.01 mm Divisions	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9202	BS Perforated Base Plate	1
24-9260	Swell Plate	1
24-9262	Swell Tripod	1
24-9216	2 kg Split Surcharge Weight	4
81-3540	Plastic Sample Container 10 dm^3 capacity complete with Lid	1
34-6575/01	Large Curing Tank complete with Circulating Pump Heater/Thermostat Unit and Lower Rack	1

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Part 4: Determination of the CBR Laboratory Method Penetration Test. — Manual Recording

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9150/01	CBR-Test 50 Machine 50 kN capacity 2 Speeds BS and ASTM supplied with Stabilising Bar	1
24-9182	Penetration Piston	1
24-9186	Penetration Dial Gauge BS	1
24-9188	Bracket and Adaptor	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	1
24-9214	2 kg Annular Surcharge Weight	1
24-9216	2 kg Split Surcharge Weight	4
78-0860	50 kN Clamped Boss Load Ring complete with Dial Gauge	1
81-0521	Stop Watch	1

Part 4: Determination of the CBR Laboratory Method Penetration Test. — Automatic Recording

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9150/01	CBR-Test 50 Machine 50 kN capacity 2 Speeds BS and ASTM supplied with Stabilising Bar	1
24-9182	Penetration Piston	1
24-9188	Bracket and Adaptor	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	1
24-9214	2 kg Annular Surcharge Weight	1
24-9216	2 kg Split Surcharge Weight	4
27-1300/01	DSU Electronic Data Acquisition and Control System	1
27-1559	S-Type Load Cell 50 kN for CBR or Marshall Tests fitted with 5-pin DIN plug	1
27-1705	CBR Penetration Transducer 50 mm Travel fitted with 5-pin DIN plug	1
81-0521	Stop Watch	1

Part 4: Determination of the CBR Laboratory Method, Multiplex 50. — Manual Recording

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9182	Penetration Piston	1
24-9186	Penetration Dial Gauge BS	1
24-9188	Bracket and Adaptor	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	1
24-9214	2 kg Annular Surcharge Weight	1
24-9216	2 kg Split Surcharge Weight	4
25-3700/01	Multiplex 50 Machine 50 kN capacity supplied with Stabilising Bar	1
78-0760	28 kN Clamped Boss Load Ring complete with Dial Gauge and Calibration Certificate, height 248 mm	1
81-0521	Stop Watch	1

Part 4: Determination of the CBR Laboratory Method, Multiplex 50. — Automatic Recording

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9182	Penetration Piston	1
24-9188	Bracket and Adaptor	1
24-9198	BS CBR Mould Body	1
24-9200	BS Extension Collar	1
24-9204	BS Solid Base or Top Plate	1
24-9214	2 kg Annular Surcharge Weight	1
24-9216	2 kg Split Surcharge Weight	4
25-3700/01	Multiplex 50 Machine 50 kN capacity supplied with Stabilising Bar	1
27-1300/01	DSU Electronic Data Acquisition and Control System	1
27-1559	S-Type Load Cell 50 kN for CBR or Marshall Tests fitted with 5-pin DIN plug	1
27-1705	CBR Penetration Transducer 50 mm Travel Fitted with 5-pin DIN plug	1
81-0521	Stop Watch	1

Part 9: Determination of the CBR In-Situ

The in-situ CBR test is generally concerned only with pavement design and the control of subgrade construction. The test method is suitable for soils not exceeding 20 mm particle size.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-9183	CBR Penetration Piston (adjustable)	1
24-9186	Penetration Dial Gauge BS	1
24-9188	Bracket and Adaptor	1
24-9290	45 kN (10000 lb) capacity Mechanical Jack	1
24-9298	Land Rover Bracket to attach 29-200 Jack	1
24-9300	Ball Seating for 24-9290 45 kN Jack	1
24-9308	Set of Extension Rods	1
24-9312	Datum Bar Assembly	1
24-9320	10 lb (4.5 kg) Annular Surcharge Weight	1
24-9322	10 lb (4.5 kg) Slotted Surcharge Weight	3
78-0760	28 kN Clamped Boss Load Ring complete with Dial Gauge and Calibration Certificate, height 248 mm	1
81-0521	Stop Watch	1
81-3540	Plastic Sample Container 10 dm^3 capacity complete with Lid	10

Part 9: In-situ Density Tests

Sand replacement method suitable for fine and medium grained soils. BS 1377: Part 9.

This test determines the in-situ density of natural or compacted fine and medium grained soils. The method is applicable to layers not exceeding 150 mm.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-0430	Glass Plate	1
29-4000	100 mm Sand Pouring Cylinder	1
29-4020	100 mm Calibrating Container 100 mm inside dia x 150 mm deep with 200 mm dia rim	1
29-4040	Metal Tray L x W x D 300 x 300 x 40 mm with a 100 mm dia hole	1
29-5000	Density Spoon	1
29-5080	Metal Dibber Tool	1
29-5140	Steel Pointed Rod	1
81-4700	Stainless Steel Tray 305 mm dia	1
82-7401	Standard Sand 600-300 Mic	1
Also required for fine grained cohesionless soils.		
29-5300	Core Cutter 100 mm inside dia x 130 mm long	1
Also required Part 1 Moisture Content Determination Oven Method - Page 112.		

Part 9: Sand Replacement Method Suitable for Fine & Medium Grained Soils

This test determines the in-situ density of natural or compacted soil containing coarse grained particles. The method is applicable to layers exceeding 150 mm but not exceeding 250 mm.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
24-0430	Glass Plate	1
29-4200	200 mm Sand Pouring Cylinder	1
29-4220	200 mm Calibrating Container 200 mm inside dia x 250 mm deep with a 350 mm dia rim	1
29-4240	Metal Tray L x W x D 500 x 500 x 50 mm with a 200 mm dia hole	1
29-5000	Density Spoon	1
29-5080	Metal Dibber Tool	1
29-5140	Steel Pointed Rod	1
81-4160	Sample Tray 910 x 910 x 76 mm	1
82-7401	Standard Sand 600-300 Mic	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Part 9: Core Cutter Method for Cohesive Soils Free from Coarse-Grained Material

This test determines the density of natural or compacted soil in-situ.

Standard(s)	BS 1377	
Product Code	**Product**	**Qty**
29-5300	Core Cutter 100 mm inside dia by 130 mm long	3
29-5320	Driving Dolly for 29-5300	1
29-5340	Driving Rammer for 29-5320	1
34-0140	300 mm Stainless Steel Rule	1
81-0140	Spatula 200 mm Blade	1
24-9010	Straight Edge 300 mm	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
23-4200	Proctor/Core Cutter Extruder Frame and Hydraulic Jack extrudes 100 mm/4 inch dia Specimens	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Buyer's Guide

50 mm Triaxial Cell with 38 mm Accessories

Standard(s)	EN 17892-8	
Product Code	**Product**	**Qty**
25-4047	50 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4166	38 mm/1.5 inch Base Adaptor with Twin Pore Pressure Ports for 50 mm Cells	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4290	Membrane Placing Tool for 35 mm and 38 mm samples	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-5050	Pressure Pad 38 mm/1.5 inch dia	1
25-5061	Rubber Membrane 38 mm/1.5 inch dia. Pack of 10	1
25-5081	Membrane Sealing Ring 38 mm/1.5 inch dia. Pack of 10	1
25-5100	Suction Membrane Device 38 mm/1.5 inch dia	1
25-5120	Two-Way Split Former 38 mm/1.5 inch dia	1
25-5130	Two Part Split Mould 38 mm	1
25-5181	Porous Disc 38 mm/1.5 inch dia. Pack of 2	1
25-5200	Filter Paper Drain 38 mm/1.5 inch dia. Pack of 50	1

50 mm Triaxial Cell with 50 mm Accessories

Standard(s)	EN 17892-8	
Product Code	**Product**	**Qty**
25-4047	50 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4168	50 mm Base Adaptor with Twin Pore Pressure Ports for 50 mm Cells	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-5430	Pressure Pad 50 mm dia	1
25-5441	Rubber Membrane 50 mm dia. Pack of 10	1
25-5461	Membrane Sealing Ring 50 mm dia. Pack of 10	1
25-5470	Membrane Placing Tool 50 mm dia	1
25-5480	Suction Membrane Device 50 mm dia	1
25-5500	Two-Way Split Former 50 mm dia	1
25-5530	Two Part Split Mould 50 mm	1
25-5561	Porous Disc 50 mm Pack of 2	1
25-5580	Filter Paper Drain 50 mm dia. Pack of 50	1

70 mm Triaxial Cell with 50 mm Accessories

Standard(s)	EN 17892-8	
Product Code	**Product**	**Qty**
25-4117	70 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4174	50 mm Base Adaptor with Twin Pore Pressure Ports for 70 mm Cells	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-5430	Pressure Pad 50 mm dia	1
25-5441	Rubber Membrane 50 mm dia. Pack of 10	1
25-5461	Membrane Sealing Ring 50 mm dia. Pack of 10	1
25-5470	Membrane Placing Tool 50 mm dia	1
25-5480	Suction Membrane Device 50 mm dia	1
25-5500	Two-Way Split Former 50 mm dia	1
25-5530	Two Part Split Mould 50 mm	1
25-5561	Porous Disc 50 mm. Pack of 2	1
25-5580	Filter Paper Drain 50 mm dia. Pack of 50	1

70 mm Triaxial Cell with 70 mm Accessories

Standard(s)	EN 17892-8	
Product Code	**Product**	**Qty**
25-4117	70 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4176	70 mm Base Adaptor with Twin Pore Pressure Ports for 70 mm Cells	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-6430	Pressure Pad 70 mm dia	1
25-6441	Rubber Membrane 70 mm/2.8 inch dia. Pack of 10	1
25-6461	Membrane Sealing Ring 70 mm dia. Pack of 10	1
25-6470	Membrane Placing Tool 70 mm/2.8 inch dia	1
25-6480	Suction Membrane Device 70 mm dia	1
25-6500	Two-Way Split Former 70 mm dia	1
25-6530	Two Part Split Mould 70 mm	1
25-6561	Porous Disc 70 mm dia. Pack of 2	1
25-6580	Filter Paper Drain 70 mm/2.8 inch dia. Pack of 50	1

100 mm Triaxial Cell with 100 mm Accessories

Standard(s)	EN 17892-8	
Product Code	**Product**	**Qty**
25-4157	100 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4186	100 mm Base Adaptor with Twin Pore Pressure Ports for 100 mm Triaxial Cell	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-7590	Pressure Pad 100 mm dia	1
25-7610	Membrane Placing Tool 100 mm/4 inch dia	1
25-7621	Rubber Membrane 100 mm/4 inch dia. Pack of 10	1
25-7631	Membrane Sealing Ring 100 mm dia. Pack of 10	1
25-7640	Suction Membrane Device 100 mm/4 inch dia	1
25-7650	Two-Way Split Former 100 mm dia	1
25-7661	Porous Disc 100 mm dia. Pack of 2	1
25-7670	Filter Paper Drain 100 mm/4 inch dia. Pack of 50	1

This List of Equipment is Suitable when Specifying Principal Items Required for Strength Testing of Soils

Part 7: Soil Strength Testing Comprising One-Dimensional Consolidation, Triaxial & Direct Shear.

Automatic Recording

The items below enable One-Dimensional Consolidation tests on 75 mm dia samples, CU/CD Triaxial tests on 50 mm dia samples and Direct Shear tests on 60 mm^2 samples to be carried out.

Standard(s)	EN 17892-5, BS 1377	
Product Code	**Product**	**Qty**
25-0402	Consolidation Frame One-Dimensional Consolidation Incremental Loading Device	1
25-0408	Set of Weights 100 kg	1
25-0503	Consolidation Cell complete 75 mm dia Sample	1
25-1833/01	De-Aired Water Apparatus 15 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1
25-3518/01	Digital Tritest 50 Triaxial Load Frame for use on 220-240 V AC, 50-60 Hz, 1 ph	1
25-4047	50 mm Triaxial Cell 1700 kPa with 5 Pressure/Drainage Ports supplied with 2 Valves	1
25-4168	50 mm Base Adaptor with Twin Pore Pressure Ports for 50 mm Cells	1
25-4200	Piston Restraint Clamp for ELE Triaxial Cells manufactured from July 1996	1
25-4520	Valve No Volume Change 1/4 inch BSP fitted with 6 mm Connector and Integral Sealing Ring	2
25-4540	10 ml Burette Single Tube Drainage	1
25-5430	Pressure Pad 50 mm dia	1
25-5441	Rubber Membrane 50 mm dia. Pack of 10	1
25-5461	Membrane Sealing Ring 50 mm dia. Pack of 10	1
25-5470	Membrane Placing Tool 50 mm dia	1
25-5480	Suction Membrane Device 50 mm dia	1
25-5500	Two-Way Split Former 50 mm dia	1

Product Code	Product	Qty
25-5530	Two Part Split Mould 50 mm	1
25-5561	Porous Disc 50 mm. Pack of 2	1
25-5580	Filter Paper Drain 50 mm dia. Pack of 50	1
26-1800/01	Pressure Test 1700 Oil/Water Constant Pressure System 0 to 1700 kPa 220-240 V AC, 50-60 Hz, 1 ph	2
26-1820	Digital Pressure Gauge 1700 kPa for use with 26-1800 Series Oil/Water Constant Pressure System	2
26-1880	Universal Pump and Pressure Indicating Panel 1700 kPa	1
26-2114/01	Digital Direct/Residual Shear Apparatus complete with Lever Loading Assembly 220-240 V AC, 50-60 Hz, 1 ph	1
26-2132	Set of Weights 50 kg Slotted	1
26-2181	Shear Box Assembly 60 mm^2	1
27-1500/01	GDU 8 Channel Data Acquisition Unit	1
27-1505	GDU 8 Channel Expansion Analogue Input Module	1
27-1561	S-Type Load Cell 5 kN for use with Direct/Residual Shear Machine fitted with 5-pin DIN plug	1
27-1617	Axial Strain Transducer Assembly 50 mm Travel fitted with 5-pin DIN plug	1
27-1633	Pressure Transducer Assembly 1700 kPa fitted with 5-pin DIN plug	3
27-1641	Volume Change Transducer Assembly 80 cm^3 capacity Max Working Pressure 1700 kPa	1
27-1649	Consolidation Transducer Assembly 10 mm Travel fitted with 5-pin DIN plug	1
27-1689	Vertical Displacement Transducer Assembly 10 mm Travel with 5-pin DIN plug Bracket for Shear Box	1
27-1697	Horizontal Displacement Transducer Assembly 10 mm Travel 5-pin DIN plug Mounting Pillar	1
27-2753	DS7.3 Undrained and Triaxial Shear Strength Program (DS7.2: 27-1753)	1
27-2763	DS7.3 CU/CD (DS7.2: 27-1763)	1
27-2773	DS7.3 One-Dimensional Consolidation (DS7.2: 27-1773)	1
27-2793	DS7.3 Direct and Residual Shear Strength Program (DS7.2: 27-1793)	1

Buyer's Guide

Water Content Determination — Oven Method

The water content is required as a guide to the classification of natural soils and as a control for re-compacted soils. The water content is measured on samples used for most field and laboratory tests.

The definitive method for the determination of water (moisture) content of soils is the oven dry method.

Standard(s)	EN 17892-1	
Product Code	**Product**	**Qty**
78-1250	225 ltr Drying Oven	1
78-6000/01	Electronic Top Loading Balance 200 g x 0.001 g	1
78-6010/01	Electronic Top Loading Balance 1200 g at 0.01 g	1
78-6040/01	Electronic Top Loading Balance 30 kg x 1.0 g	1
81-0220	Aluminium Scoop Large	1
81-2979	Unnumbered Moisture Content Tin 90 g capacity	10
81-3000	Sample Container. 0.5 ltr capacity	10
81-3060	Sample Container. 10 ltr capacity	10
81-4020	Sample Tray 306 x 306 x 38 mm	10
82-1540	Weighing Bottle Nominal Size 30 mm dia x 50 mm high	5
82-2110	Desiccator Cabinet Non-Vacuum	1

Annex A — Methods Suitable for Field Control of Earthworks

Sand Bath Method

Note: Results from this test method should be checked using the 'Oven Method'.

Standard(s)	EN 17892-1	
Product Code	**Product**	**Qty**
78-3104/01	Hotplate Digital Temperature Indication 0 to 300°C, 300 x 500 mm Heating Area 220-240 V AC, 50 Hz, 1 ph	1
78-6020/01	Electronic Top Loading Balance 6 kg x 0.1 g with below balance hanger	1
81-0100	Spatula 100 mm Blade	1
81-0220	Aluminium Scoop Large	1
81-2979	Unnumbered Moisture Content Tin 90 g capacity	10
81-4700	Stainless Steel Tray 305 mm dia	4

Alternative

Rapid Method by Speedy Tester

Note: Results from this test method should be checked using the 'Oven Method'.

Standard(s)	EN 17892-1	
Product Code	**Product**	**Qty**
23-7452	Speedy Moisture Tester D2 Large 0 to 20% Moisture Range supplied without Calcium Carbide	1
23-7702	Calcium Carbide Reagent for Speedy Moisture Testers. Pack of 12 Cans 500 g each	1

Determination of Density of Fine Grained Soil | Linear Measurement Method

This method is suitable for cohesive specimens of regular shape, normally rectangular prisms or straight cylinders.

Standard(s) EN 17892-2

Product Code	Product	Qty
23-4090	38 mm Hand Operated Hydraulic Sample Extruder with Trimming Knife 38 mm Split Former and Cutting Tool	1
23-4120	38 mm Split Former	1
23-4140	Cutting Tool for end preparation of 38 mm Samples	1
24-9010	Straight Edge 300 mm	1
34-0140	300 mm Stainless Steel Rule	1
78-6010/01	Electronic Top Loading Balance 1200 g at 0.01 g	1
81-0140	Spatula 200 mm Blade	1
81-0200	Aluminium Scoop Small	1
81-0588	Vernier Caliper Range 0 to 200 mm x 0.02 mm	1
81-0708	Wire Saw	1
81-0710	Trimming Knife	1
81-0805	Engineers' Steel Rule 300 mm	1

Also required Part 1 Moisture Content Determination Oven Method - Page 112.

Determination of Particle Density | Pyknometer Method

This test method applies to soil types with particles less than 4 mm.

Standard(s) EN 17892-3

Product Code	Product	Qty
23-3000	Riffle Box 7 mm slot width complete with 3 Containers	1
24-2900	50 ml Density Bottle with Perforated Stopper	2
78-1300/01	Drying Oven 50 ltrs capacity 220-240 V AC, 50-60 Hz, 1 ph	1
78-6000/01	Electronic Top Loading Balance 200 g x 0.001 g	1
81-0375	Red Rubber Tubing 6.5 mm Bore x 5 mm Wall thickness price per metre	2
82-1000	Volumetric Flask 100 ml capacity with Stopper	1
82-2170	Vacuum Desiccator 250 mm internal dia	1
82-2180	Safety Cage for Desiccator	1
82-2500	Wash Bottle Polythene 500 ml	1
82-4005	Glass Rods 7 mm dia x 200 mm. Pack of 10	1
82-5270	Thermometer -1 to +51°C x 0.1°C	1
82-7091	Silica Gel 2.5 to 6 mm Self Indicating 500 g	1
82-7700	Filter Pump	1
82-8500/01	12 ltr Water Bath with Digital Controller LED Display 0 to 99.9°C x 0.1°C	1

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Concrete Testing Equipment

Concrete, a composite mixture of water, aggregates, cement and sometimes additives, is the most commonly employed man-made building material in construction projects. The quality of concrete is crucial if structures are to be safe and serve the purpose for which they were designed. Consequently, the testing of fresh, hardened and in-situ concrete is vital to ensure that concrete structures comply with specifications and relevant standards. ELE International designs and manufactures a comprehensive range of concrete sampling and testing equipment to meet this requirement in accordance with international standards for both field and laboratory testing.

With high compressive strength and low tensile strength, concrete is usually reinforced with materials such as steel. However, different strengths of concrete are used for different applications. Lightweight, low-strength concrete has good thermal properties and is suitable for sub-screeds and filling redundant voids, whereas high strength concrete is generally specified in large projects - lower floor columns of high-rise concrete buildings and in bridge beams for example. ELE's concrete testing equipment is designed to ensure that these different types of concrete can be tested to ensure that they meet the specific requirements of each project.

Fresh concrete is tested on site and in the laboratory using the slump test and air entrainment meters to check the water-cement ratio, air content and workability. It may also be necessary to measure compaction and density, drying, shrinkage and moisture movement. To demonstrate compliance with specifications, concrete mix samples are taken and prepared in moulds as cubes, cylinders or beams. Typically concrete cubes are cured and tested in a manual or automatic concrete compression machine at 7 days and 28 days to assess compressive strength. ELE's comprehensive range of concrete compression machines are able to test concrete, mortar and cement samples such as cubes, cylinders, flagstones and beams, and accessories are available for testing the flexural and transverse strength of concrete samples.

Concrete cores can be taken from hardened concrete for testing, but Non-destructive Test (NDT) equipment enables the testing of in-situ concrete or concrete samples. ELE provides crack detection microscopes, and a (Schmidt) rebound hammer for measuring surface hardness and penetration resistance. In-situ water permeability equipment is available in addition to ultrasonic test equipment for the inspection of internal condition.

Fresh & Hardened Concrete Testing

Sampling, Consistency & Workability

The correct sampling and mixing of fresh concrete is important if test results are to be reliable. Most of the equipment necessary for efficient sampling and mixing is standard laboratory equipment detailed in the Laboratory Equipment section. To ensure that concrete achieves its maximum possible strength and yet retains its ease of placing on site, it is essential that the design of the concrete mix, in relation to the water-cement ratio and workability, is closely controlled.

Slump Test

- Test is appropriate for concrete mixes of medium and high workability.

The test is carried out by filling the slump cone with freshly mixed concrete, which is tamped with a steel rod in three layers. The concrete is levelled off with the top of the slump cone, the cone removed, and the slump of the sample is immediately measured.

Slump Test Set BS & ASTM

Product Code: 34-0192

Product Standards:

EN 12350-2 (BS 1881-102), ASTM C143/C143M, AASHTO T119

Set Contains

Product Code	Product
34-0110	Slump Cone
34-0180	Slump Cone Funnel
34-0160	Base Plate
34-0130	Tamping Rod
34-0140	Stainless Steel Rule

Slump Cone

Product Code: 34-0110

Included with 34-0192 Slump Test Set.

Product Standards:

EN 12350-2 (BS 1881-102), ASTM C143/C143M, AASHTO T119

Specifications

Construction	Seamless, heavy-gauge spun steel; 0.45 inches (1.1 mm) min thickness
Finish	Plated for rust and corrosion resistance
Dimensions (mm)	100 top dia x 200 bottom dia (without foot pieces) x 300 H
Weight (kg)	2.8

Accessories:

Aggregate Scoop (81-0222)

Base Plate (34-0160)

Cement Pan (34-0152)

Sample Tray 1200 x 1160 x 50 mm (81-4230)

Shovel with flat blade (81-0240)

Tamping Rod 16 mm diameter x 600 mm long (34-0130)

Slump Cone Funnel

Product Code: 34-0180

Included with 34-0192 Slump Test Set.

Product Standards: EN 12350-2 (BS 1881-102)

Specifications	
Construction	Seamless, heavy-gauge spun steel; 0.45 inches (1.1 mm) min thickness
Finish	Plated for rust and corrosion resistance
Base Dimensions L x W x H (mm)	210 x 190 x 190
Weight (kg)	1.3

Slump Cone Base Plate

Product Code: 34-0160

Product Standards: EN 12350-2 (BS 1881-102)

Specifications	
Construction	Seamless, heavy-gauge spun steel; 0.45 inches (1.1 mm) min thickness
Finish	Plated for rust and corrosion resistance
Base Dimensions L x W x H (mm)	510 x 460 x 30.5
Weight (kg)	2

Tamping Rod

Product Code: 34-0130

Steel, 600 mm long x 16 mm diameter, hemispherical at both ends. Please note this item is not graduated.

Product Standards: EN 12350-2 (BS 1881-102)

Specifications	
Weight (kg)	0.937

Stainless Steel Rule 300 mm

Product Code: 34-0140

Included with 34-0192 Slump Test Set.

Product Standards:

EN 12350-2 (BS 1881-102), ASTM C143/C143M, AASHTO T119

Specifications	
Dimensions L x W x H (mm)	350 x 30 x 10
Weight (kg)	0.06

Aggregate Scoop

Product Code: 81-0222

Product Standards: EN 12350-2 (BS 1881-102)

Fresh & Hardened Concrete Testing

K-Slump Tester

- Simple and economical to use.
- Reduces testing time.
- No special calibration required.
- Plated for rust resistance and long life.

The K-Slump Tester was developed to determine the slump and workability of fresh concrete. The device can be used for in-place measurements and for measurements inside test moulds and forms. The device is used as an indicator to correlate to the standard slump test. In operation, the K-Slump Tester is made wet and inserted into the concrete for 40 seconds. The K-Slump reading is then taken on the scale to the height that the concrete has penetrated the tester. The tester is then removed from the concrete vertically and the workability reading is taken on the scale at the height of concrete retained in the tester. After the readings, the unit is easily cleaned with water.

K-Slump Tester

Product Code: 34-0580

Developed to determine the workability of fresh concrete and the degree of concrete compaction placed in formwork. The apparatus can be used for in-place measurements of concrete in test moulds and forms and may be correlated to the standard slump test. It is simple, economical to use and reduces testing time. No special calibration is required.

Specifications

Construction	Nickel Plated Steel. Calibrated 3/4 inches (19 mm) dia. Hollow tube; pointed insertion end; round disc controls depth of penetration.
Openings	Two groups through which concrete enters
Test Time (secs)	60
Weight (g)	450

Vebe Time

- Test appropriate for concrete mixes of low and very low workability.

This method is a mechanised variation of the slump test and includes a determination of the workability of concrete. It is based on the principle of subjecting the concrete to vibration after removal of the slump cone. The assembly is mounted upon a small vibrating table operating at a fixed amplitude and frequency. The time to complete the required vibration gives an indication of the concrete workability.

Special Note: The consistometer must be operated from the correct electrical supply in order to comply with the fixed test frequency specified.

Vibro Consistometer

Product Codes: 34-0300/01, 34-0300/06

Comprising of vibrating table, container, slump cone, graduated rod and plate. For 220-240 V AC, 60 Hz, 1 ph.

Product Standards:

EN 12350-3 (BS 1881-4)

Specifications

Product Code	Power Supply
34-0300/01	220-240 V AC, 50 Hz, 1 ph
34-0300/06	220-240 V AC, 60 Hz, 1 ph

Accessories:

Transparent Disc for Vibro Consistometer 34-0300 (34-0300/10)

Flow Table

➤ Test appropriate for concrete mixes of high and very high workability.

This test will be of interest to those involved with concrete having a high workability. The test determines the flow index as an arithmetic mean of the diameter of the specimen after working on a flow table. The apparatus consists of a mould, flow table, wooden tamper, metre rule, float and stopwatch.

Flow Table Apparatus for Determining Flow in Concrete

Product Code: 34-0450

Product Standards:

EN 12350-5 (BS 1881-105)

Comprising of mould, flow table, tamping bar, metre rule, float and stopwatch.

Specifications	
Overall Dimensions L x W x H (mm)	730 x 870 x 310
Weight (kg)	45

Accessories:

Aluminium Scoop large (81-0220)

Compacting Bar 25 mm^2 x 380 mm (34-2910)

Sample Tray 1200 x 1160 x 50 mm (81-4230)

Shovel with flat blade (81-0240)

Fresh & Hardened Concrete Testing

Setting Time by Penetration Resistance

This method covers the determination of setting time of the mortar fraction of concrete mixes and is only suitable on mortars with slump values greater than zero. The definition of the initial and final setting time is taken as the period from when water was first added to the mix until the measured penetration resistance is 500 lbf/inches² and 4000 lbf/inches² respectively.

Proctor Penetrometer (Spring Type) with Adaptor Stem

Product Code: 29-3925

Product Standards:

ASTM C403/C403M, AASHTO T199

Supplied with set of needle points (29-3929)

Specifications	
Dimensions L x W x H (mm)	800 x 200 x 100
Weight (kg)	2

Accessories:

Case for Proctor Penetrometer (29-3933)

Syringe with Rubber Bulb (82-2820)

Set of Needle Points (34-0810)

Proctor Penetrometer Needle Points Set 1, 1/2, 1/4, 1/10, 1/20, 1/40 inches²

Product Code: 34-0810

Stainless Steel, 1, 1/2, 1/4, 1/10, 1/20 and 1/40 inches² area (645, 323, 161, 65, 32 and 16 mm²) with Stainless Steel adaptor for the smaller needles. For use with 29-3925 Proctor Penetrometer (Spring Type).

Product Standards:

ASTM C403/C403M, AASHTO T197

Pocket Concrete Penetrometer

Product Code: 38-2695

Product Standards:

ASTM C403/C403M, AASHTO T197

A lightweight Penetrometer for field and laboratory use to evaluate the initial set of concrete mortar.

Stainless Steel, corrosion resistant, hard wearing.

2 types available: concrete and soil.

Easy to read scale.

Specifications	
Dimensions dia x length (mm)	19 x 178
Needle	Steel shaft; 1/20 inches² surface area
Range	0 to 700 psi
Scale	Direct-reading; indicator sleeve holds reading until released
Carrying Case	Canvas with belt-loop
Weight (g)	227

Air Entrainment

The determination of air content of freshly made concrete is detailed in EN 12350-7, ASTM C231/C231M, where the importance of two main applications is highlighted. The primary purpose of entraining air in concrete is to give the required resistance to weathering. The use of chemical additives to increase the workability of concrete often requires an air content check to be made.

Precision Air Entrainment Meter

The proper control of entrained air in concrete is recognised as one of the most important functions in modern concrete manufacture. For the concrete engineer, the ELE Precision Air Entrainment Meter offers an instrument for the testing and designing of concrete mixes.

Air Entrainment Meter B Type complete with Carrying Case. Supplied with Aluminium Tamping Bar.

Product Code: 34-3265

Product Standards:

EN 12350-7 (BS 1881-106), ASTM C231/C231M, AASHTO T152

The instrument is designed so that the operating parts form an integral unit. The container is rigid, thus providing an accurate device for the performance of unit weight testing. For convenience, the tare weight in grams is stamped on the bottom. When used with the supplied nomograph, the air meter provides quick and easy particle density and percent of free moisture in aggregate determinations.

- 7 litre capacity.
- Shock-proof pressure gauge mounting.
- Lightweight aluminium construction.
- Heavy-duty plastic carrying case for easy transport to site.

Specifications	
External Dimensions Dia x H (inches)	9.75 x 13.25
Capacity (ltrs)	7
Readings	Up to 22% entrained air
Accuracy	± 0.25% full scale
Aggregate Size	2 inches (50.8 mm) max
Container	With tare weight stamped on bottom; 2-piece clamping device for positive seal.
Water	4 oz required
Initial Pressure	Approx. 10 strokes needed
Pressure Gauge	In shock-proof mounting
Tamping Rod	24 inches (610 mm) long
Dimensions Dia x H	9-3/4 inches x 13-1/4 inches (248 x 337 mm)
Weight	Net 15 lbs (8 kg)

Accessories:

Aluminium Scoop large (81-0220)
Compacting Bar 25 mm^2 x 380 mm (34-2910)
Float, Plasterer's type (81-0340)
Graduated Tamping Rod (34-0132)
Sample Tray 1200 x 1160 x 50 mm (81-4230)
Tamping Rod 16 mm diameter x 600 mm long (34-0130)

Spares/Consumables:

Concrete Air Indicator (38-3280/10)
Gauge Kit (34-3265/12)
Pump Assembly (34-3265/10)
Soft Headed Mallet (29-5020)
Stop Watch (81-0521)
Gauge for new Air Meter (1507B0101)
Lid Gasket (3494-0004)
'B' Meter Clamp (8415X0412)
Bleed Valve (1507A0108)
Toggle Clamps (4 off) (34-3265/11)

Fresh & Hardened Concrete Testing

Mixing Equipment

The efficient mixing of concrete prior to moulding specimens in the laboratory for subsequent testing is essential if quality specimens are to be manufactured. The object of mixing is to coat the surface of all aggregate particles with cement paste, and bring the mix to a uniform condition. Pan or rotating drum mixers are suitable for the mixing of small quantities of concrete, which are generally used in a laboratory.

Concrete Mixer 56/40 Litre Capacity

Product Codes: 34-3540/01, 34-3540/06

It is essential that the mixing of fresh concrete for laboratory test samples is thorough and consistent. The ELE Concrete Mixer is ideally suited for this purpose. The mixer has been developed to give efficient mixing of both wet and dry materials. The mixing pan is removable and tilts for easy access to the pan and emptying on completion of the mixing operation. It is rotated by a turntable driven by a 1500 W, IP55 protected electric motor.

The mixer head lifts clear to provide maximum access to the pan and holds the mixing blades at a constant depth during the mixing operation. The blades are readily adjusted to suit the different types and volume of materials to be mixed.

- Portable and compact.
- Tipping mechanism.
- Adjustable blades.
- Simple to clean and maintain.

Product Standards:

EN 12390-2, ASTM C192/C192M

Specifications

Product Code	Power Supply
34-3540/01	220-240 V AC, 50 Hz, 1 ph
34-3540/06	220-240 V AC, 60 Hz, 1 ph

Accessories:

Sample Tray 1200 x 1160 x 50 mm (81-4230)
Scoop 250 mm long (81-0222)
Shovel with flat blade (81-0240)
Transport/Storage Container (81-3545)

Spares/Consumables:

Bearing Assembly (34-3540/11)
Mixing Element (34-3540/12)
Set of Paddles (34-3540/13)
Set of Blades (34-3540/14)
Mixing Pan (34-3540/15)
Motor/Gearbox (3435401)
Spare Drum (1149D0050)
Drive Bumpers (3435403)

Tilting Drum Concrete Mixer 120/90 Litre/ (4/3 cu.ft.) Complete with Stand

Product Code: 34-3590/01

Product Standards:

EN 12390-2, ASTM C192

Specifications

Power Supply	220-240 V AC, 50 Hz, 1 ph
Mixing Capacity (ltrs)	120/90

Moulding Equipment

Test procedures require that specimens are cast in a number of standard sizes convenient for compressive and flexural strength determination. The engineering tolerances specified for moulds are very stringent and the internal finish of the surface must be of a high order to comply with the recommendations laid down in many International Standards. Moulds must not deform during manufacture of concrete specimens if the specimen dimensions are to be maintained.

Cube Moulds

These cube moulds are designed to produce accurate specimens while avoiding distortion over the length of the mould.

Cube Mould 4-Part Clamp Type Cast Iron Construction

Product Code: 34-4520, 34-4570, 34-4620

Product Standards:

EN 12390-1

4-part with clamp attached base plate.
Available in three sizes.

Specifications	
Cube Mould Type	4-part
Finish	Painted
Construction	Bolted sides and clamped base plate
Cube Mould 100 mm (34-4520)	
Internal Dimensions L x W x H (mm)	100 x 100 x 100
Weight (kg)	7.7
Cube Mould 150 mm (34-4570)	
Internal Dimensions L x W x H (mm)	150 x 150 x 150
Weight (kg)	18.1
Cube Mould 200 mm (34-4620)	
Internal Dimensions L x W x H (mm)	200 x 200 x 200
Weight (kg)	26.2

Accessories:

Aluminium Scoop large (81-0220)

Compacting Bar 25 mm² x 380 mm (34-2910)

Float, Plasterer's type (81-0340)

Mould Oil (25 litre drum) (82-7341)

Wire Brush (81-0705)

Cube Mould 2-Part Clamp Type Cast Iron Construction

Product Codes: 34-4650, 34-4670

Product Standards:

EN 12390-1

2-part with clamp attached base plate.
Available in two sizes.

Specifications	
Cube Mould Type	2-part
Finish	Painted
Construction	Bolted sides and clamped base plate
Cube Mould 100 mm (34-4650)	
Internal Dimensions L x W x H (mm)	100 x 100 x 100
Weight	17 lbs (8 kg)
Cube Mould 150 mm (34-4670)	
Internal Dimensions L x W x H (mm)	150 x 150 x150
Weight	42 lb (19.1 kg)

Accessories:

Aluminium Scoop large (81-0220)

Compacting Bar 25 mm² x 380 mm (34-2910)

Float, Plasterer's type (81-0340)

Mould Oil (25 litre drum) (82-7341)

Wire Brush (81-0705)

Fresh & Hardened Concrete Testing

Cylinder Moulds

These cylinder moulds are designed to produce accurate specimens while avoiding distortion over the length of the mould.

Cylinder Moulds (Various Sizes)

Product Codes: 34-5210, 34-5230, 34-5260

Product Standards:

EN 12390-1

Complete with base plate. Available in three sizes.

Specifications	
Cylinder Mould 100 Dia x 200 mm Long (34-5210)	
Specimen Size Dia x Length (mm)	100 x 200
Weight (kg)	6.5
Cylinder Mould 150 Dia x 150 mm Long (34-5230)	
Specimen Size Dia x Length (mm)	150 x 150
Weight (kg)	8.2
Cylinder Mould 150 Dia x 300 mm Long (34-5260)	
Specimen Size Dia x Length (mm)	150 x 300
Weight (kg)	13

Accessories:

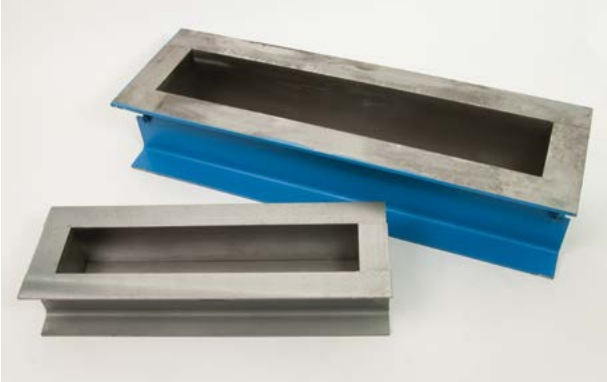
Aluminium Scoop large (81-0220)
Compacting Bar 25 mm^2 x 380 mm (34-2910)
Float, Plasterer's type (81-0340)
Mould Oil (25 litre drum) (82-7341)
Tamping Rod 16 mm diameter x 600 mm long hemispherical at both ends (34-0130)
Wire Brush (81-0705)

Beam Moulds

These beam moulds are designed to produce accurate specimens while avoiding distortion over the length of the mould.

Beam Moulds

Product Codes: 34-5003, 34-5053



Product Standards:

EN 12390-1

Complete with base plate.

Specifications	
Beam Mould 100 x 100 x 500 mm (34-5003)	
Specimen Size (mm)	100 x 100 x 500
Weight (kg)	18
Beam Mould 150 x 150 x 750 mm (34-5053)	
Specimen Size (mm)	150 x 150 x 750
Weight (kg)	44

Accessories:

Aluminium Scoop large (81-0220)
Compacting Bar 25 mm^2 x 380 mm (34-2910)
Float, Plasterer's type (81-0340)
Mould Oil (25 litre drum) (82-7341)
Wire Brush (81-0705)

Plastic Moulds

ELE International's moulds are made of high quality, durable plastic and are built for heavy duty laboratory use.

Cube Plastic Moulds

Product Codes: 34-4710, 34-4720

Product Standards:

EN 12390-1

Complete with base plate.

Specifications	
Construction	ABS
Plastic Mould 100 x 100 x 100 mm (34-4710)	
Specimen Size (mm)	100 x 100 x 100
Weight (kg)	0.4
Plastic Mould 150 x 150 x 150 mm (34-4720)	
Specimen Size (mm)	150 x 150 x 150
Weight (kg)	0.76

Accessories:

Aluminium Scoop large (81-0220)

Compacting Bar 25 mm² x 380 mm (34-2910)

Float, Plasterer's type (81-0340)

Mould Oil (25 litre drum) (82-7341)

Wire Brush (81-0705)

Compaction

The strength, durability and finish of concrete rely in part on the adequate compaction of the mix. An increasing number of contract specifications call for various forms of vibro-compacted concrete as a means to achieve a better and more consistent mixture. It should however be remembered that fluid mixes may segregate when vibrated, in which case it may be more appropriate to compact using a tamping bar or rod during laboratory mix design.

Vibrating Poker

Product Code: 34-6431/01

Product Standards:

EN 12390-2, ASTM C31/C31M, ASTM C192/C192M, AASHTO T23, AASHTO T126

Used as an internal means of vibratory compaction. The poker is inserted into the concrete which is then compacted by the high frequency vibration action. For use in either laboratory or site environments, the diameter of the vibrating tip must not exceed 25% of the smallest dimension of the specimen.

- High amplitude and speed.
- Flexible shaft for long life.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Tip Dimensions Dia x Length (mm)	22 x 250
Shaft Length (m)	2
Speed	200 Hz (1200 vibrations/min)
Dimensions (mm)	200 x 300 x 350
Weight (kg)	7

Fresh & Hardened Concrete Testing

Vibrating Table supplied with Clamp Assembly

Product Code: 34-6250/01

Product Standards:

EN 12390-2, EN 12350-6 (BS 1881-107), EN 12350-7 (BS 1881-106)

The ELE vibrating table is a compact unit providing controlled vibro-compaction in the laboratory, using cube or cylinder moulding equipment.

Vibrating table mounted on a steel stand, supplied with clamp assembly.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph
Dimensions (table top)	600 x 400 mm
Max no Cube Moulds	2 x 150 mm²
Clamp Assembly	Single
Weight (kg)	60
Cycles per minute	3000

Accessories:

Compacting Bar 25 mm² x 380 mm (34-2910)

Wire Brush (81-0705)

Curing of Specimens

The correct environment for curing concrete test specimens is important to achieve consistent and reproducible test results. Two primary factors must be taken into consideration to satisfy the requirements, namely to maintain a stable temperature and to prevent loss of moisture from the specimen. A standard curing temperature of 20°C is usually specified and should be maintained at the required degree of accuracy. The use of water to prevent loss of moisture is the method most commonly used. In tropical climates a curing temperature of 25°C is often acceptable.

Large Curing Tank complete with Circulating Pump Heater/Thermostat Unit & Lower Rack

Product Code: 34-6575/01

This large curing tank is supplied complete with a submersible pump, immersion heater/thermostat unit and separate control panel. The tank includes a lower rack as standard and is designed to maintain the temperature at 20°C ± 2°C, providing that the ambient temperature does not fall below 15°C or rise above 20°C. 3000 cycles per minute.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph
Capacity (ltrs)	650
Rated Power (W)	2000
Weight (kg)	60
Dimensions	
Internal L x W x H (mm)	1040 x 1040 x 605
External L x W x H (mm)	1120 x 1120 x 730

Accessories:

Maximum and Minimum Thermometer (82-5310)

Product Standards: EN 12390-2

Small Soaking/Curing Tank

Product Code: 34-6755/01

This small curing tank is supplied complete with a stand, internal tray, immersion heater designed to maintain the temperature at 20°C ± 2°C and thermostat. The tank can hold up to 16 x 150 mm cubes or 105 x 70.7 mm cubes.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph
Capacity (ltrs)	270
Weight (kg)	55
Dimensions	
Internal L x W x H (mm)	650 x 650 x 550
External L x W x H (mm)	710 x 710 x 610

Accessories:

Heater Unit (34-6755/10)

Product Standards: EN 12390-2

Capping of Cylinders

When conducting a compressive strength test on a concrete cylinder it is important that the ends of the specimen are flat and parallel to each other. The trowelled face of a prepared concrete cylinder, or both ends of a concrete core, will require treatment to obtain these conditions.

Melting Pot

This unit is suitable for melting wax and capping compound and comprises a metal container in a well-lagged steel jacket. A thermostatic control and stand-by heat switch are fitted. Supplied complete with lift-off cover.

Melting Pot

Product Code: 34-6122/01

Product Standards:

EN 12390-3, ASTM C617/C617M, ASTM C31/C31M, ASTM C42/C42M, ASTM C39/C39M, ASTM C192/C192M, AASHTO T22, AASHTO T23, AASHTO T24, AASHTO T126, AASHTO T231

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Internal Dimensions (dia x depth) (mm)	140 x 150
External Dimensions (dia x depth) (mm)	250 x 165
Capacity (ltrs)	4
Rated Power (W)	300
Temperature Range	50°C to 300°C
Weight (kg)	7

Fresh & Hardened Concrete Testing

Sulphur Compound Method

The sulphur compound method is a hot process and offers a considerable saving in time and labour over the mortar capping method. The method is virtually instant and the compound can often be recovered for further use. **Warning:** The sulphur compound, when hot, will give off sulphur fumes, and therefore it is important that good ventilation, or preferably a fume cupboard, is available in the laboratory.

Cylinder Capping Frame complete with 100 mm & 150 mm diameter Capping Plates

Product Code: 34-6031

Product Standards:

EN 12390-3, ASTM C617/C617M, ASTM C31/C31M, ASTM C42/C42M, ASTM C39/C39M, ASTM C192/C192M, AASHTO T22, AASHTO T23, AASHTO T24, AASHTO T126, AASHTO T231

Comprising of a vertical support, mounted on a steel base designed to accommodate both sizes of capping plates. Supplied complete with 100 mm and 150 mm capping plates.

Specifications	
Weight (kg)	12.8

Flake Capping Compound to ASTM C617 22 kg

Product Code: 34-6100

Supplied in flake form, this capping compound provides exceptionally easy and convenient handling and melting compared to powder, block or briquette compounds. Consistent from one box to the next, the compound is plasticised for minimum odour and even load distribution.

Product Standards:

ASTM C617/C617M, AASHTO T231

Supplied in 22 kg box.

Specifications	
Density	137 lbs/ft^3 (2,186 kg/m^3)
Tensile Strength	605 psi (4.2 x 105 kg/m^2) after 48 hrs
Compressive Strength	5,000 psi (3.6 x 106 kg/m^2) minimum, after 2 hrs
Melting Range	230°F-240°F (110°C-115°C)
Optimum Pouring Range	260°F-290°F (126°C-143°C)
Weight	Net 50 lbs (22.7 kg)

Density of Fresh & Hardened Concrete

The density of both fresh and hardened concrete is of interest to the engineer for numerous reasons including its effect on durability, strength and resistance to permeability. Hardened concrete density is determined either by simple dimensional checks, followed by weighing and calculation, or by weight in air/water buoyancy methods.

Hardened Concrete - Buoyancy Balance

The density of hardened concrete specimens such as cubes and cylinders can be quickly and accurately determined using a Buoyancy Balance. The Buoyancy Balance system developed by ELE consists of a rigid support frame, incorporating a water tank mounted on a platform. The water tank has internal dimensions of 380 x 240 x 280 mm (L x W x H). A mechanical lifting device is used to raise the water tank through the frame height immersing the specimen suspended below the balance. The balance supplied calculates the specific gravity of the sample automatically. The balance may also be used as a standard weighing device, thus providing a versatile and comprehensive weighing system in the laboratory.

Buoyancy Balance

Product Code: 34-8100/09

Product Standards:

EN 12390-7 (BS 1881-114)

Specifications	
Power Supply	110-240 V AC, 50-60 Hz, 1 ph
Dimensions L x W x H (mm)	600 x 400 x 1000
Weight (kg)	32

Spares/Consumables:

Lifting Frame (34-8100/10)

Cradle

Product Code: 34-8105

Product Standards:

EN 12390-7 (BS 1881-114)

Specifications	
Dimensions L x W x H (mm)	210 x 140 x 280
Weight (lbs)	1.5

Bulk Density Measures (Various Sizes)

Product Standards:

EN 1097-3

Manufactured from heavy gauge steel these bulk density measures comply with the requirements of EN 1097-3. All measures incorporate carrying handles as standard.

Specifications	
Product Code	Capacity (ltrs)
42-1995	3
42-2000	7
34-2830	10
34-2820	15
34-2800	30

Accessories:

Compacting Bar for BS/EN Tests (34-2910)

Tamping Rod for ASTM Tests (34-0130)

Fresh & Hardened Concrete Testing

Drying, Shrinkage & Moisture Movement

The apparatus has been designed and manufactured to the recommendations laid down in BS, EN and ASTM standards where tests are required on laboratory specimens, or on specimens taken from existing structures. The test procedure specifies a method for determining the change in length of a concrete or mortar sample brought about by a change in moisture content.

1. Initial drying shrinkage: the difference between the length of the moulded and cured specimen (under specified conditions), and its final (constant) length when dried.
2. Drying shrinkage: the difference between the length of a matured specimen cut from concrete and saturated, and its final (constant) length when dried.
3. Moisture movement: the difference between the constant length of a specimen when dried, and its length when subsequently saturated with water.

Drying Shrinkage & Moisture Movement Apparatus complete with Two Calibration Rods (Length Comparator)

Product Code: 34-8500

Product Standards:

EN 1367-4, ASTM C490/C490M, ASTM C151/C151M

Conforming to the requirements of EN 1367-4 and ASTM C490/C490M, ASTM C151/C151M comprising a steel frame with an adjustable-height beam and a dial gauge with 0.002 mm divisions. Supplied with two calibration rods EN and ASTM.

Specifications	
Weight (kg)	5.4

Measuring Equipment

Reference Rods

Product Standards:

ASTM C490/C490M, EN 1367-04

Specifications

Product Code	Specimen Dimensions L x W x H (mm)
34-8505/10	250 x 25 x 25
34-8509	200 x 25 x 25

Prism Moulds & Inserts

Prism Mould

Product Code: 34-8538

Product Standards:

BS 812

For producing specimens 75 mm^2 x 254 mm gauge length to BS 812-123. The mould is made of steel and constructed so that the gauge length can be set within ± 2.54 mm limits. The overall length of the manufactured prism with steel inserts is 292 mm.

Specifications	
Dimensions L x W x H (mm)	254 x 75 x 75
Weight (kg)	9.5

Accessories:

Pack of 10 Steel Inserts 500g (34-8541)

Two Gang Prism Mould

Product Code: 34-8544

Product Standards:

ASTM C141, ASTM C151, ASTM C157, ASTM C227, ASTM C490, ASTM C531, AASHTO T107

To produce specimens 1 inch square x 11¼ inches long to ASTM C490. The mould is constructed so that the gauge length can be set within ± 0.1 inch limits.

Specifications	
Gauge Length	10 inches (254 mm) between inner ends of embedded contact points
Construction	Plated steel
Weight	Net 20 lbs (4.3 kg)

Accessories:

Pack of 10 Steel Inserts (34-8547)

320 Litre Humidity Cabinet 220 V AC, 50 Hz, 1 ph (39-1300/01)

320 Litre Humidity Cabinet 220 V AC, 60 Hz, 1 ph (39-1300/06)

150 Litre EN Humidity Cabinet 220 V AC, 50 Hz, 1 ph (39-1600/01)

150 Litre EN Humidity Cabinet 220 V AC, 60 Hz, 1 ph (39-1600/06)

150 Litre ASTM Humidity Cabinet 220 V AC, 50 Hz, 1 ph (39-1601/01)

150 Litre ASTM Humidity Cabinet 220 V AC, 60 Hz, 1 ph (39-1606/01)

Non-Destructive Testing of Hardened Concrete

Crack Detection Microscope

Product Code: 35-2505

Specifically designed for measuring crack width in concrete, this high definition microscope operates via an adjustable light source provided by high power batteries. Supplied in a pocket sized carrying case.

Specifications	
Divisions (mm)	0.02
Magnification	x 40
Measuring Range (mm)	4
Dimensions	1.5 x 3.5 x 6 inches (40 x 90 x 150 mm) in case
Weight	Net 19.4 oz (550 g)

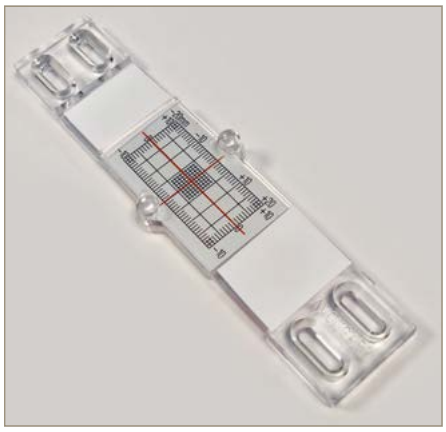
Spares/Consumables:

Bulbs (35-2505/10)

Battery (35-2505/12)

Calibrated Crack Monitor

Product Code: 35-2510



Product Standards: ASTM C141

Specifications		
Construction		10 kHz to 100 kHz in 4 switched ranges
Discrimination (mm)		0.5
Max Crack Width Movement		3/4 inch (20 mm) longitudinal
Max Upward Movement		3/8 inch (10 mm) transverse
Coeff. of Thermal Expansion		3.80 x 10.5 inch/˚F (6.84 x 10-5 mm/˚C
Dimensions	Grid	Grid: 1-1/2 x 3/4 inch (40 x 20 mm)
	Plates	1-1/4 x 4 x 1/4 inch (32 x 102 x 6.3 mm) each
	Overall	1-1/4 x 5-3/4 x 1/4 inch (32 x 146 x 6.3 mm)
Weight		Net 2 oz (57 g)

Permeability of Concrete

GWT Permeability Kit 0-6 Bar Range complete with Carrying Case

Product Code: 35-4043

The Water Permeability Test Kit is a portable unit capable of measuring in-situ permeability. It has a dual measuring range of 0-1.5 bar or 0-6 bar. Consisting of a sealed water reservoir and all necessary attachments, the unit is supplied complete with carrying case.

Specifications	
Weight (kg)	10
Carrying Case Dimensions L x W x H (mm)	460 x 310 x 100

Pull-off Testing

Automated Pull-Off Tester

Product Code: 35-2310

Product Standards:

EN ISO 4624, EN 1015-12, EN 1542, EN 1348, EN 13963, EN 14496, ASTM D4541, ASTM C1583, ASTM D7234, ASTM D7522

The quality of concrete repairs is determined by the adhesive strength between the repair material and the substrate. Pull-off testing is the most widely used test method to assess bond strength.
It is a mid-range instrument suitable for most pull-off testing applications. Calibration accuracy EN ISO 7500-1 Class 1. Comprehensive range of test discs plus adjustable foot configuration to cover a wide range of applications. Simple programming of key parameters and fully automated test. Applications for the 35-2310 pull-off tester include: adhesive strength of mortars and renders, adhesive strength of asphalt, adhesive strength of tiles, bond strength of coatings and overlays, bond strength of repair and materials such as FRP, tensile strength in concrete renovation. Maximum pulling force of 16 kN (3597 lbf).

Specifications	
Working Range	0.81 to 8.1 MPa (118 to 1182 psi)
Tensile Force (50 mm test disc)	1.6 to 16 kN (60 to 3597 lbf)
Max Stroke (mm)	5
Max Pulling Speed	4.65 mm/min (0.183 inch/min)
Memory	100 measurements
Connections	USB to PC and for charging
Calibration Accuracy	EN ISO 7500-1 Class 1 (±1% from 20% of max force)
Battery Capacity	1500 mAh, 3.7 V (min 80 measurements)
Weight (kg)	4.5

Accessories:

Test Disc, steel, diameter 50 mm/M10, set of 10 (35-2310/10)

Test Disc, aluminium, diameter 50 mm/M10, set of 10 (35-2310/11)

Test Disc, aluminium, diameter 20 mm/M10, set of 10 (35-2310/12)

Test Disc, aluminium, 50 x 50 mm/M10, set of 10 (35-2310/13)

Test Disc, aluminium, 40 x 40 mm/M10, set of 10 (35-2310/14)

Test Disc, aluminium, diameter 100 mm/M10, set of 3 (35-2310/15)

Test Disc, aluminium, 100 x 100 mm/M10, set of 3 (35-2310/16)

Test Disc, aluminium, diameter 75 mm/M10, set of 5 (35-2310/17)

Adaptor Plate for large test discs (35-2310/18)

Battery Pack complete (35-2310/19)

Automated Pull-Off Tester Fixing Kit for Vertical & Overhead Surfaces

Product Code: 35-2310/20

Product Standards:

EN 1542, EN 1015-12, EN 1348, ASTM D 4541

Specifications	
Dimensions L x W x H (mm)	0.01 x 0.01 x 0.01
Weight (kg)	0.2

Non-Destructive Testing of Hardened Concrete

Rebar Detection

Rebar Detector

Product Code: 35-2025

Product Standards: BS 1881-204

A versatile, fully-integrated rebar detector and cover meter with a unique real-time rebar visualisation allowing the user to see the location of the rebar beneath the concrete surface to a maximum depth of 180 mm. This is coupled with rebar-proximity indicators and optical and acoustical locating aids. Rebar diameter can also be estimated within the specified testing range. It combines these unique features in a compact, light device that allows the user to operate this rebar detector with one hand making the task of locating rebars a simple and efficient process. The intuitive user interface makes the instrument very easy to use.

- A rebar detector with real-time visualisation of the rebars beneath the instrument.
- Visual indication of rebars in close proximity.
- Ability to identify the mid-point between rebars as well as the orientation of rebars.
- Optical and acoustical indication of rebar location and minimum cover alert.
- Offers neighbouring bar correction.
- Regional settings (metric, imperial).
- Cordless and single handed operation.
- Switchable display backlight for dark environments.
- Icon-based language independent menus.
- Start-up test kit allows user to familiarise him/herself with all functions in a comfortable environment, wasting no time on site.

Specifications	
Power Supply	2 x 1.5 V AA Batteries
Power Range	3.6 V to 1.8 V
Dimensions	205 x 92 x 41 mm (8 x 3.6 x 1.6 inches)
Temperature Range	-10°C to 60°C (14°F to 140°F)
Humidity Range	0 to 100% rH
Protection Range	IP54

Advanced Cover Meter

Product Code: 35-2304/09

Advanced Cover Meter based on the new generation touchscreen with universal probe and scan cart.
An enhanced correction factor for maximum cover accuracy on congested rebar arrangements. Dedicated functionalities for mapping concrete cover and for reporting any 2D rectangular rebar arrangement.

- Highest cover measurement accuracy through Artificial Intelligence (AI) feature.
- Full 2D rebar visualisation with detailed cover, rebar size and spacing data for fast reporting.
- Applications include: locate rebars before drilling, cutting and coring, spot check of cover and rebar size, measurements on rough surfaces with scan cart, measuring wide areas over long distances, conformity check of new buildings, fire resistance assessment, investigation on unknown structures and complete imaging of rebar geometry.

Product Standards:

EN 12504-2 (BS 1881-202), ASTM C805/C805M

Surface Hardness

Surface hardness is used to measure the resistance of concrete to impact or penetration. From the measurements it is possible to obtain an estimation of the concrete strength and quality.

The method is based on the principle that the rebound of an elastic mass depends on the hardness of the surface which it strikes. The test is fast and unlikely to cause damage to the concrete.

Advanced Silver Schmidt Concrete Test Hammer

Product Code: 35-1500

Product Standards:

EN 12504-2 (BS 1881-202), ASTM C805/C805M

The Silver Schmidt ST/PC is the first integrated concrete test hammer featuring true rebound value and unmatched repeatability. Two factors contribute to the improved performance of this concrete test hammer over its predecessors:

- Velocity based detection of the rebound quotient.
- The lightweight hybrid design of the impact plunger made from aerospace alloy, matched to the elastic properties of the concrete and equipped with a hardness steel cap. Independent validation testing by BAM (Federal Institute for Materials Research and Testing, Germany) has shown the Silver Schmidt ST/PC to have less dispersion than the classical concrete test hammer over the entire range. The unique design and high quality construction of the concrete test hammer Silver Schmidt ST/PC makes rebound hammer testing quicker and more accurate than ever before.

The Silver Schmidt ST/PC concrete test hammer combines a high measurement accuracy with an unmatched repeatability.

- The rebound value requires no angular correction. The concrete test hammer offers customer conversion curves for a wide range of compressive concrete strengths, including low fc (<10 N/mm2, 1'450 psi) and high strength concrete (up to 100 N/mm2, 14'500 psi).
- A large number of measurement points can be easily collected by the concrete test hammer and automatically evaluated according to statistical data. The concrete test hammer offers automatic conversion to the required measurement unit (MPa, N/mm2, kg/cm^2, psi).

Specifications	
Technical Data	Silver Schmidt
Impact Energy (Nm)	2.207
Hammer Mass (g)	135
Spring Constant	0.79 N/mm
Spring Extension	75 mm (2.95 inches)
Dimensions	55 x 55 x 255 mm (2.16 x 2.16 x 9.84 inches)
Concrete Compressive Strengths	10-100 N/mm2 (1450 -14500 psi)
Weight	570 g (1.4 lb)

Non-Destructive Testing of Hardened Concrete

Standard Concrete Test Hammer

Product Code: 35-1480

Product Standards:

EN 12504-2 (BS 1881-202), ASTM C805/C805M

The hammer is intended for testing the quality of concrete in finished structures such as buildings and bridges. Supplied complete with carrying case and carborundum stone, the hammer is suitable for testing concrete with compressive strengths of 10 to 70 N/mm².

Specifications	
Body	Includes indicator scale, calibration curves
Calibration Curves	Rebound number vs. compressive strength
Rubbing Stone	Prepares test surface
Accuracy	Within 15%
Carrying Case	Plastic
Weight	Net 3 lbs (1.4 kg)

Spares/Consumables:

Rubbing Stone (35-1475/10)

Testing Anvil

Product Code: 35-1530

Product Standards:

EN 12504-2 (BS 1881-202), ASTM C805/C805M

Specifications	
Dimensions L x W x H (mm)	400 x 200 x 230
Volume (cm)	0.0184
Weight (kg)	0.2

Pulse Velocity Measurement

The basic principle of this method of testing is that the velocity of an ultrasonic pulse through concrete is related to its density and elastic properties. Some care is necessary when testing, but an experienced operator may obtain a considerable amount of information about a concrete member. The advantage of this method is that the pulse passes through the complete thickness of the concrete so that the significant defects can be detected. Pulse Velocity Measurement can be used for the following applications:

- The measurement of concrete uniformity.
- Determination of the presence or absence of voids, cracks and other imperfections.
- Deterioration of the concrete which might have occurred due to age or through the action of fire, frost or chemical attack.
- Measurement of layer thickness and elastic modulus.
- Determination and monitoring of concrete strength.

Pundit Lab

Pundit Lab Ultrasonic Concrete Tester

Product Code: 35-2302/09

Product Standards:

BS 1881-203, EN 12504-4, ASTM C597

Pundit Lab is the most versatile Pundit to date. It has all the functions of the classic Pundit 7, but offers additional benefits. Designed with laboratory use in mind, its compact size, rugged construction and optimised power consumption make it equally suitable for on-site use. Along with the traditional transit time and pulse velocity measurement, Pundit Lab offers path length measurement, perpendicular crack depth measurement and surface velocity measurement. Optimised pulse shaping gives greater transmission range at lower voltage levels.

This, coupled with automated combination of the transmitter voltage and the receiver gain, ensures an optimum received signal level for accurate and stable measurements.

The waveform can be viewed either via an external oscilloscope connection or directly on a connected PC screen. Full remote control capability completes the package. Complete with two 54 kHz transducers each with 3.6 metres of cable, coupling agent, carrying case and instruction manual.

Specifications	
Dimensions L x W x H (mm)	120 x 180 x 60
Power Supply	110-240 V AC, 50-60 Hz, 1 ph

Accessories:

Ultrasound Couplant supplied in 250 ml bottle (35-2305)

New ADR Touch Control Pro

Accurate and Consistent Testing

- Larger 7-inch, high resolution, colour display
- Favourites option for test samples
- Flexible head: 75-degree rotation and 45-degree tilt
- Available in English, Spanish, Portuguese and French options
- Remote operation away from test area via App
- Remote diagnostics
- Dual sensor for testing both concrete and cement samples on one frame
- Upgrade kits available for compatibility with existing lower consoles
- Over 100 pre-programmed test profiles and large memory storage capacity available

Contact the team now for further information

+44 (0)1525 249 200 • ele@eleint.co.uk

With new tilt and turn screen

The ADR Touch Control Pro will deliver all the features and quality of the established ADR-Auto range, with its 20 year history, but with a new sleek design and additional capabilities. The console assembly consists of an ADR Touch Control Pro and power base which can be used with all existing concrete and cement frames.

User interface

The new ADR Touch Control Pro has an improved user interface providing a high quality platform for testing that will enhance the performance of our compression machines. It now has a larger 7-inch colour touch screen with a higher definition display, allowing easier observation of test progress. A favourites option is also available, allowing users to save the most common set-ups for immediate access, without the need for navigating through selection menus.

User flexibility

The ADR Touch Control Pro has a unique flexible head with rotation capabilities of 75-degrees and a 45-degree tilt, improving usability and comfort for individual users. It is available in four languages: English, Spanish, Portuguese and French, making it even more user-friendly and accessible to a wider audience. The new LAN connectivity feature lets the operator use the PC based App (ELE Logger) to download test results away from the test area.

User flexibility has also increased with the new ADR Touch Control Pro as it can now be operated remotely, so tests can be initiated away from the test area. Many issues can be resolved quickly by our service team through the new remote diagnostics feature and updating to the latest version of software has never been easier.

Compatibility

The all new dual sensor capabilities allow users to test both concrete and cement samples on one frame. The ADR Touch Control Pro is compatible with all existing compression frames and upgrade kits are also available. The upgrade kits can be used to convert existing ADR-Auto consoles to the new Automatic Digital Control Readout.

Testing times

The new generation ADR Compression Machines have an increased control over the pace rate, which allows users to run the pace rate higher than average, but still within standard. This produces an average time saving of 10% for a typical 150 mm cube sample.

Electrical

The reduced component count and modular design offer increased reliability and serviceability and the new low voltage interlocks and e-stop have increased safety. The ADR Touch Control Pro has the latest Arm Core Processor technology which has improved the processing power and speed.

Compression Machines

ADR Touch Control Pro 2000 BS EN Auto Compression Machine

Product Codes: 36-5150/01, 36-5150/06

Specifications	
Force Capacity (kN)	2000
Max Ram Travel (mm)	50
Cubes (Concrete)	Up to 200 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	Via optional Platen Handling System
TFV and ACV	Yes
Frame Type	Welded
Max vert. Clearance	375 mm
Max hor. Clearance	355 mm
Platen Sizes	Lower 220 mm^2 Upper 300 mm dia
Product Code	**Power Supply**
36-5150/01	220-240 V AC, 50 Hz, 1 ph
36-5150/06	220-240 V AC, 60 Hz, 1 ph

Product Standards:

EN 12390-4 (BS 1881-115), EN 12390-3 (BS 1881-116), EN 12504-1, EN 1354, EN 13286-41, EN 772-1, EN ISO 7500-1, ASTM E4

The ADR Touch Control Pro 2000 BS EN is supplied complete with self-centring lower platen, oil filled ball seating assembly and safety gates fitted with interlock switches ready for testing 300 x 150 mm diameter cylinders. When used for cube testing, distance pieces (EN) of the appropriate size must be ordered separately.

Spares/Consumables:

Power Supply or Switch Mode PSU (1850A0044)
Switch (Console on/off) (6013X0186)
Outlet Adaptor (1858A0046)
Console Assembly (1887B0001)
ADR Autotest Power Pack (1858B0031)
Solenoid Assembly (1676A0083)
Gasket (1210B0015)
Oil Pump (5020A0061)
Top Plate Assembly (1676D0025)
Dump Valve Assembly, 110 V, 60 Hz, 1 ph (1676B0098)
Dump Valve Assembly, 240 V, 50 Hz, 1 ph (1676B0039)
Motor Power Pack (1312B201)
Upgrade Head (37-4900/01)
ADR MK111 LCD (1850A0050)
Relay Board (1819A0049)
Tension Spring (8426X0039)
Keyboard (1887B0031)
Flexible Hose (5038B0021)
Stepper Linear Actuator Assembly (1676C0024)

ADR Touch Control Pro 3000 BS EN Auto Compression Machine

Product Codes: 36-5165/01, 36-5165/06

Product Standards:

EN 12390-4 (BS 1881-115), EN 12390-3 (BS 1881-116), EN 12504-1, EN 1354, EN 13286-41, EN 772-1, EN ISO 7500-1, ASTM E4

The ADR Touch Control Pro 3000 BS EN is supplied complete with self-centring lower platen, oil filled ball seating assembly and safety gates fitted with interlock switches ready for testing 300 x 150 mm diameter cylinders. When used for cube testing, distance pieces (EN) of the appropriate size must be ordered separately.

Specifications	
Force Capacity (kN)	3000
Max Ram Travel (mm)	50
Cubes (Concrete)	Up to 200 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	Via optional Platen Handling System
TFV and ACV	Yes
Frame Type	Welded
Max vert. Clearance	375 mm
Max hor. Clearance	320 mm
Platen Sizes	Lower 220 mm^2 Upper 300 mm dia
Product Code	**Power Supply**
36-5165/01	220-240 V AC, 50 Hz, 1 ph
36-5165/06	220-240 V AC, 60 Hz, 1 ph

Accessories:

Flexural Fitting Kit for ADR Auto 220-240 V AC, 50 Hz, 1 ph (37-6135/01)

Flexural Fitting Kit for ADR Auto 220-240 V AC, 60 Hz, 1 ph (37-6135/06)

3000 kN capacity Calibration Load Cell with Hand-Held Readout and Calibrated to UKAS (37-8400/10)

300 mm Lower Brick Platen (37-4842)

BS Block Platens and Platen Handling Assembly for 2000 kN and 3000 kN BS Frames (37-4830)

BS/EN Standard Rectangular Platen (37-4860)

EN 12390-3/4 Distance Piece - 20 mm depth (37-5110)

EN 12390-3/4 Distance Piece - 50 mm depth (37-5120)

EN 12390-3/4 Distance Piece - 60 mm depth (37-5140)

EN 12390-3/4 Distance Piece - 80 mm depth (37-5170)

EN 12390-3/4 Distance Piece - 100 mm depth (37-5180)

Self-Centring Lower Platen (1857C0001)

T46 Hydraulic Oil (26-1805)

Flexible Hose (5038B0027)

Impact Printer RS 232 serial connection. Supplied complete with 1 paper roll (37-4859/01)

Spares/Consumables:

Pressure Transducer, 0-700 bar, 0.05 to 10 V DC Output (6014A0062)

Compression Machines

ADR Touch Control Pro 2000 Auto Compression Machine

Product Codes: 36-5125/01, 36-5125/02, 36-5125/06

Product Standards:

BS EN 7500, BS EN 196

ADR Touch Control Pro supplied complete with interlocked safety gates ready for testing 300 x 150 mm diameter cylinders. When used for cube testing, distance pieces of the appropriate size must be ordered separately.

Specifications	
Force Capacity (kN)	2000
Dimensions L x W x H (mm)	480 x 765 x 1050
Rated power (W)	1600
Cubes (Concrete)	Up to 150 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Max vert. Clearance	375 mm
Max hor. Clearance	355 mm
Max Ram Travel (mm)	50
Blocks	N/A
TFV and ACV	Yes
Frame Type	Welded
Platen Sizes	Lower 222 mm dia Upper 222 mm dia
Product Code	**Power Supply**
36-5125/01	220-240 V AC, 50 Hz, 1 ph
36-5125/02	110-120 V AC, 60 Hz, 1 ph
36-5125/06	220-240 V AC, 60 Hz, 1 ph

Accessories:

100 kN Flexural Fitting Kit for ADR Auto 220-240 V AC, 50 Hz, 1 ph (37-6135/01)

100 kN Flexural Fitting Kit for ADR Auto 220-240 V AC, 60 Hz, 1 ph (37-6135/06)

2000 kN capacity Calibration Load Cell with Hand-Held Readout and Calibrated to UKAS (37-8315)

Flexible Hose (5038B0027)

Impact Printer RS 232 serial connection. Supplied complete with 1 paper roll (37-4859/01)

Standard Distance Piece - 20 mm depth (37-4980)

Standard Distance Piece - 50 mm depth (37-5000)

Standard Distance Piece - 60 mm depth (37-5020)

Standard Distance Piece - 80 mm depth (37-5050)

Standard Distance Piece - 100 mm depth (37-5100)

Spares/Consumables:

Pressure Transducer, 0-700 bar, 0.05 to 10 V DC Output (6014A0062)

T46 Hydraulic Oil (26-1805)

Self-Centring Lower Platen (37-5250)

Dual Frame Compression Machine

Designed to provide comprehensive test facilities, dual-frame compression machines enable a versatile testing programme. Controlled by a single console, dual-frame compression machines provide an economic means of testing the full range of concrete, mortar and cement samples.

ADR Touch Control Pro 2000/250 kN Auto BS EN Compression Machine

Product Codes: 36-5155/01, 36-5155/06

Product Standards:

EN 12390-4 (BS 1881-115), BS EN 12390-3 (BS 1881-116), BS EN 12504-1, BS EN 1354, BS EN 13286-41, BS EN 772-1, BS EN ISO 7500-1, ASTM E4, EN 196-1, EN 459-2, ASTM C109/C109M, ASTM C349

Designed to provide comprehensive test facilities, this twin-frame compression machine is controlled by the automatic console. The 2000 kN capacity frame meets the requirements of EN Standards and accepts the range of on-board accessories. The 250 kN frame is supplied complete with compression jig, 40 mm, 50 mm/2 inch square platens and meets the requirements of EN 196-1. When selecting the frame to be used for testing, the automatic changeover valve incorporated in the system delivers the hydraulic fluid to that frame.

- 220-240 V AC, 50 Hz, 1 ph.
- 2000/250 kN capacity.
- Concrete and cement specimens.
- Tests 200, 150, 100, 70.7, 50 and 40 mm cubes and cylinders up to 320 x 160 mm diameter.
- Calibration accuracy and repeatability conforms to BS EN ISO 7500-1; ASTM E4.
- Supplied with Windows(R) download software as standard.

Specifications	
Frame 1 (kN)	2000
Frame 2 (kN)	250
Product Code	**Power Supply**
36-5155/01	220-240 V AC, 50 Hz, 1 ph
36-5155/06	220-240 V AC, 60 Hz, 1 ph

Accessories:

Flexural Fitting Kit for ADR Auto 220-240 V AC, 50 Hz, 1 ph (37-6135/01)

Flexural Fitting Kit for ADR Auto 220-240 V AC, 60 Hz, 1 ph (37-6135/06)

2000 kN capacity Calibration Load Cell with Hand-Held Readout and Calibrated to UKAS (37-8315)

BS/EN Standard Rectangular Platen (37-4860)

EN 12390-3/4 Distance Piece - 20 mm depth (37-5110)

EN 12390-3/4 Distance Piece - 50 mm depth (37-5120)

EN 12390-3/4 Distance Piece - 60 mm depth (37-5140)

EN 12390-3/4 Distance Piece - 80 mm depth (37-5170)

EN 12390-3/4 Distance Piece - 100 mm depth (37-5180)

Self-Centring Lower Platen (1857C0001)

T46 Hydraulic Oil (26-1805)

Extended Front Safety Gate for use with 2000 kN BS/EN Load Frames fitted with Rectangular Platens (37-4835)

Flexible Hose (5038B0027)

Impact Printer RS 232 Serial Connection. Supplied complete with 1 paper roll (37-4859/01)

Spares/Consumables:

Pressure Transducer, 0-700 bar, 0.05 to 10 V DC Output (6014A0062)

Compression Machines

Manually-Operated Compression Machines

Accuracy and Savings:

The new ADR Touch Series, with 145 mm (5.7 inches) high resolution QVGA touch screen interface and intuitive menu-driven operation, reduces the time taken to set up the machine and perform tests, reducing the time to train staff by up to 25%.

- Up to 6 sample types per operating mode can be set as favourites, enabling one-touch set up for repeat testing.
- Full QWERTY touch pad for input of test data.

Most testing errors produce lower strength results. Non-compliant loading rates can generate errors in measured strength. The user interface includes real-time display of load vs. time, further ensuring accurate and consistent test results and providing "goodness of test" data to improve traceability in your QC operations.

Traceability and Data Quality:

The ADR range now provides improved data quality and traceability in due diligence cases - it is now possible to demonstrate traceability all the way from the machine/ user to the accreditation body, increasing your reputation and peace of mind, all test results now come complete with the machine serial number attached.

- Enhanced USB data communications between PC and machine, eliminating the need for download software.
- Two GB of storage memory.
- Full customisation of sample sizes - stress calculations are automatically recalculated.

Compression Machines BS EN

- 2000 kN and 3000 kN capacity.
- Optional platen handling systems which include BS 6073-1, EN 772-1 specification rectangular platens.
- Machines to meet the requirements of EN 12390-3, -4, -5, 12504-1, 1354, 1521, 3161, 1338, 772-6, 13286-41 BS 3892-3, 187, 6717.
- Tests 200, 150 and 100 mm cubes and cylinders up to 320 x 160 mm diameter.

The ADR Touch range of 2000 kN and 3000 kN capacity compression machines has been designed to meet the need for reliable and consistent testing. The load frame is a welded steel fabrication carrying the ball-seated upper platen. Positively located on the loading ram, which is protected from debris by a flexible cover, the lower platen is marked for the centring of cube and cylinder specimens. Self-centring lower platens for cube location are supplied as standard on EN machines and are available as an optional extra on the standard machine. The two machines for cube testing to EN standards are assembled and aligned using a special compression frame stability tester. The dimensions of the frame allow the testing of concrete cylinders up to 320 mm long x 160 mm diameter, 150 and 100 mm square cubes, and on EN/BS machines, 200 mm square cubes. Kerbs and flagstones may also be tested on ADR machines as well as 150 mm and 100 mm square section beams to ASTM C78 using the optional 100 kN flexural frames which are connected to the power pack.

Further Information:

ADR Touch BS EN 2000 kN and 3000 kN compression machines are supplied complete with self-centring lower platen and safety gates fitted with interlock switches ready for testing 300 x 150 mm diameter cylinders. Whilst delivering all the features and reputation of the established ADR Series with its extensive design history, the new and improved user interface provides a high quality platform for testing that enhances the performance of ELE's compression machines. New, sophisticated electronics further the benefits of simplified operation, whilst delivering the highest levels of accuracy in testing concrete and cement/mortar samples, satisfying the needs of Quality Control Managers, Laboratory Managers and Technicians.

User Safety:

With full safety gates as standard, total systems diagnostics, ram run-out switches and overload warnings ensure the safety of your employees and the reliability of your machine.

ADR Touch 2000 BS EN Compression Machine with Digital Readout & Self-Centring Platens

Product Code: 36-3280/01

Product Standards:

EN 12390-4 (BS 1881-115), BS EN 12390-3 (BS 1881-116), BS EN 12504-1, BS EN 1354, BS EN 13286-41, BS EN 772-1, BS EN ISO 7500-1, ASTM E4, EN 196-1, EN 459-2, ASTM C109/C109M, ASTM C349

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Force Capacity (kN)	2000
Max Ram Travel (mm)	50
Cubes (Concrete)	Up to 200 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	Via optional Platen Handling System
Flexural Testing	Via Flexural Frame
TFV and ACV	Yes
Frame Class (Stability)	Tested
Frame Type	Welded
Max vert. Clearance	375 mm
Max hor. Clearance	355 mm
Platen Sizes	Lower 220 mm^2 Upper 300 mm dia

Spares/Consumables:

Switch, Circuit Breaker (6013X0084)
Display Touch Screen (6033X0027)
Pressure Release Valve (5021X0136)
Piston (RAM) (1147C0461)
Cylinder 2000 kN Load Frame (1796D0048)
Dust Cover, Rubber Ram Gaiter (1147C0467)
2000 kN Ram Seal (5125A0140)
3000 kN Ram Seal (5125A0675)
Single Cylinder Injection Pump (5020A0061)
Pump Holder (994117)
20 mm RAM Extension 2000 KN (1562C0028)
Ball Seating Oil Filled (1489C0001)
20 mm RAM Extension 3000 kN (1600C0058)
Bleed Screw (1188A0064)
Bleed Ball 8 mm (8420X0325)
3000 kN RAM Dust Cover (1600C0059)
Ball Seat Cover, Gaiter (1489D0012)
Dump Valve (1706B0035)
Special Lubricant Oil for Ball Seating (1489A0020)
Gaiter Moulding, Ball Seal (1489D0012)
Self-Centring Lower Platen (1857B0001)
Micro Switch (6013X0082)
Oil Tank Gasket (1706A0041)
Door Switch/Gate Operated Micro Switch (6013X0199)
Terminal Block for Power Pack (1312B300A)
Power Pack (1706D0001)
Knob Control (1706A0050)
Electric Motor, 230 V (6018A0021)

Compression Machines

ADR Touch 3000 BS EN Compression Machine with Digital Readout & Self-Centring Platens

Product Code: 36-3320/01

Product Standards:

EN 12390-4 (BS 1881-115), BS EN 12390-3 (BS 1881-116), BS EN 12504-1, BS EN 1354, BS EN 13286-41, BS EN 772-1, BS EN ISO 7500-1, ASTM E4, EN 196-1, EN 459-2, ASTM C109/C109M, ASTM C349

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Force Capacity (kN)	3000
Max Ram Travel (mm)	50
Cubes (Concrete)	Up to 200 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	Via optional Platen Handling System
Flexural Testing	Via Flexural Frame
TFV and ACV	Yes
Frame Class (Stability)	Tested
Frame Type	Welded
Max vert. Clearance	340 mm
Max hor. Clearance	310 mm
Platen Sizes	Lower 220 mm^2 Upper 300 mm dia

Accessories:

100 kN Flexural Fitting Kit (ADR) used for connecting Flexural Frames to ADR Compression Machines (37-6138)

3000 kN Load Calibration Device complete with Hand-Held Readout Unit (37-8400)

ADR Touch Head for Compression Machines (37-4950/09)

BS/EN Standard Rectangular Platen (37-4860)

EN 12390-3/4 Distance Piece - 20 mm depth (37-5110)

EN 12390-3/4 Distance Piece - 50 mm depth (37-5120)

EN 12390-3/4 Distance Piece - 60 mm depth (37-5140)

EN 12390-3/4 Distance Piece - 80 mm depth (37-5170)

EN 12390-3/4 Distance Piece - 100 mm depth (37-5180)

Self-Centring Lower Platen (1857C0001)

T46 Hydraulic Oil (26-1805)

Impact Printer RS 232 serial connection. Supplied complete with 1 paper roll (37-4859/01)

Spares/Consumables:

Pressure Transducer, 0-700 bar, 0.05 to 10 V DC Output (6014A0062)

General Purpose Compression Machines

1560 kN / 350,000 lbf and 2000 kN / 450,000 lbf capacity.

- Tests 150 and 100 mm cubes, or cylinders up to 320 x 160 mm diameter.
- ADR Touch Digital readout in kN/lbf/kgf.
- Calibration accuracy to BS EN ISO 7500-1; ASTM E4.
- Efficient hydraulic power packs.
- Economic machines ideal for site use.

Incorporating the ADR Touch digital readout, the machines are designed to test cubes and cylinders in accordance with most International Standards. Supplied fitted for cylinder testing with safety gates. When used for cube testing appropriate distance pieces, according to the size of specimen to be tested, are required and must be ordered separately.

Further Information:

The standard range of compression machines has been designed to meet the need for a simple, economic and reliable means of testing concrete. Whilst delivering all the features and reputation of the established ADR Series with its extensive design history, the new and improved user interface provides a high quality platform for testing that enhances the performance of ELE's compression machines. New, sophisticated electronics further the benefits of simplified operation, whilst delivering the highest levels of accuracy in testing concrete and cement/mortar samples, satisfying the needs of Quality Control Managers, Laboratory Managers and Technicians.

Accuracy and Savings:

The new ADR Touch Series, with 145 mm (5.7 inches) high resolution QVGA touch screen interface and intuitive menu-driven operation, reduces the time taken to set up the machine and perform tests, reducing the time to train staff by up to 25%.

- Up to 6 sample types per operating mode can be set as favourites, enabling one-touch set up for repeat testing.
- Full QWERTY touch pad for input of test data.

Most testing errors produce lower strength results. Non compliant loading rates can generate errors in measured strength. The user interface includes real-time display of load vs. time, further ensuring accurate and consistent test results and providing "goodness of test" data to improve traceability in your QC operations.

Traceability and Data Quality:

The ADR range now provides improved data quality and traceability in due diligence cases - it is now possible to demonstrate traceability all the way from the machine/ user to the accreditation body, increasing your reputation and peace of mind - all test results now come complete with the machine serial number attached.

- Enhanced USB data communications between PC and machine, eliminating the need for download software.
- 2GB of storage memory.
- Full customisation of sample sizes - stress calculations are automatically recalculated.

User Safety:

With full safety gates as standard, total systems diagnostics, ram run-out switches and overload warnings ensure the safety of your employees and the reliability of your machine.

Compression Machines

ADR Touch 2000 Standard Compression Machine with Digital Readout

Product Code: 36-3090/01

Product Standards:

BS EN ISO 7500-1, ASTM E4

- 2000 kN / 450,000 lbf capacity.
- Tests 150 and 100 mm concrete cubes or cylinders up to 320 x 160 mm diameter.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Force Capacity (kN)	2000
Max Ram Travel (mm)	50
Dimensions L x W x H (mm)	410 x 630 x 1195
Cubes (Concrete)	Up to 150 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	N/A
Flexural Testing	Via Flexural Frame
TFV and ACV	Yes
Frame Type	Welded
Max vert. Clearance	340 mm
Max hor. Clearance	325 mm
Platen Sizes	Lower 222 mm dia Upper 222 mm dia
Weight (kg)	595

Accessories:

100 kN Flexural Fitting Kit (ADR) used for connecting Flexural Frames to ADR Compression Machines (37-6138)

3000 kN Load Calibration Device complete with Hand-Held Readout Unit (37-8400)

ADR Touch Head for Compression Machines (37-4950/09)

BS/EN Standard Rectangular Platen (37-4860)

EN 12390-3/4 Distance Piece - 20 mm depth (37-5110)

EN 12390-3/4 Distance Piece - 50 mm depth (37-5120)

EN 12390-3/4 Distance Piece - 60 mm depth (37-5140)

EN 12390-3/4 Distance Piece - 80 mm depth (37-5170)

EN 12390-3/4 Distance Piece - 100 mm depth (37-5180)

Self-Centring Lower Platen (1857C0001)

T46 Hydraulic Oil (26-1805)

Impact Printer RS 232 serial connection. Supplied complete with 1 paper roll (37-4859/01)

ADR Touch 1500 Compression Machine with Digital Readout

Product Code: 36-0720/01

Product Standards:

BS EN ISO 7500-1, ASTM E4

The Compact 1500 range of compression machines has been designed to meet the need for a simple, economic and reliable means of testing concrete.

Specimen Capacity:

The dimensions of the frame allow the testing of cylinders up to 320 mm long x 160 mm diameter, and cubes 150 or 100 mm square. Kerbs and flagstones may also be tested on the ADR machine as well as 150 mm and 100 mm square section beams to ASTM C78, using the optional 100 kN flexural frames which are connected to the power pack.

Load Indication:

The ADR digital readout is a microprocessor controlled instrument which is fitted as standard to all digital machines in the range. Load can be displayed in kN, lbf or kgf as selected by the operator.

- 1560 kN / 350,000 lbf capacity.
- Efficient hydraulic power packs.
- Economic machines ideal for site use.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Force Capacity (kN)	1500
Max Ram Travel (mm)	50
Dimensions L x W x H (mm)	430 x 600 x 1035
Rated Power (W)	1350
Cubes (Concrete)	Up to 150 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	N/A
Flexural Testing	Via Flexural Frame
TFV and ACV	Yes
Frame Type	Welded
Max vert. Clearance	340 mm
Max hor. Clearance	325 mm
Platen Sizes	Lower 222 mm Upper 222 mm
Weight (kg)	350

Accessories:

100 kN Flexural Fitting Kit (ADR) used for connecting Flexural Frames to ADR Compression Machines (37-6138)

2000 kN capacity Calibration Load Cell with Hand-Held Readout Unit (37-8315)

ADR Touch Head for Compression Machines (37-4950/09)

Impact Printer RS 232 serial connection. Supplied complete with 1 paper roll (37-4859/01)

Standard Distance Piece - 20 mm depth (37-4980)

Standard Distance Piece - 50 mm depth (37-5000)

Standard Distance Piece - 60 mm depth (37-5020)

Standard Distance Piece - 80 mm depth (37-5050)

Standard Distance Piece - 100 mm depth (37-5100)

Spares/Consumables:

Pressure Transducer, 0-700 bar, 0.05 to 10 V DC Output (6014A0062)

ADR Touch Machines Spares Kits

Grouped Product Matrix:

Product Code	Product
36-3280/K	ADR 2000 BS Spares Kit
36-0720/K	ADR 1500 Standard Spares Kit
36-3090/K	ADR 1500/2000 Standard Spares Kit

Compression Machines

Compression/Tension Testing

Motorised Compression/Tension Machine (complete with Grips) 1000/500 kN

Product Code: 36-1410/01

Product Standards:

BS EN ISO 7500-1, ASTM E4

The load frame is of high quality steel construction with a fixed upper head carrying a ball-seated platen. The ram carrying the lower platen is contained in the base of the frame and is protected by a shroud. Sufficient clearance between the platens allows the compression testing of concrete cylinders up to 160 mm diameter by 320 mm long. To allow for the compression testing of concrete cubes, a range of distance pieces is available. Tension tests on steel reinforcing bars are conducted by replacing the platens with special grips. As standard the machine is supplied with the following size grips for testing bars, 10 mm, 12 mm, 20 mm, and 25 mm diameter. The machine is motorised, incorporating a change-over lever to select either compression or tension output from the pump.

- Compression testing of concrete cubes and cylinders.
- Calibration in compression is accurate to 1% of indicated load, satisfying BS EN ISO 7500-1; ASTM E4.
- Self-aligning upper platen for compression tests.
- Easily fitted grips for tension testing.

Specifications

Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Dimensions L x W x H (mm)	440 x 600 x 1250
Max Vert. Clearance of platens (mm)	340
Platen Dia (mm)	Upper 220
Rated power (W)	1350
Weight (kg)	455

Accessories:

Pack of Grips for Tensile Testing of 6 mm diameter Reinforcing Bar (Pack of 2) (36-1420)

Pack of Grips for Tensile Testing of 8 mm diameter Reinforcing Bar (Pack of 2) (36-1421)

Pack of Grips for Tensile Testing of 10 mm diameter Reinforcing Bar (Pack of 2) (36-1422)

Pack of Grips for Tensile Testing of 12 mm diameter Reinforcing Bar (Pack of 2) (36-1423)

Pack of Grips for Tensile Testing of 14 mm diameter Reinforcing Bar (Pack of 2) (36-1424)

Pack of Grips for Tensile Testing of 16 mm diameter Reinforcing Bar (Pack of 2) (36-1425)

Pack of Grips for Tensile Testing of 18 mm diameter Reinforcing Bar (Pack of 2) (36-1426)

Pack of Grips for Tensile Testing of 20 mm diameter Reinforcing Bar (Pack of 2) (36-1427)

Pack of Grips for Tensile Testing of 22 mm diameter Reinforcing Bar (Pack of 2) (36-1428)

Pack of Grips for Tensile Testing of 25 mm diameter Reinforcing Bar (Pack of 2) (36-1429)

Pack of Grips for Tensile Testing of 28 mm diameter Reinforcing Bar (Pack of 2) (36-1430)

Pack of Grips for Tensile Testing of 32 mm diameter Reinforcing Bar (Pack of 2) (36-1431)

Set of Grips for Tensile Testing including 1 pair of 10 mm, 12 mm, 20 mm, and 25 mm (SP36GRIPKIT)

Set of Grips for Tensile Testing including 1 pair of 6 mm, 8 mm, and 16 mm (SP36GRIPKIT2)

Spares/Consumables:

Gauge (5022A0137)

Co-Axial Seal (5125A0640)

Co-Axial Seal (5125A0641)

Compression Tension Machine Spares Kit

Product Code:	Product
36-1410/K	Spares Kit for 1000/500 kN Motorised Compression/Tension Machine

Compression Machines Accessories

The selection and use of the correct accessories is essential if the range of machines described in the Compression Machines section are to be utilised to their full advantage. This section details a wide range of accessory items including distance pieces, specialist platens, flexural testing frames and other devices.

"Demec" Mechanical Strain Gauge 200 mm

Product Code: 35-2846

Product Standards: BS 1881-206

This gauge is ideal for monitoring cracks and strains in a number of structure types.

Flexible Hose for Compression Machines

Product Code: 5038B0027

For use on compression machines, allowing you to place the frame on the right hand side of an ADR Auto Console.

Compressometers

Product Code: 37-5630

Product Standards:

BS 1881-121, ASTM C469/C469M

- With metric reading dial indicators.
- Used to determine Young's Modulus and Poisson's Ratio in concrete cylinders.
- Compressometers come with one dial to measure axial strain.

Distance Pieces

Distance pieces are used to reduce the amount of vertical space between the upper platen and the top surface of the specimen. Two versions are offered, both of which have a maximum load capacity of 3000 kN and are for use with fixed head load frames.

Product Standards:

EN 12390-4 (BS 1881-115), ASTM C39/C39M

Product Code	Machine Type	Depth (mm)
37-4980	Standard	20
37-5000	Standard	50
37-5020	Standard	60
37-5050	Standard	80
37-5100	Standard	100
37-5110	BS EN	20
37-5120	BS EN	50
37-5140	BS EN	60
37-5170	BS EN	80
37-5180	BS EN	100

Compression Machines

Platen Assemblies

All ELE compression machines are supplied as standard with relevant platen assemblies. The versatility of the machines is such that other tests may be performed in addition to the main application. Often these tests will require different platens, e.g. for block testing. ELE offers a range of optional platen assemblies which are quickly fitted for use.

Block Platens & Platen Handling Assembly for 2000 kN & 3000 kN BS Frames

Product Code: 37-4830

Product Standards: EN 772-1

Sub-Platen Assembly for 150 mm diameter Specimens for Split Cylinder Testing to BS1881 / EN12390-6

Product Code: 37-5420

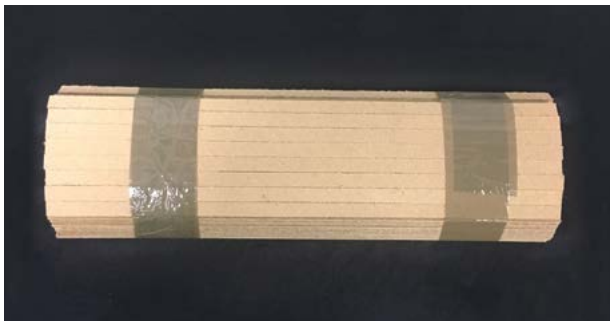
Product Standards:

EN 12390-6 (BS 1881-117), ASTM C496/C496M

For testing cylinders of 150 x 150 mm and 150 x 300 mm (diameter x length).

Test Pieces EN 12390-6 Pack of 100 Hardboard

Product Code: 37-5450



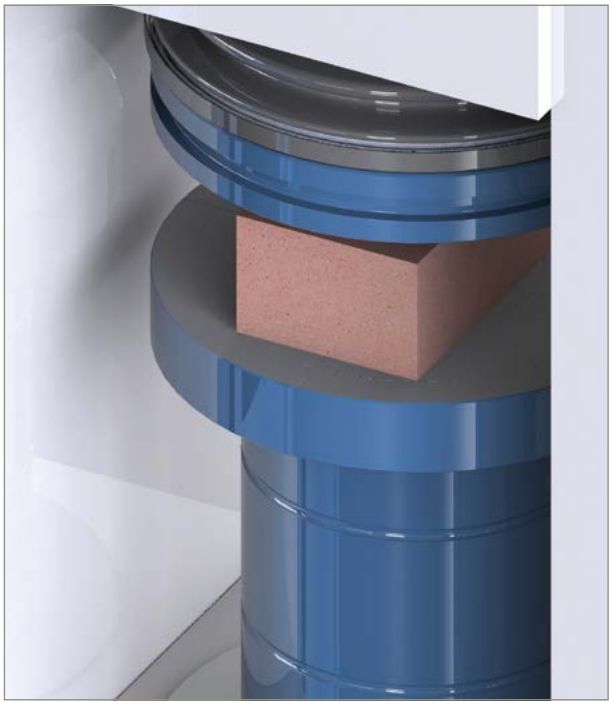
Product Standards:

EN 12390-6 (BS 1881-117)

Hardboard strips for use with Split Cylinder Platen Assemblies. Pack of 100.

Lower Brick Platen 300 mm Diameter

Product Code: 37-4842



Product Standards: EN 12390-4

300 mm diameter lower platen hardened to 60 HRC minimum. Certified by UKAS approved laboratory to EN 12390-4 with calibration certificate.

Standard Rectangular Platen BS/EN

Product Code: 37-4860

Product Standards:

EN 772-1

Manufactured to the requirements of BS 6073-1 and EN 772-1 these platens, measuring 445 x 250 x 75 mm thick, are suitable for testing a wide range of samples. The upper platen is clipped to the machine's standard ball seating assembly. The platens are supplied complete with 2 bolt-on spacers for use when testing blocks of 140 mm or 190 mm height. Maximum vertical clearance is 245 mm. Please note: Platen handling kit is required for this product (37-4830).

Extended Front Safety Gate for use with 2000 kN BS/EN Load Frames fitted with Rectangular Platens

Product Code: 37-4835

For use with 2000 kN capacity machines fitted with rectangular platens.

Printing of Results

Impact Printer RS 232 Serial Connection

Product Code: 37-4859/01

Supplied complete with serial RS 232 communications cable and 1 paper roll.

220-240 V AC, 50-60 Hz, 1 ph.

Impact Printer RS 232 Paper Rolls

Product Code: 37-4859/12

Paper rolls 76 mm wide. Box of 20 rolls.

Impact Printer RS 232 Printer Ribbon (Black/Red)

Product Code: 37-4859/10

Compression Machines

ADR Auto Machines Spares Kits

ADR Auto 3000 BS Spares Kit

Product Code: 36-4165/K

The Kit Includes			
Description	**Qty**	**Description**	**Qty**
3000 kN Ram Seal	1	Tension Spring	3
Ram Cover (3000 kN)	1	3/8 inch B.S.P. Dowty Seal	4
Bleed Screw	1	1/4 inch B.S.P. Dowty Seal	2
Bleed Ball 8 mm dia steel	1	Oil 5 ltrs T46	2
Microswitch	1	Special Lubricant for Ball Seatings 350 ml	1
1/2 inch Dowty Seal	2	Fuse 500 mA Antisurge (T) 20 x 5 mm dia UL approved	2
Non Return Valve Steel Ball	2		
Replacement Filter for Power Pack	1	Gaiter Moulding	1
Steel Ball 6 mm	2	Fuse 10 amp	2

Compression Machine Upgrades

Upgrade your ELE compression machines to enjoy the features of the ADR Touch and ADR range.

ADR Touch Control Pro V2.0 to V3.0 Console Assembly Upgrade

Product Codes: 37-4881/01, 37-4881/02, 37-4881/06

For upgrading ELE concrete compression machines please speak to an ELE representative as there may be more options available.

Specifications	
Product Code	**Power Supply**
37-4881/01	220-240 V AC, 50 Hz, 1 ph
37-4881/02	110 V AC, 60 Hz, 1 ph
37-4881/06	220-240 V AC, 60 Hz, 1 ph

ADR Touch Solo Kit to Upgrade Manual Compression Machines

Product Code: 37-4990/09

Following the introduction of the new range of ADR Touch compression machines, ELE are pleased to announce the release of an upgrade package for existing machines. This package is suitable for a wide range of ELE manually-controlled machines in service (contact our service department for details) and in most cases can fit directly to the existing machines. Supplied complete in colour-matched housing with all fittings and new replacement high quality pressure transducer, this system enables users to take advantage of the latest touch screen technology plus enhanced data facilities.

- Includes sensor and all cables.

110-240 V AC, 50-60 Hz, 1 ph.

Compression Machine Calibration Devices

- Calibrated to BS EN ISO376.
- 3000, 2000, 600 and 300 kN capacity.
- 7½ digit high-resolution hand-held readout.
- Designed for the calibration and verification of concrete compression machines.

The ELE electronic 2000 kN load cell and readout unit is an accurate and sensitive system for the calibration and verification of the load measuring systems of concrete compression machines. Each system can be supplied complete with NPL (National Physical Laboratory UK) calibration certificate in compliance with BS EN ISO376 or with UKAS traceable certificate.

Product Standards:

EN ISO 376, ASTM E74

Supplied with rechargeable batteries and universal charger.

110-240 V AC, 50-60 Hz, 1 ph.

Accessories:

CCDHA High Accuracy Column/Canister Load Cell (37-4800/10)

Product Code	Machine Type	Capacity (kN)
37-8300	Calibration Load Cell with Hand-Held Readout and UKAS Calibration Certificate	600
37-8320	Calibration Load Cell with Hand-Held Readout	2000
37-8315	Calibration Load Cell with Hand-Held Readout and UKAS Calibration Certificate	2000
37-8310	Calibration Load Cell with Hand-Held Readout	300
37-8400/10	Calibration Load Cell with Hand-Held Readout	3000
37-8400	Calibration Load Cell with Hand-Held Readout and UKAS Calibration Certificate	3000

Flexural, Transverse Machines & Accessories

Flexural, Transverse Machines & Accessories

The flexural and transverse strength of concrete is of interest to engineers for many reasons. Movement of structures which may be induced by temperature changes, ground vibrations, cyclic loading of road pavements and many other external influences, will set up internal stresses within a concrete member. Modern concrete technology utilises a wide range of materials such as glass or steel fibres to improve the flexural strength of the concrete. These modified concretes often require the use of special tests and equipment. Lower loads are used to test concrete in flexure; however, the shape and size of test specimens is such that larger and often heavy specimens can be difficult to handle. ELE has designed the range of machines offered to provide for ease of specimen positioning and subsequent testing. The range of flexural test equipment offered provides a wide variety of choice and test methods including low strength compression tests using optional ball seating assemblies.

Flexural & Transverse (Flags) Frame 100 kN. Supplied without Specimen Bearers & Fitting Kit

Product Code: 37-6140

Product Standards:

EN 1339, EN 1440, EN 12390-5 (BS 1881-118), EN 1521, EN 13161, EN 772-6, ASTM C78/C78M, ASTM C293/C293M, AASHTO T97, AASHTO T177

This rigidly constructed, open sided frame is suitable for testing kerbs and flagstones to EN 1339. With optional accessories it can also be used to test 100 mm and 150 mm section beams for flexural strength to EN 12390-5. The frame supports a hydraulic ram and upper sub-platen assembly incorporating spherical seating. The upper and lower sub-platens will accept specimen loading bearers, which are supplied separately.

- Open sided for ease of specimen loading.
- Meets EN 1339, 1340 for kerbs and flagstones.
- Optional ball seating assembly.

Specifications

Dimensions L x W x H (mm)	840 x 845 x 1215
Vertical Clearance with Bearers (mm)	170
Throat Clearance (mm)	330
Ram Travel (mm)	330
Weight (kg)	460

Accessories:

Ball Seating Assembly, 150 mm diameter platens (37-6133)

Specimen Bearer Assembly (37-6330)

Specimen Bearers for Testing Kerbs, used on 37-6140 Flags Frame (37-6362)

Specimen Bearers for Testing Flags, used on 37-6140 Flags Frame (37-6364)

Standard Distance Piece - 20 mm depth (37-4980)

Standard Distance Piece - 50 mm depth (37-5000)

Standard Distance Piece - 60 mm depth (37-5020)

Standard Distance Piece - 80 mm depth (37-5050)

Standard Distance Piece - 100 mm depth (37-5100)

Spares/Consumables:

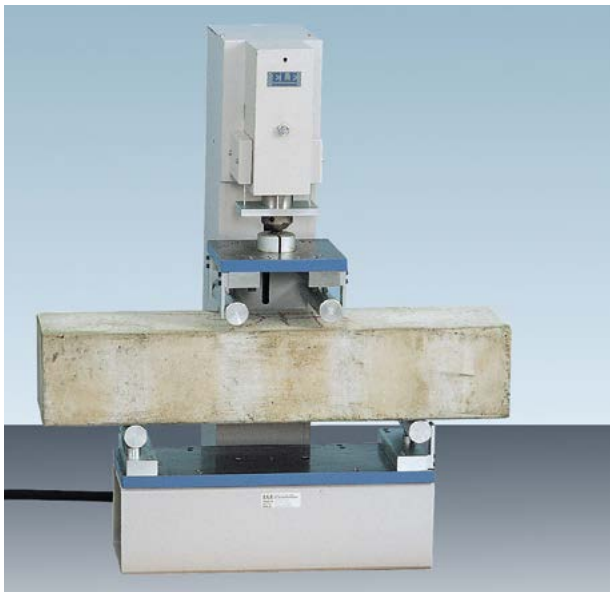
Spares Kit (37-6140/K)

Flexural Testing for Beams

These flexural frames can be used with a wide range of ELE compression machines. Simply select one of the two fitting kits designed to link the flexural frame to either the ADR-Auto range of compression machines or any other ADR compression machine. For fitting kits please see Page 158.

Flexural (Beams) Frame 100 kN. Supplied without Specimen Bearers & Fitting Kit

Product Code: 37-6130



Product Standards:

EN 12390-5 (BS 1881-118), EN 1521, EN 13161, EN 772-6, ASTM C78/C78M, ASTM C293/C293, AASHTO T97, AASHTO T177

This rigidly constructed, open sided frame is suitable for testing 100 mm and 150 mm square-section beams. The frame supports a hydraulic ram and upper sub-platen assembly incorporating a spherical seating. The upper and lower sub-platens will accept various specimen loading bearers, which are supplied separately.

- Open sided for ease of specimen loading.
- Meets EN 12390-5, 1521, 13161, 772-6 and ASTM C78 for standard section beams.
- Optional ball seating assembly.

Specifications	
Weight (kg)	159
Dimensions L x W x H (mm)	380 x 505 x 845
Max Vertical Clearance (mm)	164
Max Ram Travel (mm)	75

Accessories:

BS 1881 Specimen Bearer Assembly, 38 mm diameter x 160 mm length (37-6131)
ASTM C78 Specimen Bearer Assembly, case-hardened, 38 mm diameter x 160 mm length (37-6132)
Ball Seating Assembly, 150 mm diameter platens (37-6133)
Standard Distance Piece - 20 mm depth (37-4980)
Standard Distance Piece - 50 mm depth (37-5000)
Standard Distance Piece - 60 mm depth (37-5020)
Standard Distance Piece - 80 mm depth (37-5050)
Standard Distance Piece - 100 mm depth (37-5100)

Spares/Consumables:

Spares Kit (37-6130/K)

Specimen Bearer Assembly

Product Code: 37-6330

Product Standards:

EN 12390-5 (BS 1881-118), EN 1521, EN 13161, EN 722-6

Comprising 2 self-aligning upper roller bearers, 1 self-aligning and 1 fixed lower roller bearer. Roller bearers are 38 mm diameter x 320 mm long and suitable for 3-point or 4-point flexural testing of beams.

Specimen Bearers for Testing Kerbs. Used on 37-6140 Flags Frame

Product Code: 37-6362

Product Standards: EN 1340

For transverse testing of kerbs to EN 1340.

Specimen Bearers for Testing Flags. Used on 37-6140 Flags Frame

Product Code: 37-6364

Product Standards: EN 1339

For transverse testing of flags to EN 1339.

Flexural, Transverse Machines & Accessories

Flexural/Transverse Frame Fitting Kits for ELE Compression Machines

Product Code	Power	Product
37-6135/02	110-120 V AC, 60 Hz, 1 ph	Flexural Fitting Kit for ADR Auto
37-6138	N/A	Flexural Fitting Kit for ADR Touch
37-6135/01	220-240 V AC, 50 Hz, 1 ph	Flexural Fitting Kit for ADR Auto
37-6135/06	220-240 V AC, 60 Hz, 1 ph	Flexural Fitting Kit for ADR Auto

Flexural Machine Spares Kits

Product Code	Product
37-6130/K	Spares Kit for 37-6130/6140 Series 100 kN Flexural Load Frame
37-6140/K	Spares Kit for 37-6130/6140 Series 100 kN Flexural Load Frame

Flexural Machine, Hand-operated

Mini-Flexural Machine 50 kN

Product Code: 37-6040

Product Standards:

EN 12390-5 (BS 1881-118), EN 1521, EN 13161, EN 772-6, ASTM C78/C78M, ASTM C293/C293, AASHTO T97, AASHTO T177

This compact flexural machine is designed for testing 100 mm and 150 mm square section beams. The base incorporates a series of bearer locating points, enabling a wide range of tests to be performed. The unit is self contained with hydraulic pressure applied through a double-action hand pump to a ram fitted in the top of the frame, making this an ideal portable on-site quality control machine. A 200 mm diameter load gauge, dual calibrated to 50 kN x 0.1 kN and 11000 lbf x 50 lbf graduations is fitted as standard.

- Hand operated.
- Rugged, high strength frame.
- Double-action hydraulic pump.
- Dual calibrated (kN/lbf) gauge.

Specifications	
Dimensions L x W x H (mm)	500 x 350 x 1090
Max Vertical Clearance (mm)	160
Max Ram Travel (mm)	15
Weight (kg)	50

Mixing & Sampling Fresh Concrete, Site & Laboratory

The correct sampling and mixing of fresh concrete is important if test results are to be reliable.
This Standard specifies two procedures for sampling fresh concrete, by composite and spot sampling.

Standard(s)	EN 12350-1	
Product Code	**Product**	**Qty**
81-0222	Aggregate Scoop with Two Handles 250 mm long by 125 mm dia 5 kg capacity	1
81-0240	Shovel (Flat)	1
81-4230	Sample Tray 1200 x 1160 x 50 mm	1
81-3545	Transport/Storage Container complete with Snap-on Lid and Handle 22 ltrs	10
34-3540/01	ELE Concrete Mixer 56/40 ltrs capacity, 220-240 V AC, 50 Hz, 1 ph	1

Determination of Slump

The Slump Test is sensitive to changes in the consistency of concrete which correspond to slumps of 10 to 200 mm.
This test is not suitable for concrete containing aggregate greater than 40 mm.

Standard(s)	EN 12350-2	
Product Code	**Product**	**Qty**
34-0110	Slump Cone	1
34-0130	Tamping Rod 16 mm dia x 600 mm long hemispherical at both ends	1
34-0140	Stainless Steel Rule 300 mm	1
34-0160	Base Plate for Slump Test	1
34-0180	Slump Cone Funnel	1
81-0220	Aluminium Scoop Large	1
81-0521	Stop Watch	1
81-0240	Shovel (Flat)	1
81-4230	Sample Tray 1200 x 1160 x 50 mm	1

Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1

Determination of Vebe Time

This test method is suitable for concrete mixes of low and very low workability but is not applicable to concrete containing aggregate greater than 63 mm. If the Vebe time is less than 5 secs or more than 30 secs the concrete has a consistency that is not suitable for this test method.

Standard(s)	EN 12350-3	
Product Code	**Product**	**Qty**
34-0130	Tamping Rod 16 mm dia x 600 mm long hemispherical at both ends	1
34-0300/01	Vibro Consistometer 220-240 V AC, 50 Hz, 1 ph, EN 12350-3	1
81-0220	Aluminium Scoop Large	1
81-0521	Stop Watch	1
81-0240	Shovel (Flat)	1
81-4230	Sample Tray 1200 x 1160 x 50 mm	1

Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1

Buyer's Guide

Density of Compacted Fresh Concrete

The density of fresh concrete has an effect on the durability, strength and resistance to permeability of the finished structure.

Standard(s)	EN 12350-6	
Product Code	**Product**	**Qty**
34-2830	Bulk Density Measure 10 ltrs	1
34-2910	Compacting Bar 25 mm^2 x 380 mm	1
24-9010	Straight Edge 300 mm	1
78-6050/01	Electronic Top Loading Balance 50 kg x 10 g	1
81-0240	Shovel (Flat)	1
81-4230	Sample Tray 1200 x 1160 x 50 mm	1
81-0340	Plasterers Steel Float	2
81-0220	Aluminium Scoop Large	1
29-5020	Soft Headed Mallet	1
24-0430	Glass Plate	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Air Content of Fresh Concrete, Pressure Gauge (Type B) Method

The determination of air content of freshly made concrete is important for giving the concrete the required resistance to weathering. The use of chemical additives to increase the workability often requires an air content check to be made. The test method is suitable for concrete containing normal weight or relatively dense aggregate up to 63 mm maximum size.

Standard(s)	EN 12350-7	
Product Code	**Product**	**Qty**
34-3265	Air Entrainment Meter 'B' Type complete with Carrying Case, supplied with Aluminium Tamping Bar	1
34-2910	Compacting Bar 25 mm^2 x 380 mm	1
34-0130	Tamping Rod 16 mm dia x 600 mm long hemispherical at both ends	1
81-0220	Aluminium Scoop Large	1
29-5020	Soft Headed Mallet	1
81-0240	Shovel (Flat)	1
81-4230	Sample Tray 1200 x 1160 x 50 mm	2
81-0340	Plasterers Steel Float	1
81-0521	Stop Watch	1
Also required for calibration		
78-7090	Harvard Trip Balance 2000 g capacity x 0.1 g with 225 g additional Tare	1
78-7110	Weight Set for 78-7090	1
78-6040/01	Balance 30 kg at 1 g	1
82-1880	Plastic Measuring Cylinder 500 ml	1
24-0430	Glass Plate	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Making Specimens from Fresh Concrete

Test procedures require that specimens are cast in a number of standard sizes which are convenient to compressive and flexural strength determination.
The following lists of equipment to produce various types/sizes of specimen include hand compaction and, as an alternative, compaction by vibrating table. It should be noted that fluid mixes may segregate when vibrated making hand compaction more appropriate.

Making 100 mm Test Cubes from Fresh Concrete

Standard(s)	EN 12390-1, 2	
Product Code	**Product**	**Qty**
34-2910	Compacting Bar 25 mm^2 x 380 mm	1
34-4520	Cube Mould 100 mm 4-Part Clamp Type, Cast Iron Construction	6
81-0220	Aluminium Scoop Large	1
81-0340	Plasterers Steel Float	2
81-0705	Wire Brush	1
82-7341	Mould Oil (20 ltr drum)	1
29-5020	Soft Headed Mallet	1
Optional		
34-6250/01	Vibrating Table 600 x 400 mm Table Top, 220-240 V AC, 50 Hz, 1 ph supplied with clamping assembly	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Making 150 mm Test Cubes from Fresh Concrete

Standard(s)	EN 12390-1, 2	
Product Code	**Product**	**Qty**
34-2910	Compacting Bar 25 mm^2 x 380 mm	1
34-4570	Cube Mould 150 mm 4-Part Clamp Type, Cast Iron Construction	6
81-0220	Aluminium Scoop Large	1
81-0340	Plasterers Steel Float	2
81-0705	Wire Brush	1
82-7341	Mould Oil (20 ltr drum)	1
29-5020	Soft Headed Mallet	1
Optional		
34-6250/01	Vibrating Table 600 x 400 mm Table Top, 220-240 V AC, 50 Hz, 1 ph supplied with clamping assembly	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Buyer's Guide

Making Test Beams from Fresh Concrete (150 x 150 x 750 mm)

Standard(s)	EN 12390-1, 2	
Product Code	**Product**	**Qty**
34-2910	Compacting Bar 25 mm² x 380 mm	1
34-5053	Beam Mould 150 x 150 x 750 mm	6
81-0220	Aluminium Scoop Large	1
81-0340	Plasterers Steel Float	2
81-0705	Wire Brush	1
82-7341	Mould Oil (20 ltr drum)	1
29-5020	Soft Headed Mallet	1
Optional		
34-6250/01	Vibrating Table 600 x 400 mm Table Top, 220-240 V AC, 50 Hz, 1 ph supplied with clamping assembly	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Making Test Beams from Fresh Concrete (100 x 100 x 500 mm)

Standard(s)	EN 12390-1, 2	
Product Code	**Product**	**Qty**
34-2910	Compacting Bar 25 mm² x 380 mm	1
34-5003	Beam Mould 100 x 100 x 500 mm	6
81-0220	Aluminium Scoop Large	1
81-0340	Plasterers Steel Float	2
81-0705	Wire Brush	1
82-7341	Mould Oil (20 ltr drum)	1
29-5020	Soft Headed Mallet	1
Optional		
34-6250/01	Vibrating Table 600 x 400 mm Table Top, 220-240 V AC, 50 Hz, 1 ph supplied with clamping assembly	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Making Test Cylinders from Fresh Concrete (150 mm diameter x 300 mm)

Standard(s)	EN 12390-1, EN 12390-2	
Product Code	**Product**	**Qty**
34-2910	Compacting Bar 25 mm² x 380 mm	1
34-5260	Cylinder Mould 150 mm dia x 300 mm long	6
81-0220	Aluminium Scoop Large	1
81-0340	Plasterers Steel Float	2
81-0705	Wire Brush	1
82-7341	Mould Oil (20 ltr drum)	1
29-5020	Soft Headed Mallet	1
Optional		
34-6250/01	Vibrating Table 600 x 400 mm Table Top, 220-240 V AC, 50 Hz, 1 ph supplied with clamping assembly	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Making Test Cylinders from Fresh Concrete (100 mm diameter x 200 mm)

Standard(s)	EN 12390-1, EN 12390-2	
Product Code	**Product**	**Qty**
34-2910	Compacting Bar 25 mm² x 380 mm	1
34-5210	Cylinder Mould 100 mm dia x 200 mm long	6
81-0220	Aluminium Scoop Large	1
81-0340	Plasterers Steel Float	2
81-0705	Wire Brush	1
82-7341	Mould Oil (20 ltr drum)	1
29-5020	Soft Headed Mallet	1
Optional		
34-6250/01	Vibrating Table 600 x 400 mm Table Top, 220-240 V AC, 50 Hz, 1 ph supplied with clamping assembly	1
Additional equipment also required as stated in mixing and sampling fresh concrete, site and laboratory, EN 12350-1		

Buyer's Guide

Capping 150 & 100 mm diameter Hardened Cylinders & Cores

When performing compressive strength tests on concrete cylinders it is important that the ends of the specimen are flat and parallel to each other.

Standard(s)	EN 12390-3	
Product Code	**Product**	**Qty**
34-6031	Cylinder Capping Frame complete with 100 mm and 150 mm dia Capping Plates	1
34-6122/01	Melting Pot for use with Capping Compound 220-240 V AC, 50-60 Hz, 1 ph	1
34-6100	Flake Capping Compound 22 kg	1

Normal Curing of Test Specimens (20˚C Method)

The correct environment for curing concrete specimens is important to achieve consistent and reproducible results. Two key factors are to maintain a stable temperature and prevent loss of moisture from the specimen.

Standard(s)	EN 12390-2	
Product Code	**Product**	**Qty**
34-6575/01	Large Curing Tank complete with Circulating Pump Heater/Thermostat Unit and Lower Rack	1
82-5310	Max/Min Thermometer (Mercury Free) Range -40.0˚C to +50.0˚C	1

Standard Concrete Cube & Cylinder Compression Testing of 100 mm & 150 mm Specimens

The design and manufacture of reliable compression machines is essential in ensuring accurate and reproducible test results. ELE International has a wide range of compression testing machines and accessories.

For full details on the range of machine types/capacities contact ELE.

Product Code	Product	Qty
36-3090/01	ADR Touch 2000 Standard Compression Machine with Digital Readout 220-240 V AC, 50-60 Hz, 1 ph	1
37-5000	Standard Distance Piece 50 mm Effective Height	1
37-5020	Standard Distance Piece 60 mm Effective Height	
37-5050	Standard Distance Piece 80 mm Effective Height	1
37-5100	Standard Distance Piece 100 mm Effective Height	1

Compression Testing of 150 mm Cubes & Flexural Testing of Beams

Standard(s)	EN 12390-3, EN 12390-5	
Product Code	**Product**	**Qty**
36-3280/01	ADR 2000 BS Compression Machine with Digital Readout and Self Centring Platens	1
37-5170	Distance Piece to 80 mm Effective Height	1
37-5180	Distance Piece to 100 mm Effective Height	1
37-6138	100 kN Flexural Fitting Kit (ADR) used for connecting Flexural Frames to ADR Compression Machines	1
37-6130	100 kN Flexural (Beams) Frame supplied without Specimen Bearers and Fitting Kit	1
37-6131	BS 1881 Specimen Bearer Assembly 38 mm dia x 160 mm length	1

Automatic Compression Testing of 150 mm Cubes & Flexural Testing of Beams, Kerbs & Flags

Standard(s)	EN 12390-3, EN 1340, EN 1339	
Product Code	**Product**	**Qty**
36-5150/01	ADR Touch Control Pro 2000 Auto BS EN Compression Machine 220-240 V AC, 50 Hz, 1 ph	1
37-5170	Distance Piece to 80 mm Effective Height	1
37-5180	Distance Piece to 100 mm Effective Height	1
37-6135/01	100 kN Flexural Fitting Kit (ADR-Auto)	1
37-6330	Specimen Bearer Assembly	1
37-6362	Specimen Bearers for Testing Kerbs	1
37-6364	Specimen Bearers for Testing Flags	1

Our knowledgeable & skilled after-sales service engineers ensure your equipment operates at optimum performance all year round.

Installation

- Full installation and commissioning service of new laboratory equipment to ensure long term performance.
- ELE's trained engineers have extensive product and test application knowledge.

Service & Calibration

- Service and calibration of Concrete Testing Machines, Load Measuring Devices, Displacement and Pressure Transducers.
- Our service engineers are UKAS certified and carry out calibration of concrete machines in customers' laboratories.
- In-house support is available from our experienced technical and calibration engineers.

Training

- Training programmes in Test Methods can be provided to meet customers' requirements.
- Training content is in accordance with the relevant International Test Standards.
- ELE's headquarters in the UK includes a purpose-designed demonstration laboratory facility.

Contact the team now for further information: +44 (0)1525 249 200 • ele@eleint.co.uk

Cement Testing Equipment

Cement is a binding material used with fine aggregate to produce mortar for masonry, or with sand and aggregates to produce concrete. Construction cements are usually comprised of lime or calcium silicate and combined with fly ash. They are categorised as either hydraulic (eg. Portland cement) or non-hydraulic, depending on their ability to set in water.

High quality cement is necessary to produce concrete and mortar that meets relevant construction industry specifications. ELE International designs and manufactures a wide range of sample preparation and cement testing equipment which complies with global standards for the assessment of fineness, consistency, setting time, workability, flow, strength, soundness, heat of hydration and chemical composition.

ELE's comprehensive cement testing equipment enables the mixing, moulding and curing of samples prior to compressive and flexural strength testing of prisms, cubes and briquettes.

Chemical Tests

Chemical Tests

Chemical analysis plays an important part in the categorisation of cements and other construction materials such as lime. The use of analytical instrumentation such as flame photometry offers a simple and cost effective solution to the determination of the constituent parts of cement.

Loss-on-Ignition

The Loss-on-Ignition of Cement and Building Lime can be determined using a Muffle Furnace to oxidize the sample in air at 975°C ± 25°C.

Muffle Furnace

Product Codes: 83-4170/10, 83-4170/06

Product Standards:

EN 196-2 (EN 196-21), EN 459-2, EN 13454-2

Specifications	
External Dimensions L x W x H (mm)	545 x 385 x 400
Work Chamber Dimensions L x W x H (mm)	300 x 200 x 120
Internal Volume (ltrs)	6.9
Max Temperature (°C)	1200
Power Supply (W)	2500
Weight (kg)	130
Product Code	**Electrical Supply**
83-4170/01	220-240 V AC, 50 Hz, 1 ph
83-4170/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Thermostat, KGrade, 370 mm long, diameter 2.5 mm (83-4170/10)

Controller (83-4170/11)

Heating element/chamber complete (83-4170/12)

Refractory brick (83-4170/13)

Heating Element for use in 83-4170 (83-4170/14)

Refractory Bricks

Product Code: 83-4170/13

Porcelain Crucible

Product Code: 82-3320

30 ml capacity complete with lid.

Specifications	
Capacity (ml)	30

Flame Photometry

Today, cement is manufactured by a chemical process with raw materials being crushed, ground and blended before being heated in a rotary kiln until they combine chemically.

ELE Flame Photometer

The ELE Flame Photometer is built to a high specification and can be used with confidence for the most exacting analysis. It is a low temperature, single channel emission flame photometer with a large clear digital readout. The unit incorporates zero and gain controls with fine and coarse sensitivity, electronic ignition and automatic air supply regulation. The meter is supplied with sodium and potassium filters, fuel and air connections, nebuliser cleaning wire, hose connecting clips, auxiliary power plug, hexagon key, 2 lengths of drain tubing and a comprehensive instruction book and service manual. The unit is housed in a strong case.

ELE Flame Photometer

Product Code: 38-0200/01

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Special Note: The Flame Photometer requires a source of moisture-free air at 6 litres/minute at a pressure of 1 kg/cm². It also requires a fuel source for the flame and a regulator (see accessories).

Accessories:

Air Compressor (38-0320/01)

Calcium Filter (38-0250)

Barium Filter (38-0260)

Regulators for Natural Gas (38-0270)

Regulators for Propane Gas (38-0280)

Specifications	
Dimensions L x W x H (mm)	420 x 360 x 300
Readout	LED three 12.5 mm digits
Sensitivity Na, K, Ca	Na: 3 to 100 ppm K: 3 to 100 ppm Ca: 5 to 100 ppm (optional filter)
Reproducibility	1% CV for 20 consecutive samples using 10 ppm, set to read 100
Recorder Output	Nominal 1.00 V for a reading of 100.0
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	8
Range (ppm)	0 to 199.9

Chemical Tests

Flame Photometer Accessories

Air Compressor

Product Code: 38-0320/01

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Supplies air at 6 litres/minute at a pressure of 1 kg/cm^2, for use with 38-0200/01 Flame Photometer.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Calcium Filter

Product Code: 38-0250

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Barium Filter

Product Code: 38-0260

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Regulators for Natural Gas

Product Code: 38-0270

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Regulators for Propane Gas

Product Code: 38-0280

Product Standards:

EN 196-2 (EN 196-21), ASTM C114

Determination of Fineness Blaine Apparatus

The fineness of cement is a property that must be carefully controlled during the manufacturing process. The total specific surface of the cement represents the surface area available for hydration. Various methods are in use to measure the specific surface of cements. For most purposes air permeability methods produce accurate, repeatable results.

This method has been adopted in Europe as the definitive means of determining the fineness of cement and other powder materials. The system is supplied complete with Stainless Steel cell, perforated disc and plunger, manometer U-tube, aspirator, bottle of manometer liquid and a box of filter papers.

Blaine Air Permeability Apparatus

Product Code: 38-1000

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Specifications	
Cell	Stainless Steel; 12.70 ± 0.10 mm i.d.
Disk	0.9 ± 0.1 mm thick with 30-40 one mm dia holes
Plunger	Stainless Steel
Manometer	U-tube glass with ground joint, stop cock and rubber bulb assembly
Filter Paper	12.70 mm dia
Fluid	Pure Mineral Oil
Weight	Net 7 lbs. (3.2 kg)

Spares/Consumables:

Manometer U-tube (38-1000/10)

Aspirator (38-0500/11)

Blaine Air Permeability Cell (38-1000/15)

Perforated Disc (38-1000/17)

Filter Papers (38-0650)

Reference Cement 5 g Sachet (38-0645)

Reference Cement (5 g Sachet)

Product Code: 38-0645

Product Standards:

EN 196-6, ASTM C204, AASHTO T153)

Filter Papers

Product Code: 38-0650

Product Standards:

EN 196-6, AASHTO T153

12.7 mm diameter. Box of 100.

Pure Mineral Oil 1 Litre Bottle

Product Code: 38-0620

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Blaine Air Permeability Cell

Product Code: 38-1000/15

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Stainless Steel with a perforated disc and plunger.

Spares/Consumables:

Perforated Disc (38-1000/17)

Manometer U-tube

Product Code: 38-1000/10

Product Standards:

EN 196-6, ASTM C204, AASHTO T153

Fineness

Specific Gravity (Relative Density) of Hydration Cement

It is necessary to know the specific gravity of cement for various reasons related to its quality and use. In particular it will be necessary to determine the specific gravity as part of the determination of the specific surface of a cement. The ELE Le Chatelier Flask is a high specification unit that is individually calibrated and supplied with calibration certificate.

Le Chatelier Flask

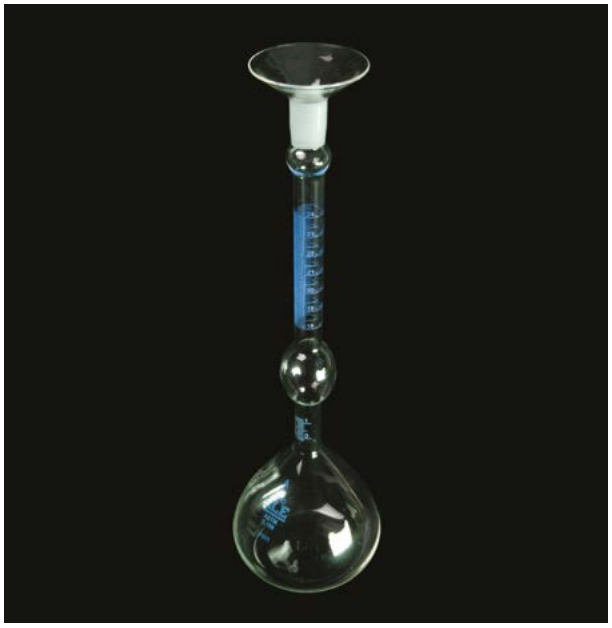
Product Code: 38-1200

Product Standards:

EN 196-6, ASTM C128, ASTM C188, E 694, AASHTO T133

For determining the density of hydraulic cement and lime, supplied complete with calibration certificate. Capacity 250 ml. Graduated from 0 to 1 ml and from 18 to 24 ml graduations. Accurate to 0.05 ml.

Specifications	
Graduations	Zero mark represents 250 ml, the capacity of the large bulb; neck graduations from 0-1 ml in 0.1 ml divisions with two extra 0.1 ml graduations above the 1.0 and below the 0 marks; bulb portion of neck holds 17 ml; top portion of neck graduated from 18-24 ml in 0.1 ml divisions; 24 ml capacity
Stopper	Ground glass
Weight	Net 8 oz. (227 g)



Consistency, Setting Time, Workability & Flow

Determination of setting time and soundness of cement requires the use of a neat cement paste of standard consistence. The Vicat method is usually specified as the test used to determine the water content which will produce the desired consistence.

Concrete Mortar Penetrometer

The Concrete Mortar Penetrometer is used for field and laboratory evaluations of the initial set of concrete mortars. The test involves inserting the penetrometer shaft to a depth of 25.4 mm at constant rate and time interval. The resistance in lbf/in^2 is shown on the penetrometer's direct-reading scale.

Pocket Concrete Penetrometer

Product Codes: 38-2696

Product Standards:

ASTM C403/C403M, AASHTO T197

Supplied complete with belt-loop, canvas carrying case.

Specifications	
Needle	Steel shaft; 1/20 sq. in. surface area
Range	0 to 700 psi
Scale	Direct-reading; indicator sleeve holds reading until released
Dimensions Dia. x Length	3/4 inches (19 mm) x 7 inches (178 mm)
Carrying Case	Canvas, with belt-loop
Weight	Net 8 oz. (227 g)

Spares/Consumables:

Spare Indicator Ring (194150033)

Flow & Workability of Mortar Lime

To perform this test, a sample is placed on a metal surface which is then raised and dropped through a known height.

Flow Table

Product Code: 38-6000

Product Standards:

ASTM C230/C230M

Manufactured from cast bronze as specified in BS and ASTM C230. Complete with Tripod and Baseplate.

Specifications	
Dimensions W x D x H (m)	0.6 x 0.42 x 0.43
Weight (kg)	25

Spares/Consumables:

BS/ASTM Flow Table Top (38-6000/10)

Tripod (38-6020)

Baseplate (38-6060)

Flow Mould

Product Code: 38-6040

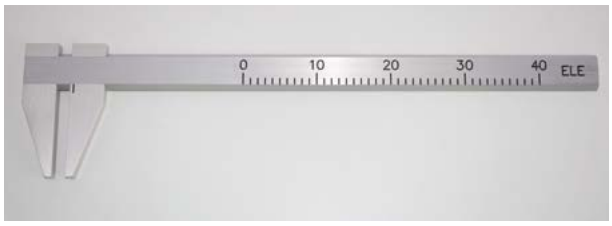
Product Standards:

ASTM C230/C230M

Manufactured from bronze as specified in BS and ASTM.

Calipers ASTM

Product Code: 38-6080



Product Standards: ASTM C230/C230M

For measuring the diameter of the sample.

Specifications	
Dimensions W x D x H (m)	0.04 x 0.1 x 0.33
Weight (kg)	0.2

Plastic Tamper

Product Code: 38-6160

Product Standards: ASTM C230/C230M

Specifications	
Dimensions W x D x H (m)	0.142 x 0.025 x 0.155

Motorised Unit for 38-6000 Flow Table

Product Code: 38-6100/01, 38-6100/06

Product Standards:

ASTM C230/C230M

For use with 38-6000 Flow Table. Operates the cam at a speed of 100 rpm. For 220-240 V AC, 50 Hz, 1 ph.

Specifications	
Dimensions W x D x H (m)	0.39 x 0.55 0.22
Weight (kg)	5
Product Code:	**Power Supply**
38-6100/01	220-240 V AC, 50 Hz, 1 ph
38-6100/06	220-240 V AC, 60 Hz, 1 ph

Consistency, Setting Time, Workability & Flow

Vicat Method

This procedure is used to determine the quantity of water required to produce a cement paste of standard consistence.

Vicat Frame

Product Code: 38-4010

Product Standards:

EN 196-3, EN 480-2, EN 13454-2, ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Complete with consistency plunger, 10 mm diameter. Requires one initial or final set needle to make up test weight to 300 g (less Needle Sets and Moulds).

Specifications	
Weight (kg)	1.3

Spares/Consumables:

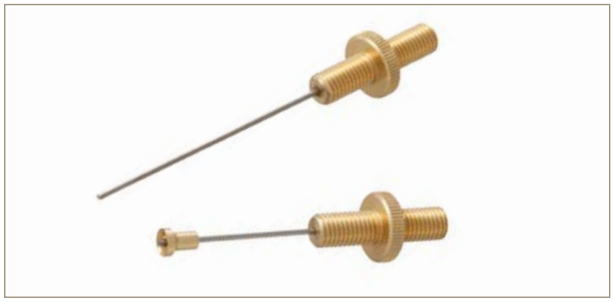
Consistency Plunger (38-4010/14)

Accessories:

ASTM Vicat Mould (38-2660)
EN Vicat Mould (38-2300)
Vicat Mould (38-2200)
Engineer's Steel Rule (81-0805)
Harvard Trip Balance (78-7090)
Weights for Harvard Trip Balance (78-7110)
ASTM Initial Set Needle (38-4010/10)
EN Initial Needle (38-4010/11)
EN Final Needle (38-4010/12)
EN Set of Needles (38-4010/13)

Initial & Final Set Needle EN

Product Code: 38-4010/13



Product Standards:

EN 196-3, EN 480-2, EN 13454-2

1.13 mm diameter.

Initial Set Needle ASTM

Product Code: 38-4010/10

Product Standards:

ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

1 mm diameter.

Automatic Vicat

The Automatic Vicat Apparatus executes the test program using a fully automatic test cycle. The integral LCD display indicates test progress in real time. Firmware in the unit enables up to five user test profiles to be established. Integrated on-board memory will store up to 50 complete tests. On completion of the test the integral printer automatically prints all test data including a graph penetration with related data. As standard, the unit includes an RS232 serial port for connection to PC which, when used in conjunction with the supplied software, enables users to manage test data including graphing and report generation. The timed cycle of events is operator-selectable and penetrations can be selectable at intervals of 30 seconds, 1, 5, 15 or 30 minutes.

Automatic Vicat Apparatus

Product Code: 38-2015/01

Product Standards:

EN 196-3, EN 480-2, EN 13454-2, ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Complete with EN and ASTM Initial and Final needles, Consistency Plunger, Windows® software and RS232 cable, 1 x EN and ASTM Mould and Glass Plate. Suitable for continuous use in saturated humidity, at a controlled temperature of 20°C ± 1°C.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Spares/Consumables:

ASTM Initial and Final Set Needle (38-2023)

Consistency Plunger (38-2015/16)

EN Initial and Final Set Needle (38-2021)

Accessories:

ASTM Vicat Mould (38-2660)

EN Vicat Mould (38-2300)

Vicat Mould (38-2200)

Needle Cleaning Device (38-2015/12)

Printer Paper Rolls (38-2015/14)

Mould Tank (38-2015/15)

Weight, 700 g (38-2015/17)

Consistency, Setting Time, Workability & Flow

Mould Tank

Product Code: 38-2015/15

Product Standards:

EN 196-3

For testing samples under water as per EN 196-3, for use in temperature controlled laboratories.

Printer Paper Rolls (Pack of 10) For Automatic Vicat

Product Code: 38-2015/14

Consistency Plunger

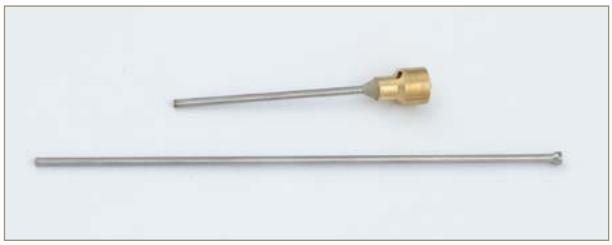
Product Code: 38-2015/16

Product Standards:

EN 196-3, EN 480-2, EN 13454-2, ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Initial & Final Set Needle EN

Product Code: 38-2021



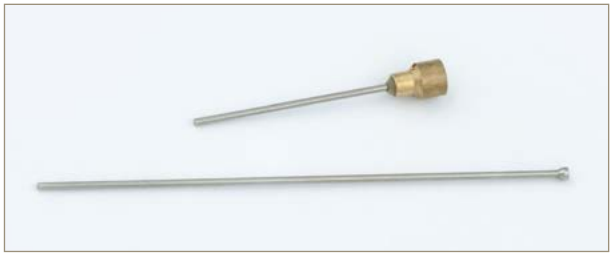
Product Standards:

EN 196-3, EN 13454-2, EN 480-2

3 mm + 1.13 mm diameter with special footing.

Initial & Final Set Needle ASTM

Product Code: 38-2023



Product Standards:

ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

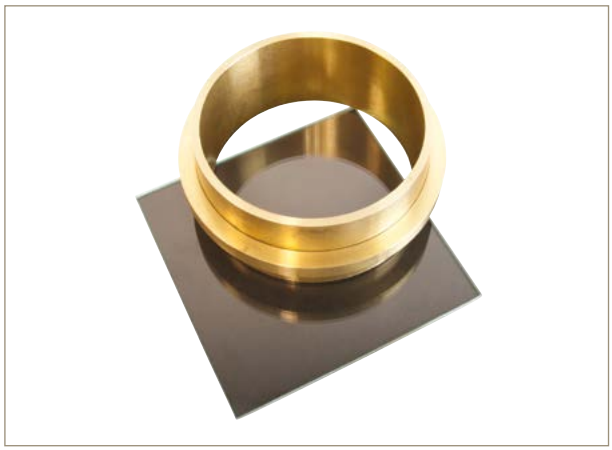
1 mm + 1 mm diameter with special footing.

Automatic Vicat Needle Cleaning Device

Product Code: 38-2015/12

Vicat Mould

Product Code: 38-2200



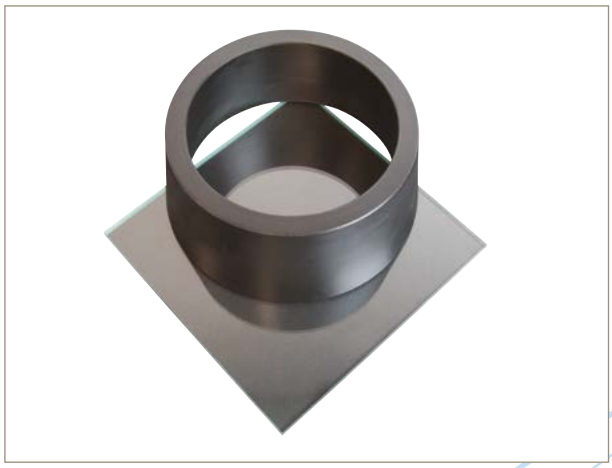
Product Standards:

BS 4550-3-3.5, BS 4550-3-3.6

Manufactured from brass and supplied complete with a ring and glass base plate.

Vicat Mould EN

Product Code: 38-2300



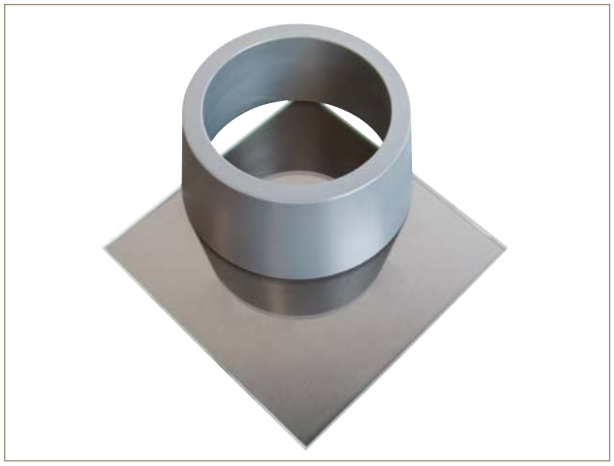
Product Standards:

EN 196-3, EN 13454-2, EN 480-2

Manufactured from a hard rubber compound and supplied complete with a glass base plate.

Vicat Mould ASTM

Product Code: 38-2660



Product Standards:

ASTM C187, ASTM C191, AASHTO T129, AASHTO T131

Manufactured from non-absorbent plastic and supplied complete with a glass base plate.

Soundness

Soundness

The soundness of cement and hydrated lime is of particular importance. It is essential that once hardened the paste does not undergo a large change in volume. The soundness of cements and limes can be determined by an expansion test using Le Chatelier Moulds. The method of curing lime differs from that of cements, lime being cured in a steam tank and cements in a water bath. The ASTM method uses a high-pressure steam vessel (Autoclave) to cure the specimens.

General Expansion of Dry Hydrated Lime by the Le Chatelier Method

Le Chatelier Mould

Product Code: 38-3005

Product Standards:

BS 6463-4, EN 196-3, EN 459-2

Comprising a split cylinder fitted with two indicator stems. The mould is supplied complete with two glass plates and a weight 100 g ± 10 g. Three moulds required for each test.

Specifications	
Weight (kg)	0.9

Extensibility of Mould Apparatus BS

Product Code: 38-3200

Product Standards:

BS 6463-4

The unit comprises a metal sleeve with a hook and set screw to fit over one of the mould pointers, and a clamp to fit onto the other pointer of the mould. Supplied complete with one weight 100 g ±1 g.

Specifications	
Weight (kg)	0.1

Extensibility of Mould Apparatus EN

Product Code: 38-3205

Product Standards:

EN 196-3, EN 459-2

The unit comprises a metal sleeve with a hook and set screw to fit over one of the mould pointers, and a clamp to fit onto the other pointer of the mould. Supplied complete with one weight 300 g ±1 g.

Specifications	
Weight (kg)	0.4

Tamping Rod for Le Chatelier Mould

Product Code: 38-3300

Product Standards:

BS 6463-4

17 mm end diameter.

Specifications	
Weight (kg)	0.07

Soundness of Cement Paste Test Set

Grouped Product Standards:

EN 196-3

Set Contains:

Product Code	Product	Qty
38-3005	Le Chatelier Mould	3
38-3205	Extensibility of Mould Apparatus EN	1
38-3420/01	Le Chatelier Water Bath	1
Additional Set Items		
81-0335	Trowel BS 4550	1
24-0430	Glass Plate	1

Soundness of Cement Paste by the Le Chatelier Method

Le Chatelier Water Bath

Product Code: 38-3420/01

Product Standards:

BS 6463-4, EN 196-3, EN 459-2

Manufactured from corrosion resistant material, complete with a removable rack to hold up to 12 moulds and timer unit.

Specifications	
Weight (kg)	5.4

Spares/Consumables:

Element (38-3420/10)
Switch (SP16522)
Heating Element Seal (38-3420/11)
Heating Timer

Soundness of Portland Cement by the Autoclave Method

Specimens are cured in a high-pressure steam vessel and the change in specimen length is determined using Drying, Shrinkage and Moisture Movement Apparatus. **Note:** This unit draws a current of 20 amps.

Autoclave

Product Code: 38-3800/01

Product Standards:

ASTM C151, AASHTO T107

The Autoclave provides high pressure steam curing of the specimens and is supplied with a safety valve, pressure gauge and controlled heater unit. The pressure vessel is independently certified and certificated. A specimen rack with capacity for 12 specimens included. The unit conforms to the requirements of ASTM C151.
220-240 V AC, 50-60 Hz, 1 ph.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Spares/Consumables:

Safety relief valve (5021A0038)
Vent valve (1135A0050)
Gauge (5022A0118)
Heating element (38-3800/14)
Specimen Rack (38-3800/15)
Vent valve Seal (8439X0203))

Autoclave Lid Sealing Gasket

Product Code: 38-3800/13

Autoclave Spares Kit

Product Code: 38-3800/K1

Spares Kit Includes:	Qty
Heating Element 110/240 V Dual Voltage	1
Lid Gasket	5
Energy Regulator 240 V	1
Safety Relief Valve. 707-11 MD Safety VV set at 350 psi 15 mm: complete with certificates	1
Folded Copper Washer; 1/2 BSP	5
Folded Copper Washer; 3/8 BSP	1
Valve Assembly for Autoclave	1

Soundness

Heat of Hydration Cement

The Heat of Hydration Apparatus is manufactured to the requirements specified in BS 4550. It comprises a Dewar flask, an internally lagged case, a constant speed electric stirrer, filler funnel and a Beckman-type thermometer complete with reader.

Heat of Hydration Apparatus

Product Code: 38-4600/01, 38-4600/06

Product Standards:

BS 4550-38

Specifications

Product Code	Power Supply
38-4600/01	220-240 V AC, 50 Hz, 1 ph
38-4600/06	220-240 V AC, 60 Hz, 1 ph

Dewar Flask, 600ml

Product Code: 38-4600/10

Product Standards:

BS 4550-3.8

Filling Funnel

Product Code: 38-4600/11

Glass Paddle for Stirrer

Product Code: 38-4600/13

Product Standards:

BS 4550-3.8

Air Content & Density

Mortars are used for a variety of purposes, the most common being as a bond between brick and blockwork.

Air Content of Mortar, Masonry Cement & Lime by the Pressure Method

Both air content and density are important if durability and strength of mortar is to be adequate. Specifications often require minimum levels of air content and density. The equipment described enables standard tests to be performed on mortars and similar materials.

Laboratory Humidifier/Vapouriser

Product Code: 39-1510/01

- Used to humidify curing rooms for concrete and mortar specimens.
- Max room capacity 500 cubic meters.
- Supplied complete with level regulator with anti-overflow that allows direct connection to the water network for continuous use.

Specifications	
Capacity	500 m^3
Water Source	Water mains
Use	Continuous when used with level regulator
Dimensions L x W x H (mm)	350 x 350 x 420
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight	7 lbs (3.2 kg)

Air Entrainment Meter

Product Code: 38-7087

Product Standards:

EN 459-2, EN 413-2

0.75 litre capacity, complete with integral pump.

This Air Entrainment Meter is designed to satisfy the requirements of a variety of EN and other standards for testing mortars, limes and masonry cement.

The unit incorporates a large pressure gauge giving direct reading of air content in percent.

- Direct reading of air content in percent.
- Fine control test valves.
- Positive sealing, quick release clamps.
- Heavy duty 0.75 litre container.

Specifications	
Capacity (ltrs)	0.75
Weight (kg)	6

Fly Ash

Fly Ash

Fly Ash of Pulverised Fuel Ash is a by-product of coal-fired power stations. It is a fine material with spherical particles. Uses include as an additive in composite cements, as a cementitious component in concrete and as a filler in certain types of asphalt. Various test methods are specified in BS and EN Standards and include the determination of moisture content, water requirement, strength, loss-on-ignition, initial setting time, and soundness. These tests are based on those described in BS EN 196. A major requirement for Fly Ash is consistency of fineness.

Loss-on-Ignition

This method is for cement specified in EN 196-2 with an ignition time of 1 hour at 975°C.

Muffle Furnace

Product Code: 83-4170/10, 83-4170/06

Product Standards

EN 196-2 (EN 196-21), EN 459-2, EN 13454-2

Specifications	
External Dimensions L x W x H (mm)	545 x 385 x 400
Work Chamber Dimensions L x W x H (mm)	300 x 200 x 120
Internal Volume (ltrs)	6.9
Max Temperature (°C)	1200
Power Supply (W)	2500
Weight (kg)	130
Product Code	**Electrical Supply**
83-4170/01	220-240 V AC, 50 Hz, 1 ph
83-4170/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Thermostat, K-Grade, 370 mm long, diameter 2.5 mm (83-4170/10)

Controller (83-4170/11)

Heating element/chamber complete (83-4170/12)

Refractory brick (83-4170/13)

Heating Element for use in 83-4170 (83-4170/14)

High Temperature Laboratory Furnace 1600°C (Muffle Furnace Alternative)

Product Code: 83-4180/01

Product Standards

BS EN 61010-2-010:2014, BS EN 61326-1:2013

Features:

- 1600°C maximum operating temperature.
- Controller, with single ramp to set-point and process timer.
- 3 litre chamber volumes.
- Soft closing parallel action door.
- Silicon carbide heating elements provide long life and are able to withstand the stresses of intermittent operation.
- Have a cast alumina hearth.
- Low thermal mass insulation for high energy efficiency.

Specifications	
External Dimensions L x W x H (mm)	655 x 435 x 610 (905 - door open)
Internal Dimensions L x W x H (mm)	120 x 120 x 205
Internal Volume (ltrs)	3
Max Temperature (°C)	1600
Configuration	Bench Top
Max Power (W)	4500
Holding Power (W)	2300
Weight (kg)	42

Activity Index

The activity index is the ratio (in percent) of the compressive strength of standard mortar prisms 40 x 40 x 160 mm, prepared with 75% reference cement and 25% fly ash, to standard mortar prisms prepared with reference cement alone. The equipment required comprises that which is used to prepare specimens and determine their compressive strength in accordance with EN 196-1.

Product Code	Product
39-7160/01	ADR Touch Control PRO 250/25 Cement Machine 220-240 V AC, 50 Hz, 1 ph
39-7160/02	ADR Touch Control PRO 250/25 Cement Machine 110 V AC, 60 Hz, 1 ph
39-7160/06	ADR Touch Control PRO 250/25 Cement Machine 220-240 V AC, 60 Hz, 1 ph
39-1100	Three Gang Mould for 40.1 x 40 x 160 mm Mortar Prisms
39-7160/K	Spares Kit for Control Pro 250/25

Fineness of Fly Ash (Wet Sieving)

Spray Nozzle Apparatus

Product Code: 38-7600

Product Standards:

EN 451-2, ASTM C430, AASHTO T192

Comprising a spray nozzle 17.5 mm internal diameter with 17 holes as specified in EN 451, a vacuum pressure gauge, 160 kPa graduated at 5 kPa divisions and fittings to attach the apparatus to a standard domestic water supply. Supplied without sieve.

Specifications	
Weight (kg)	2.1

Fly Ash Sieve 45 μm

Product Code: 38-7600/12

Product Standards:

AASHTO T192, EN 451-2, ASTM C430

Stainless Steel mesh, 50 mm internal diameter.

Mixing, Moulding, Curing & Strength

Mixing

The correct mixing sequence and homogenity of mix is important if consistent, repeatable test results are to be obtained. Mixers should be powerful enough to ensure that the motor's speed is not affected by the mix constituents and designed to ensure that the mixer action and blade does not break down individual sand particles and preferably provide automatic mixing cycles. In the USA, ASTM C109 and C190 are the definitive methods for determining compressive and tensile strength. The BS 4550 method using either 70.7 mm or 100 mm cubes has been retained in the UK only for comparative purposes. EN 196-1 is now the definitive method.

Mortar Mixer Digital 5 Litre Capacity

Product Code: 39-0045/01, 39-0045/06

Product Standards:

EN 196-1, EN 196-3, ISO 679, EN 413-2, EN 459-2, EN 1744-1, EN 13279-2, EN 1015-2, EN 13395-1, EN 13454-2, BS 6463-103

This mixer is designed to mix mortars and cement pastes to the requirements of the above Standards. The mixing paddle has a planetary motion and is driven by a motor with a microprocessor based speed and program controller. The mixer can be operated either in an automatic or manual mode. When the mixer is used in the manual mode, the two mixing speeds can be changed by means of a rocker switch, without switching off the motor. In the automatic mode any one of the pre-set mixing programs may be selected.

- New microprocessor control.
- New mix program selector.
- Complies with latest EN Standards update.
- Choice of automatic mixing cycles.
- Sand and water dispenser supplied as standard.

Further Information:

Complete with bowl and paddle, sand and water dispensers.

Specifications	
Dimensions L x W x H (mm)	530 x 350 x 580
Speeds (rpm) Low, High	Paddle: 140 ± 5, 285 ± 10 Mixing Head: 62 ± 5, 125 ± 10
Rated Power (W)	180
Bowl Capacity (ltrs)	5 (approx)
Weight (kg)	54

Spares/Consumables:

Bowl (39-0045/10)

Paddle (39-0045/11)

Plastic Scraper (39-0045/12)

Cleaning Brush (39-0045/13)

Paddle

Product Code: 39-0045/11

Product Standards:
BS 3892-1, EN 451-2

Stainless Steel complies with EN 196.

Bowl

Product Code: 39-0045/10

Product Standards: BS 3892-1, EN 451-2

Stainless Steel complies with EN 196. 5 litre capacity (approx).

Scraper (Pack of 5)

Product Code: 39-0045/12

Product Standards: EN 196-1

Plastic 200 mm long.

Moulding

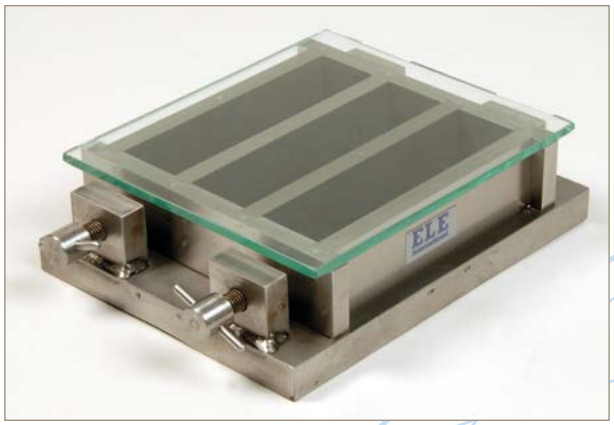
The successful preparation and moulding of prisms, cubes and briquettes is essential if subsequent strength tests on the specimens are to be meaningful. Moulds should be manufactured from material which is capable of retaining its form under heavy usage. The equipment detailed in this section has been designed and manufactured to meet the requirements for moulding laid down in the various standards.

Moulding of Prisms

Two methods of moulding and compaction are used in the various testing standards. The jolting table method is usually described as the reference method and a vibratory method is permitted as an alternative.

Three-Gang Mould

Product Code: 39-1100



Product Standards:

EN 196-1, ISO 679, EN 413-2, EN 459-2, EN 13454-2

For 40.1 x 40 x 160 mm mortar prisms. This mould is manufactured to a very high specification. Supplied with glass plate.

Specifications	
Weight (kg)	12.2

Spares/Consumables:

Glass Plate (39-1100/10)

Mortar Sand EN 196 (39-1170)

Scraper (39-1130)

Feeding Hopper

Product Code: 39-1120

Product Standards:

EN 196-1, ISO 679, EN 413-2, EN 459-2, EN 13454-2

For 39-1100 Mould.

Specifications	
Weight (kg)	1.4

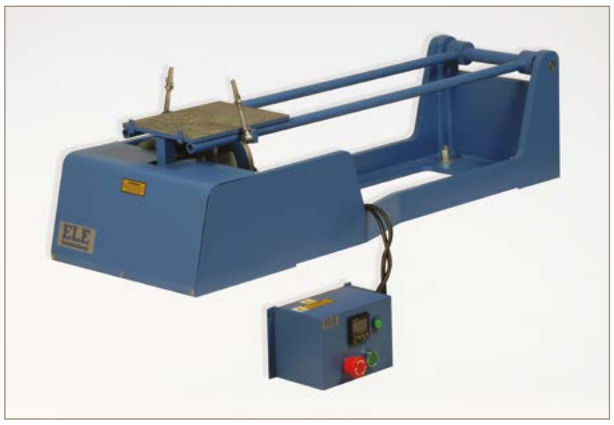
Mixing, Moulding, Curing & Strength

Jolting Table

This machine consists of a mould table seated on a rotating cam driven at 60 revolutions per minute. The apparatus is supplied with a remote mains switch box, incorporating a push button start/stop control, and automatic stop control at end of test.

Jolting Table

Product Codes: 39-1150/01, 39-1150/06



Product Standards:

EN 196-1, ISO 679, EN 413-2, EN 459-2, EN 13454-2

Supplied without moulds.

Specifications	
Weight (kg)	55
Product Code	**Power Supply**
39-1150/01	220-240 V AC, 50 Hz, 1 ph
39-1150/06	220-240 V AC, 60 Hz, 1 ph

Jolting Table Spares Kit

Product Code	Product
39-1150/K	Spares kit for Joining Table

Moulding of 50 mm & 100 mm Specimens

Three-Gang Mould

Product Code: 39-0410

Product Standards:

ASTM C109/C109M

For 50 mm mortar cubes. Manufactured from cast iron with simple cube release mechanism.

Specifications	
Weight (kg)	6.5

Accessories:

Mould Oil (25 litre Drum) (82-7341)

Three Gang Mould 2 Inches (50.8 mm)

Product Codes: 39-0412

Product Standards:

ASTM C87, ASTM C109, ASTM C141, ASTM C579, ASTM C593, AASHTO T106

Machine forged bronze with simple cube release mechanism.

Cover Plate

Product Codes: 39-0412/10

Product Standards:

ASTM C617

Moulding of 70.7 mm Mortar Cubes

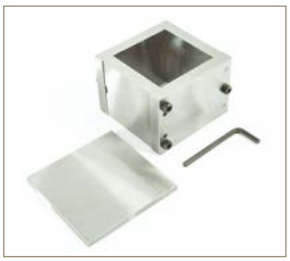
Cube Mould 70.7 mm

Product Code: 39-0100

Product Standards:

BS 4550-3.4

Manufactured from steel to dimensions specified in the relevant British Standard. Supplied complete with baseplate. Three moulds required for each test.



Specifications	
Weight (kg)	2.9

Moulding of Mortar Briquettes

Briquette Mould

Product Code: 39-1000

Product Standards:

ASTM C307

Manufactured to the dimensions in the relevant specification. Two part construction, supplied complete with baseplate.

Specifications	
Weight (kg)	1.3

Curing

Humidity Cabinet 150 Litre Capacity

Product Codes: 39-1600/01, 39-1601/01, 39-1600/06, 39-1601/06

Prior to testing, prisms to be cured for a period of at least 24 hours at 20°C ± 1°C, 90% RH minimum. The prisms are then de-moulded and stored under water for the required curing time, usually 48 hours, 72 hours, 7 and 28 days.

The Humidity Cabinet is built to a high specification and is designed for the early curing of mortar prisms prior to storing under water. Relative humidity up to 98%.

- Micro-processer controller for temperature and humidity for precise and reliable control.
- Stainless Steel interior with adjustable shelves.
- CFC-free polyurethane insulation to provide efficient thermal stability.
- 12 mm access port.
- Temperature and humidity digital data recorder (only with ASTM models).
- 4 shelves.

Specifications

Standard	BS EN	ASTM	BS EN	ASTM
Product Code	39-1600/01	39-1601/01	39-1600/06	39-1601/06
Power Supply	220-240 V AC, 50 Hz, 1 ph		220-240 V AC, 60 Hz, 1 ph	
Capacity (ltrs)	150		150	
External Dimensions L x W x D (mm)	1075 x 635 x 660		1075 x 635 x 660	
Internal Dimensions L x W x D (mm)	590 x 510 x 490		590 x 510 x 490	
Temperature Range (°C)	+5 to 60		+5 to 60	
Temperature Control (°C)	0.2 at 20		0.2 at 20	
Temperature Variation (°C)	± 0.5 at 20		± 0.5 at 20	
Humidity Range	0 - 98%		0 - 98%	
Shelves	4 Shelves hold 6 x 39-1100 moulds		4 Shelves hold 6 x 39-1100 moulds	
Shelf Capacity (kg)	15		15	
Input Power (W)	800		800	
Weight (kg)	100	100	100	100

Mixing, Moulding, Curing & Strength

Humidity Cabinet BS EN 196-320 Litre Capacity

Product Code: 39-1300/01, 39-1300/06

Specifications	
Capacity (ltrs)	320
Dimensions External L x W x D (mm)	660 x 635 x 1745
Dimensions Internal L x W x D (mm)	490 x 510 x 1275
Temperature Range (°C)	+5.0 to +60
Fluctuation (better than) (°C)	± 0.2
Variation (better than) (°C)	± 0.5
Rated Power (W)	850
Number of Shelves	10
Weight (kg)	200
Product Code	**Power Supply**
39-1300/01	220-240 V AC, 50 Hz, 1 ph
39-1300/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables for 39-1300/01:

Temperature Sensor (39-1300/11)
Humidity Cabinet Fan/Motor (39-1300/12)
470 Ohm Resistor for Humidity Cabinet Fan/Motor (39-1300/17)
Buzzer for Humidity Cabinet (39-1300/18)
Over/Under temperature cut-out (39-1300/19)
Over temperature relay (39-1300/20)
Fuse (39-1300/21)
Spare Shelf (39-1300/23)
Stand Alone Data Logger (39-1300/24)
Calibration Certificate for temperature and RH (39-1300/25)

Product Standards:

EN 196-1, EN 459-2

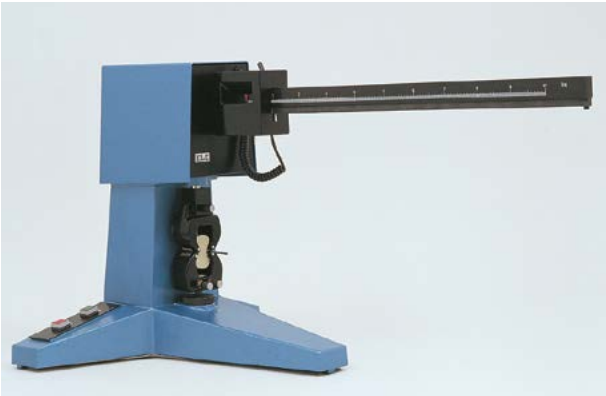
Further Information:

10 reinforced shelves and Digital Data Recorder. USB connection, stores up to 1 year of data.

Strength

Flexural/Tensile Testing Machine 10 kN

Product Code: 39-7100/01



This single lever machine is designed for flexural tests on 40.1 x 40 x 160 mm mortar prisms and tensile tests on mortar briquettes. The rate of applied loading for flexural testing is to EN 196-1. Load is applied by a weight travelling along the beam at a constant rate, driven by a motor/gearbox. Readings are made by means of a cursor visible through a window in the moving weight. Failure of a specimen triggers a switch mechanism and brings the weight to a halt immediately. To prevent overloading, a sensor is incorporated in the weight and automatically stops the machine at its maximum capacity of 10 kN. Supplied complete with flexural and tensile jaws.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph

Spares/Consumables:

Flexural Jaws (39-7100/10)
Tensile Jaws (39-7100/15)

Product Standards:

EN 196-1, ASTM C307

ADR Touch Control PRO

250/25 Cement Machine

Innovation in Design – Simplicity in Performance

Other products in this range:

- 2000 kN
- 2000 BS
- 2000/250 BS
- 3000 BS

Full specifications available on page190

Tilt and turn screen

Favourites option available

Mixing, Moulding, Curing & Strength

ADR Touch Control Pro 250/25 Cement Machine complete with Compression with Flexural Jigs & Platen Sets

Product Codes: 39-7160/01, 39-7160/02, 39-7160/06

Product Standards:

EN 196-1, EN 196-2, ISO 679, EN 459-2, EN 1015-11, EN 13454-2, ASTM C109/C109M, ISO 7500-1, ASTM E4

The ADR Touch Control Pro 250/25 machine provides consistent automatic testing of a wide range of specimens. As standard the machine is supplied with platens fitted to the load frame, compression jig with 40 mm and 2.06 inch square platen sets and flexural jig for testing 40.1 x 40 x 160 mm prisms. The availability of the 25 kN low capacity load frame as standard extends the test capability of the machine for low strength compression or flexural testing.

- Rotatable high-resolution control display.
- Favourites option for test samples.
- On average 10% time savings per test sample.
- LAN connectivity for remote operation and diagnostics.
- Over 100 pre-programmed test profiles available.
- 7 inch 800 x 480 TFT LED touch screen (IP31 rated).
- Connects to external PC.
- 6 customised test profile favourite buttons for rapid testing.
- Stores over 1 million test results.

Specifications

Product Code	Power Supply
39-7160/01	220-240 V AC, 50 Hz, 1 ph
39-7160/02	110 V AC, 60 Hz, 1 ph
39-6160/16	220-240 V AC, 60 Hz, 1 ph
250 kN frame	
Overall Dimensions L x W x H (mm)	520 x 850 x 1255
Max Vertical Clearance (mm)	230
Max Horizontal Clearance (mm)	225
Upper and Lower Platens	150 mm dia
Max Ram Travel (mm)	15
Related Power (W)	1600
Weight (kg)	700

Micro-processor Control Specifications

Measurement Units	kN, lbf or kgf - selectable
Accuracy	Better than ±1% over calibrated range
Display Backlit	7 inch touch screen
Max Load	Held until reset
Output	Serial RS 232C/USB/Ethernet

ADR Touch Control Pro 250/25 Cement Machine Spares Kit

Product Code	Product
39-7160/K	Spares kit for ADR Touch Control Pro 250/25 Cement Machine

Impact Printer RS 232 Serial Connection

Product Code: 37-4859/01

Supplied complete with serial RS232 communications cable and one paper roll.

Spares/Consumables:

Paper Roll 76 mm wide (Box of 20) (37-4859/12)

Printer Ribbon(Black/Red) for use with Impact Printer (37-4859/10)

Distance Pieces Full Set

Product Code: 39-6220

Accessory for testing samples 40 mm, 50 mm, 70.7 mm and 100 mm.

These items are required when testing above sample sizes NOT using the compression jig.

Cement Testing Accessories

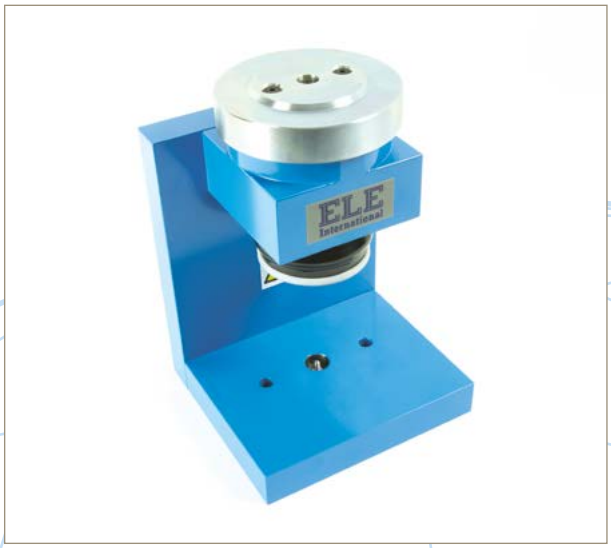
Flexural Jig Assembly

Product Code: 39-6160

Comes as standard with 39-7160/01, 39-7160/02, 39-7160/06.

Compression Jig Assembly

Product Code: 39-5600



Comes as standard with 39-7160/01, 39-7160/02, 39-7160/06.

39-5600/10 = 40 mm Square Platens

39-5600/11 = 2.06 inch Square Platens
(also for use with 50 mm cubes)

39-5600/13 = Aligning Block for 40 mm Square Platen

39-5600/14 = Single Oversize Square Platen 2.06 inch

Mixing it up with full control

- 5 litre nominal capacity.
- Microprocessor control.
- New mix program selector.
- Complies with latest EN Standards update.
- Choice of automatic mixing cycles.
- Sand and water dispenser supplied as standard.

Digital Mortar Mixer

Automatic & Manual Modes

Designed to mix mortars and cement pastes to the required industry Standards, the Digital Mortar Mixer has a planetary motion and is driven by a motor with a microprocessor based speed and program controller.

Operated in either automatic or manual mode allowing complete control of the mixing. When used in manual mode, the two mixing speeds can be changed by means of a rocker switch, without switching off the motor. In automatic mode, any one of the pre-set mixing programs may be selected.

Product Standards:

EN 196-1	EN 196-3
ISO 679	EN 413-2
EN 459-2	EN 1744-1
EN 13279-2	EN 1015-2
EN 13395-1	EN 13454-2
BS 6463-103	

Contact the team now for further information: +44 (0)1525 249 200 • ele@eleint.co.uk

Air Permeability Method (Blaine Method)

The Air Permeability (Blaine) method measures the specific surface by comparison with a reference cement sample. The determination of the specific surface is to primarily check the consistency of the grinding process.

Standard(s)	EN 196-6, ASTM C204	
Product Code	**Product**	**Qty**
24-2900	50 ml Density Bottle with Perforated Stopper	6
38-0620	Pure Mineral Oil 1 ltr Bottle	1
38-0640	NBS - Srm Reference Cement 10 g	1
38-0650	Filter Paper equivalent to Whatman No 40 12.7 mm dia. Box of 100	1
38-1000	Blaine Air Permeability Apparatus	1
78-6000/01	Electronic Top Loading Balance 200 g at 0.001 g. Dual Voltage 50-60 Hz	1
81-0518	Timer Clock	1
82-5310	Max-Min Thermometer (Mercury Free) Range -40.0˚C to +50.0˚C	1
Also requires Mercury not supplied by ELE		

Determination of Density of Cement

This test determines the density of cement by the displacement of a non-reactive liquid in a pyknometer.

Standard(s)	EN 196-6	
Product Code	**Product**	**Qty**
24-2900	50 ml Density Bottle with Perforated Stopper	6
78-6000/01	Electronic Top Loading Balance 200 g at 0.001 g. Dual Voltage 50-60 Hz	1
81-0180	Chattaway Spatula 125 mm	1
81-0375	Red Rubber Tubing H 6.5 mm Bore 5.0 mm Wall priced by metre	2
82-2170	Vacuum Desiccator 250 mm internal dia	1
82-2180	Safety Cage for Desiccator	1
82-2660	Polythene Funnel 200 mm dia	1
82-7091	Silica Gel 500 g pack, particle size 2.5-6.0 mm	1
82-7700	Filter Pump	1
82-8500/01	12 ltr Water Bath with Digital Controller LED Display 0 to 99.9˚C x 0.1˚C	1

Specific Gravity of Hydraulic Cement

This test method determines the specific gravity of hydraulic cement and lime.

Standard(s)	EN 196-6, ASTM C188	
Product Code	**Product**	**Qty**
38-1200	Le Chatelier Flask EN 196-6 ASTM C188 complete with Calibration Certificate	3
78-6000/01	Electronic Top Loading Balance 200 g at 0.001 g. Dual Voltage 50-60 Hz	1
81-0180	Chattaway Spatula 125 mm	1
82-8500/01	12 ltr Water Bath with Digital Controller LED Display 0 to 99.9˚C x 0.1˚C	1

Standard Consistence Test

Cement paste of standard consistence has a specified resistance to penetration by a standard plunger.

Standard(s)	EN 196-3	
Product Code	**Product**	**Qty**
38-4010	Vicat Frame Complete	1
38-4010/10	ASTM Initial Set Needle	1
38-4010/13	EN Initial and Final Set Needle	1
38-2300	Vicat Mould to EN 196 Part 3 complete with Glass Plate	1
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
78-7090	Harvard Trip Balance 2000 g capacity x 0.1 g with 225 g Additional Tare	1
78-7110	Weight Set for 78-7090	1
81-0518	Timer Clock	1
81-0805	Engineers' Steel Rule 300 mm	1

Automatic Standard Consistence & Setting Time Test

Cement paste of standard consistence has a specified resistance to penetration by a standard plunger.
The setting time is determined by measuring the penetration of a needle into cement paste of standard consistence until it reaches a specified value.

Standard(s)	EN 196-3	
Product Code	**Product**	**Qty**
38-2015/01	Digital Automatic Vicat Apparatus	1
38-2015/12	Needle Cleaning Device for 38-2015 Series Automatic Vicat Apparatus	1
38-2015/15	Mould Tank for use with 38-2015/01 Automatic Vicat for testing samples under water to EN 96-3	1
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
78-7090	Harvard Trip Balance 2000 g capacity x 0.1 g with 225 g Additional Tare	1
78-7110	Weight Set for 78-7090	1
81-0518	Timer Clock	1
81-0805	Engineers' Steel Rule 300 mm	1

Part 4: General Expansion Test for Dry Hydrated Lime

This test method determines the expansion of dry hydrated lime.

Standard(s)	BS 6463	
Product Code	**Product**	**Qty**
38-3005	Le Chatelier Mould to EN 196-3 complete with Glass Plates and Counterweight	3
38-3200	Extensibility of Mould Apparatus	1
38-3300	Tamping Rod 17 mm dia	1
38-3420/01	Le Chatelier Water Bath complete with Timer. Complies with EN 196-3. 220-240 V AC, 50-60 Hz, 1 ph	1
81-0335	Trowel Gauging to BS:4550 approximately 175 mm long	1
Also required:		
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
39-1400/01	Humidity Cabinet complete with Nebulizer and 5 Shelves	1

Soundness of Cement Paste

Soundness is determined by observing the volume expansion of cement paste of standard consistence as indicated by the relative movement of two needles.

Standard(s)	EN 196-3	
Product Code	**Product**	**Qty**
38-3005	Le Chatelier Mould to EN 196-3 complete with Glass Plates and Counterweight	3
38-3205	Extensibility of Mould Apparatus to EN 196-3	1
38-3420/01	Le Chatelier Water Bath complete with Timer. Complies with EN 196-3. 220-240 V AC, 50-60 Hz, 1 ph	1
81-0335	Trowel Gauging to BS:4550 approximately 175 mm long	1
Also required:		
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
39-1400/01	Humidity Cabinet complete with Nebulizer and 5 Shelves 112 ltr	1

Heat of Hydration of Portland Cement

This test method determines the heat of hydration of cements by means of solution calorimetry, also known as the solution method.
The test is applicable to cements and hydraulic binders whatever their chemical composition and the heat of hydration is expressed in joules per gram of cement.

Standard(s)	EN 196-8, BS 4550-3	
Product Code	**Product**	**Qty**
23-3505	Mortar and Pestle Porcelain	1
38-4600/01	Heat of Hydration Apparatus BS 4550. 220-240 V AC, 50 Hz, 1 ph	1
78-5335/01	Analytical Electronic Balance 220 g x 0.001 g with 100 mm dia Top-Loading Pan and Draught Shield	1
78-7090	Harvard Trip Balance 2000 g capacity x 0.1 g with 225 g Additional Tare	1
78-7110	Weight Set for 78-7090	1
79-0020	200 mm dia Receiver	1
79-0110	200 mm dia BS Sieve 125 Mic Stainless Steel Mesh	1
79-0200	200 mm dia BS Sieve 600 Mic Stainless Steel Mesh	1
79-7210	Sieve Brush Double-Ended Nylon	1
81-0100	Spatula 100 mm	1
81-0518	Timer Clock	1
82-1540	Weighing Bottle nominal size 30 mm dia x 50 mm height	5
82-2100	Non-Vacuum Desiccator 200 mm internal dia	1
82-3320	Porcelain Crucible 30 ml supplied with Lid	
82-7091	Silica Gel 500 g pack, particle size 2.5-6.0 mm	1
83-4140/01	Muffle (Ashing) Furnace with Digital Control Pid. 1100˚C max temperature	1

Flow of Mortars & Hydraulic Cement

To perform this test method a sample is placed on a metal surface which is then raised and dropped through a known height.

Standard(s)	BS 4551, ASTM 230	
Product Code	**Product**	**Qty**
38-6000	BS/ASTM Flow Table Top (complete with tripod/baseplate)	1
38-6020	Tripod for Flow Table	1
38-6040	BS/ASTM Flow Mould	1
38-6060	Baseplate for Flow Table	1
38-6080	Calipers	1
38-6100/01	Motor Unit for use with 38-6000 220-240 V AC, 50-60 Hz, 1 ph	1
38-6160	Plastic Tamper	1

Fineness of Fly Ash (PFA) by Wet Sieving

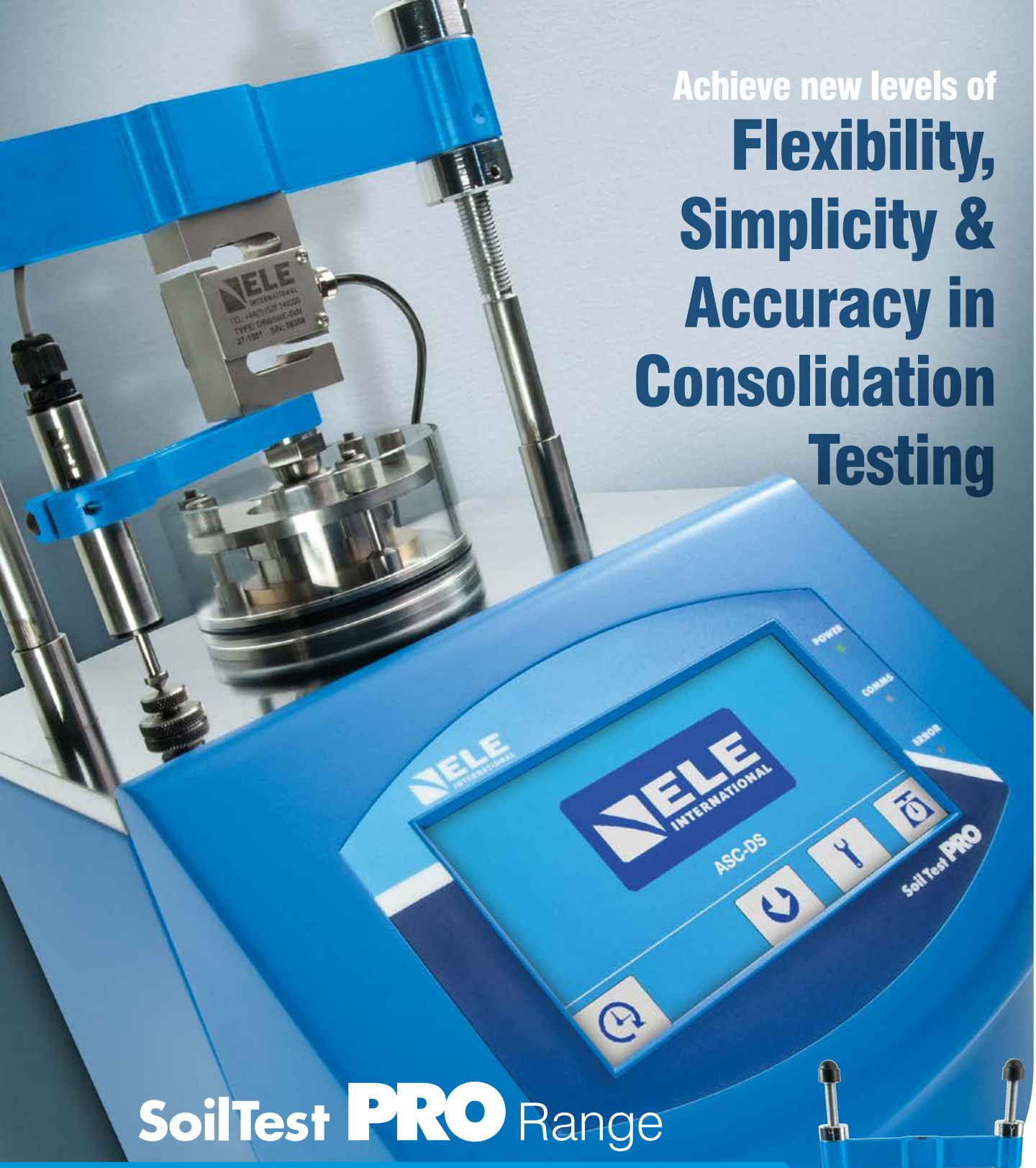
This test method determines the fly ash fineness by wet sieving on a 45 micron sieve.

Standard(s)	EN 451-2, ASTM C115, C430	
Product Code	**Product**	**Qty**
38-7600	Spray Nozzle Apparatus for Wet Sieving of Fly Ash to EN 451 ASTM C115 C430	1
38-7600/12	45 Mic Sieve Stainless Steel Mesh 50 mm internal dia	1
78-1215/01	Drying Oven 50 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	2
78-6000/01	Electronic Top Loading 200 g at 0.001 g Balance	3

Preparation and Testing of 40 x 40 x 160 mm Mortar Prisms

This test method determines the compressive strength and optionally the flexural strength of cement mortar. The test is used to assess whether the compressive strength is in conformity with its specification.

Standard(s)	EN196-1, 413-2, 459-2, BS 3892	
Product Code	**Product**	**Qty**
24-9010	Straight Edge 300 mm	1
34-6575/01	Large Curing Tank complete with Circulating Pump Heater/Thermostat Unit and Lower Rack	1
39-0035/01	Automatic/Manual Mortar Mixer 5 ltr capacity supplied with Sand and Water Dispensers	1
39-1100	Three Gang Mould for 40.1 x 40 x 160 mm Prisms complete with Glass Plate	3
39-1120	Feeding Hopper	1
39-1130	Scraper	1
39-1150/01	Jolting Table to EN 196-1 supplied without Moulds. 220-240 V AC, 50 Hz, 1 ph	1
39-1170	Standard Sand Graded Pack for Mortar Prisms to EN 196 (1350 g)	10
39-1400/01	Humidity Cabinet complete with Nebulizer and 5 Shelves	1
39-7160/01	ADR Touch Control Pro 250/25 Cement Machine 220-240 V AC, 50 Hz, 1 ph	1
78-6020/01	Electronic Top Loading 6 kg x 0.1 g Balance	1
79-0085	200 mm dia Sieve 80 Mic Stainless Steel Mesh according to ISO 3310-1	1
79-0125	200 mm dia Sieve 160 Mic Stainless Steel Mesh according to ISO 3310-1	1
79-0190	200 mm dia BS Sieve 500 Mic Stainless Steel Mesh	1
79-0230	200 mm dia BS Sieve 1 mm Stainless Steel Mesh	1
79-0255	200 mm dia Iso: 565 3310/1 Sieve 1.6 mm Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1
81-0518	Timer Clock	1
81-0705	Wire Brush	1
82-7341	Mould Oil (25 ltr drum)	1



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SoilTest PRO Range

AUTO Soils Consolidator

- Complies to BS EN ISO 17892-5 (BS 1377-5), ASTM D2435/ D2435M-11, ASTM D4546-08 and AASHTO 216
- Automatic – reduces testing time.
- No compressor – stepper motor improves accuracy across entire 15 kN load range.
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Aggregates Testing

Aggregates comprise a significant proportion of all materials used in the many different construction processes, so it is important to determine the properties of different types of aggregates through effective testing and measurement.

The required properties will vary from project to project, for example, resistance to polishing will be unimportant in a pavement base course but will be crucial in a wearing course. However, the key criteria throughout are accurate and repeatable test procedures, and our range of aggregate testing equipment has therefore been designed to help determine a wide range of factors. These include: particle size, shape and texture; relative, bulk and compacted densities; soundness and resistance to chemical attack; and mechanical properties.

Sampling & Preparation of Aggregates

Sampling & Preparation of Aggregates

Sampling and preparation of aggregates and fillers is necessary for a variety of reasons including research, design and quality control. The main aim of sampling is to obtain a sample representative of the average quality. Sampling techniques and procedures are described in various standards including BS 812: Part 101 and 102 and ASTM D75. Individual items of equipment necessary for sampling and preparation are described in the soils section of the catalogue.

Drying, Weighing & Moisture Content

Most test techniques involve the use of drying ovens and balances. The moisture content of aggregate is of importance e.g. when batching concrete or when compacting unbound materials to achieve a specified density. Accurate means of determining moisture content are specified in various Standards and include methods suitable for use in the laboratory or on the construction site.

Oven Drying Method

Grouped Product Standards:

BS 1377, BS 1924, BS 2648, BS 598, BS 598-104, EN 12697-32, EN 13280-4

The standard method for determining the moisture content of soil is the Oven Drying Method, which is recommended for a Soils Laboratory. See page 270 of the Soil section.

Particle Size & Shape

Grouped Product Standards:

EN 933-1, BS 812, ASTM C136

See Laboratory Testing Equipment section pages 271-276 for a comprehensive range of Sieves and Shakers.

Sand Equivalent Value

Grouped Product Standards:

AASHTO T176, ASTM D2419.

See the Soils Testing Equipment section pages 26-28 for further information.

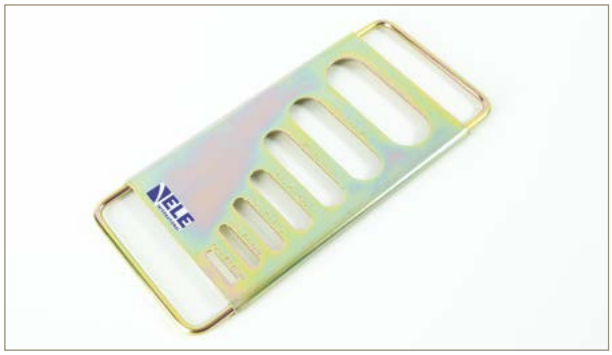
Determination of Flakiness & Elongation

Aggregates which are flaky and/or elongated will often lower the workability of a concrete mix and may also affect long term durability. In bituminous mixtures flaky aggregate makes for a harsh mix and may also crack and break up during compaction by rolling.

Flakiness Sieves & Gauges

Flakiness Gauge

Product Code: 42-0410



Product Standards:

BS 812

Constructed of heavy gauge sheet steel to the dimensions specified in BS 812.

Specifications	
Weight (kg)	0.06

Sieves Set For Flakiness Testing

Product Code: 42-0600

Product Standards:

BS 813

Comprising 1 each of, 4.9 mm, 7.2 mm, 10.2 mm, 14.4 mm, 19.7 mm, 26.3 mm and 33.9 mm.

Grid Sieves

A series of grid sieves formed from 5 mm diameter steel parallel bars securely fixed in a metal frame.

Product Code	Passing Size (mm)	Retained Size (mm)	Slot Width (mm)
42-0300	5	4	2.5
42-0302	6.3	5	3.15
42-0304	8	6.3	4
42-0306	10	8	5
42-0308	12.5	10	6.3
42-0310	16	12.5	8
42-0314	20	16	10
42-0316	25	20	12.5
42-0318	31.5	25	16
42-0320	40	31.5	20
42-0322	50	40	25
42-0324	63	50	31.5
42-0326	80	63	40

Determination of Flakiness & Elongation

Determination of the Shape Index

This method described in EN933-4 measures the ratio of length to width of individual aggregate particles using a vernier caliper and a specially designed 3:1 length gauge.

Shape Index Caliper 3.1

Product Code: 42-0821

Product Standards:

EN 933-4

Designed to measure the ratio of length to width of individual aggregate particles.

Specifications	
Weight (kg)	1

Elongation Index

This method classifies aggregate elongation by measuring the length of individual particles. The test is not applicable to material retained on a 63 mm BS test sieve.

Length Gauge

Product Code: 42-0820

Product Standards:

BS 812-105

Manufactured to the dimensions specified in BS 182.

Specifications	
Weight (kg)	0.7

Vernier Caliper (LCD) Range 0 to 200 mm x 0.01 mm

Product Code: 81-0590

Product Standards:

EN 933-4

Dual measuring range, highly accurate, vernier caliper 0 to 200 mm x 0.01 mm (8 inch x 0.001 inch) to comply with BS 887 and BS 6365. Complete with liquid crystal display.

Specifications	
Weight (kg)	0.1
Measuring Range (mm)	0 to 200 x 0.01

Vernier Caliper Range 0 to 200 mm x 0.02 mm

Product Code: 81-0588

Product Standards:

EN 933-4, BS 1377

Vernier caliper 0 to 200 x 0.02 mm. Graduated in mm and inches.

Specifications	
Measuring Range (mm)	0 to 200 x 0.02

Density, Voids & Bulking

As with any porous material, the value obtained for the particle density of an aggregate will depend on the method of test and apparatus used. Different particle sizes within a sample often have different particle densities. The term particle density expressed in Mg/m³ is numerically equal to the specific gravity. Various methods, depending upon the type and size of material to be tested, are specified in standards for testing aggregate.

Buoyancy Balance 6.2 kg x 0.1 g supplied with Support Frame, Water Tank & Suspension Hook

Product Code: 42-1000/01, 42-1000/02

Method for Aggregate between 63 mm and 5 mm.

Product Standards:

EN 1097-6, EN 12697-6, BS 812, ASTM C127, AASHTO T85

The buoyancy balance system developed by ELE consists of a rigid support frame incorporating a water tank mounted on a platform. A mechanical lifting device is used to raise the water tank through the frame height, immersing the specimen suspended below the balance. The balance supplied may also be used as a standard weighing device, thus providing a versatile and comprehensive weighing system in the laboratory.

Further Information:

For 220-240 V AC, 50-60 Hz, 1 ph.

Specifications

Product Code	Power Supply
42-1000/01	220-240 V AC, 50-60 Hz, 80 W
42-1000/02	110-120 V AC, 50-60 Hz

Wire Basket, Brass with Handle, Nominal 6000 cm³ Capacity with 1.7 mm Wire Mesh

Product Code: 42-1005

Product Standards:

EN 1097-6, EN 12697-6, BS 812, ASTM C127, AASHTO T85

For BS 812 Relative Density.

Specifications

Dimensions (mm)	200 dia x 190 deep x 1.70 wire mesh

Bulk Density Measures

Grouped Product Standards:

ASTM C138, ASTM C29, BS 812, EN 1097-3, EN 12350-6

Manufactured from heavy gauge steel these bulk density measures comply with the requirements of either BS 812 or ASTM C-29. Other than the 3 litre size, all measures incorporate carrying handles as standard.

Product Code	Capacity (Litres)
34-2800	30
34-2820	15
34-2830	10
42-2000	7
42-1995	3

Density, Voids & Bulking

Determination of Bulk Density of Aggregates Set

Grouped Product Standards:

BS 812

Set Contains:

Product Code	Product
34-0130	Tamping Rod
34-2800	30 ltrs Bulk Density Measure
34-2820	15 ltrs Bulk Density Measure
42-2000	7 ltrs Bulk Density Measure
42-1995	3 ltrs Bulk Density Measure

Particle Density (Specific Gravity) & Water Absorption for Fine Aggregates

The Gas Jar method described in BS 812 is suitable for all aggregates smaller than 20 mm in size and is particularly suited to friable aggregates. Please see page 25 of the Soils Section.

The Pyknometer method described in ASTM C128 is suitable for determining the particle density of samples of fine aggregates. Please see page 26 of the Soils Section.

The particle density of fillers can be determined using the Density Bottle method specified for testing cement.

Specific Gravity & Absorption of Fine Aggregates Set

Grouped Product Standards:

ASTM C128, AASHTO T84

Set Contains:

Product Code	Product
24-2885	Pyknometer 1 kg capacity
42-1700	Sand Absorption Cone
42-1720	Tamping Rod
81-4020	Sample Tray (306 x 306 x 38 mm)

Sand Absorption Cone

Product Code: 42-1700

Product Standards:

BS 812, ASTM C128, AASHTO T84

Made of brass to the dimensions given in BS 812, ASTM C128 and AASHTO T84.

Specifications

Dimensions: Top dia x base dia x H (mm)	90 x 40 x 80

Accessories:

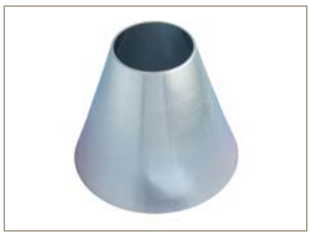
200 mm diameter BS Sieve 75 Micron Stainless Steel mesh. (79-0080)

Funnel (82-2660)

Sample Container, plastic 10 litres (81-3540)

Sample Container, tinned steel 10 litres (81-3060)

Sample Tray, 305 mm diameter x 50 mm (81-4700)



Tamping Rod for Sand Absorption Cone

Product Code: 42-1720

Product Standards:

BS 812, ASTM C128, AASHTO T84

For use with Cone. Tamping face 25 mm diameter.

Specifications

Dimensions: Dia x H (mm)	25.4 x 168

Soundness & Chemical Tests

The presence of organic matter and certain chemicals can have a considerable influence on the strength and durability of concrete. The ability of aggregates to resist excessive changes in volume due to physical changes in the environment is also of importance. Knowledge of these potentially harmful factors will ensure that precautions can be taken at the mix design stage of a project.

Chloride Content: Rapid Method

Quantab chloride titrators can be used for estimating the chloride content of aqueous solutions. They are suitable for site testing and quality control of aggregates requiring less than 30 minutes to obtain a result.

Quantab Chloride Titrator Type 1175

Product Code: 42-2950

Type 1175 titration range 0.005% to 0.1% (30 to 600 ppm) NaCl. Pack of 40.

Specifications	
Range (ppm)	30 to 600
Weight (g)	10

Quantab Chloride Titrator Strips Type 1176

Product Code: 42-2952

Type 1176 titration range 0.05 % to 1% (300 to 6000 ppm) NaCl. Pack of 40.

Specifications	
Range (ppm)	300 to 6000
Weight (g)	10

Soundness & Chemical Tests

Organic Impurities in Fine Aggregate

If aggregate contains organic impurities it may not be suitable for inclusion in concrete. Organic impurities, usually tannic acid and its derivatives, may interfere with the chemical reactions of hydration. Impurities are more likely to be found in fine (sand) aggregate.

Glass Bottle

Product Code: 42-3000

Product Standards:

ASTM C40

12 ounce (300 ml approx) capacity, graduated at 2, 4 and 7 ounce positions, complete with screw cap.

Specifications	
Weight (kg)	0.34

Colour Standard

Product Code: 42-3040

Product Standards:

ASTM C40, AASHTO T21

With five organic colour transparencies mounted in a holder.

Specifications	
Colour Standards	Five, on non-fading glass
Dimensions W x D x H	3 x 2-7/8 x 4 inches 76 x 73 x 102 mm
Weight	Net 4 oz (113 g)

Spares/Consumables:

Sodium Hydroxide Pellets 500g (82-7141)

Soundness of Aggregates

Product Standards:

ASTM C88, AASHTO T104, BS 812, EN 1367-2

The soundness of aggregates to physical changes caused by the environment is important to the long-term durability characteristics of concrete. Excessive changes in volume can be caused by freezing and thawing, thermal changes at temperatures greater than freezing, and cycles of wetting and drying. For Hydrometers and Wire Baskets also see the Laboratory Equipment Section.

Product Code	Product
82-3505	Hydrometer Type L50 1150 to 1200 Relative Density
82-3510	Hydrometer Type L50 1250 to 1300 Relative Density

Wire Baskets (Various Sizes)

Specifications

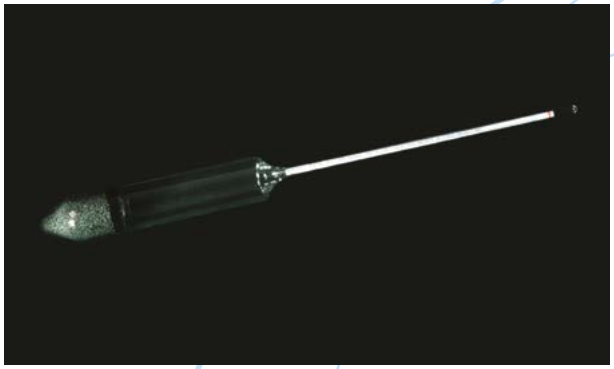
Product Code	Standards	Dimensions dia x depth	Aperture
81-4819	BS 812 Type 1 EN 1367-2	65 mm x 80 mm	150 μm wire mesh
81-4821	BS 812 Type 2 EN 1367-2	95 mm x 120 mm	600 μm wire mesh
81-4823	BS 812 Type 3 EN 1367-2	95 mm x 120 mm	1.18 mm wire mesh
81-4825	BS 812 Type 4 EN 1367-2	120 mm x 120 mm	3.35 mm wire mesh

Soundness of Aggregates in Sodium Sulphate or Magnesium Sulphate to ASTM C88 and AASHTO T104 Set

Product Code	Product
42-1005	Wire Basket 6000 cm³ capacity 1.7 mm
45-6550/01	30 ltrs Heating Bath
79-5030	8 inch dia ASTM Sieve 4 mm
79-5500	8 inch dia ASTM Sieve 8 mm
79-5550	8 inch dia ASTM Sieve 16 mm
79-5600	8 inch dia ASTM Sieve 31.5 mm
81-4821	Wire Basket BS 812 Type 2 EN 1367-2
82-3505	Hydrometer Type L50 1150 to 1200 Relative Density
82-3510	Hydrometer Type L50 1250 to 1300 Relative Density

Hydrometer

Product Code: 82-3505



Product Standards:

BS 812, EN 1367-2, ASTM C88, AASHTO T104, BS 7188

Type L50, ASTM C 88 graduated 1150 to 1200 relative density (used with sodium sulphate method).

Hydrometer

Product Code: 82-3510

Product Standards:

BS 812, EN 1367-2, ASTM C88, AASHTO T104

Type L50, ASTM C 88 graduated 1250 to 1300 relative density (used with magnesium sulphate method).

Sulphate Content: Rapid Method

A qualitative or semi-quantitative test is recommended for determining sulphate ions in aqueous solutions. Sulphate test strips are convenient measuring devices for preliminary assessment of sulphate content.

Sulphate Test Strips

Product Code: 42-2958

Detection range 200 to 900 mg/l. Pack of 100.

Specifications

Weight (g)	10

Mechanical Properties

Mechanical Properties

The diverse range of aggregates available to the engineer makes it essential to select a material that is adequate for a given application. The following equipment is designed to determine various mechanical characteristics that need to be known in order to select the most suitable type of aggregate.

Aggregate Crushing Value (ACV) & Ten Percent Fines Value (TFV)

These tests are a measure of the crushing properties of aggregate and use the same basic equipment. The ACV test requires a standard load of 400 kN to be applied over a period of 10 minutes while the TFV test measures the force required to produce a specified depth of plunger penetration.

ADR Touch 1500 Compression Machine with Digital Readout

Product Code: 36-0720/01

Product Standards:

BS EN ISO 7500-1; ASTM E4; BS 812-110, BS 812-111

The Compact 1500 range of compression machines has been designed to meet the need for a simple, economic and reliable means of ACV/TFV testing.

Load Indication:

The ADR digital readout is a microprocessor controlled instrument which is fitted as standard to all digital machines in the range. Load can be displayed in kN, lbf or kgf as selected by the operator.

- 1500 kN / 350,000 lbf capacity.
- Efficient hydraulic power packs.
- Economic machines ideal for site use.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Force Capacity (kN)	1500
Max Ram Travel (mm)	50
Dimensions L x W x H (mm)	430 x 600 x 1035
Rated Power (W)	1350
Cubes (Concrete)	Up to 150 mm
Cylinders (Concrete)	Up to 160 x 320 mm
Blocks	N/A
Flexural Testing	Via Flexural Frame
TFV and ACV	Yes
Frame Type	Welded
Max Vert. Clearance	340 mm
Max Hor. Clearance	325 mm
Platen Sizes	Lower, Upper 222 mm
Weight (kg)	350

Note: All other ELE Compression Machines from the Concrete Section are suitable for ACV/TFV testing.

Aggregate Crushing Value & Ten Percent Fines Value Apparatus

Product Codes: 42-4300, 42-4500

Product Standards:

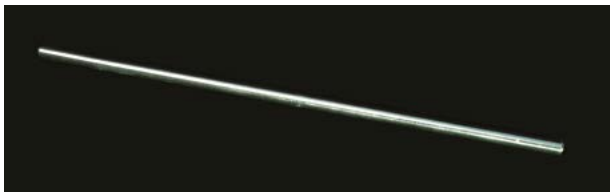
BS 812-112

Comprising of 75 mm or 150 mm nominal diameter steel cylinder, plunger and base plate supplied complete with metal measure and tamping rod (2 sizes).

Specifications	
150 mm Crushing Value Apparatus (42-4300)	
Nominal Diameter (mm)	150
Weight (kg)	16.6
75 mm Crushing Value Apparatus (42-4500)	
Nominal Diameter (mm)	75
Weight (kg)	3.5

Spare Tamping Rods

Product Codes: 34-0130, 42-4580



Specifications	
Spare Tamping Rod (34-0130)	
Dimensions (Dia x Length) (mm)	16 x 600
ACV / TFV Test (mm)	150
Spare Tamping Rod (42-4580)	
Dimensions (Dia x Length) (mm)	8 x 300
ACV / TFV Test (mm)	75

Spare Metal Measures

Product Codes: 42-4360, 42-4560

Specifications	
Spare Metal Measure (42-4560)	
ACV / TFV Test (mm)	150
Spare Metal Measure (42-4360)	
ACV / TFV Test (mm)	75

Mechanical Properties

Aggregate Impact Value (AIV)

The apparatus has been designed in a particularly heavy duty form, with specially hardened steel surfaces for minimum wear. The assembly is heavily plated to ensure corrosion resistance and forms a rigid frame around the quick-release trigger mechanism, which ensures an effective free fall of the hammer when released. A built-in counter automatically indicates the number of blows delivered. The apparatus is supplied complete with cylindrical measure 75 mm diameter x 50 mm deep, and a steel tamping rod 16 mm diameter x 600 mm long.

Aggregate Impact Value Apparatus

Product Code: 42-4005

Product Standards:

BS 812-112

Heavy duty construction, heavily plated assembly ensures corrosion resistance.

Specifications	
L x W x H (mm)	500 x 300 x 980

Los Angeles Abrasion Machine

- European and ASTM methods.
- Revolution counter.
- Safety cut-out.
- Full width cover.

The Los Angeles Machine comprises a heavy steel cylinder, rotated about its horizontal axis. The cylinder incorporates a removable internal shelf, as specified in the ASTM and EN test methods. The steel cylinder is manufactured from structural steel plate conforming to S275 of EN 10025:1993. The filling aperture is provided with a cover and a safety stop button is prominently positioned. The machine is fitted with a revolution counter and steel tray for specimen unloading. Supplied without abrasive charges which should be ordered separately.

Los Angeles Abrasion Machine with CE Safety Cabinet fitted with Microswitches

Product Codes: 42-5310/01, 42-5310/06

Product Standards:

EN 1097-2, ASTM C131, ASTM C535, AASHTO T96, NF P18-573

The machine consists of a closed hollow cylindrical steel drum rotating around its horizontal axis on ball bearing units mounted on a sturdy base framework. The full enclosure ensures noise is minimized. The drum is driven at a speed of between 30 to 33 rpm via an enclosed belt drive arrangement from an electric motor/gearbox unit situated on the base frame. Inside the drum a full length steel shelf is attached, accessed by a dust-proof opening. The cylinder incorporates a removable internal shelf, one shelf position is provided to meet the requirements of both the ASTM and EN test standards. Controls are located easily on the right-hand side of the machine at convenient operator height. Start and stop push buttons and a subtracting revolution counter allows the user to preset the number of revolutions before an automatic stop.

Specifications	
Power Supply	
42-5310/01	220-240 V AC, 50 Hz, 1 ph
42-5310/06	220-240 V AC, 60 Hz, 1 ph

Los Angeles Abrasion Machine Meets ASTM and European Standards

Product Code: 42-5315/01, 42-5315/06

Product Standards:

EN 1097-2, ASTM C131, ASTM C535, AASHTO T96, NF P18-573

Specifications	
Motor	1 hp
Capacity	5,000 g each of aggregate and charge
Drum Speed (rpm)	30 to 33
Frame	Welded structural steel
Counter	Adjustable; automatic shut-off; push-button reset and adjustment
Controls	Magnetic motor starter with overload protection and integral on/off switches
Dimensions W x D x H	38.6 x 36.2 x 38.6 inches 980 x 920 x 980 mm
Weight	Net 882 lbs (400 kg)
Power Supply	
42-5315/01	220-240 V AC, 50 Hz, 1 ph
42-5315/06	220-240 V AC, 60 Hz, 1 ph

Abrasive Charge Set of 12 (EN)

Product Code: 42-5305/10

Product Standards:

EN 1097-2, ASTM C131, ASTM C535
Set of 12.

Abrasive Charges Set of 12 (ASTM)

Product Code: 42-5300/10

Product Standards:

EN 1097-2, ASTM C131, ASTM C535, AASHTO T96

Set of 12.

Specifications	
Weight (lbs)	11.3

Mechanical Properties

Skid Resistance Testing

The Pendulum Skid Resistance Tester was originally designed in the 1940s in the USA, and further developed in the 1960s at the TRL (Transport Research Laboratory) for the testing of road surfaces. The device measures the frictional resistance between a rubber slider mounted on the end of a pendulum arm and the surface to be tested. This provides road engineers with a method of checking the resistance of wet and dry surfaces to slipping and skidding, both in the laboratory and in-situ. It operates by a pendulum rotating about a spindle which is attached to a vertical pillar. At the end of the tubular arm, a head of known mass is fitted with a rubber slider. The pendulum is released from a horizontal position so that it strikes the sample surface at a constant speed. The distance travelled by the head after hitting the sample is determined by the friction of the sample surface.

Pendulum Skid Resistance Tester

Product Code: 42-6000

Product Standards:

EN 1097-8:2009, EN 1436:1997, EN 13036-4:2003, ASTM E303-93, BS 812 Pt 114, BS 6077 Pt 1, BS 7044, BS 7188, BS 8204, BS 7976

Further Information:

Applications:

- Assessment of surface friction and skid resistance properties.
- Testing of aggregates in the PSV (Polished Stone Value) test.
- Testing of new road surface materials.
- Testing of pedestrian pavements.
- RTA (road traffic accidents).
- Litigation investigations

Features:

- Designed for laboratory and on-site road surface testing.
- Factory calibrated to EN 1097-8.
- Low friction arm and lightweight pointer.
- Supplied with ‘F’ scale for use with small slider set for 76 mm slide length (PSV test).
- Highly repeatable.
- Supplied with carrying case and tool kit.

Specifications	
Dimensions W x D x H (mm)	695 x 295 x 695
Volume (m^3)	0.15
Weight (kg)	30

Spreader Feet for Skid Resistance Tester for In-situ Testing. Set of 3

Product Code: 42-6000/10

Skid Resistance Tester Base Plate for Laboratory Testing

Product Code: 42-6200

Rubber Mounted PSV Slider

Slider for polished stones for use with Pendulum Skid Resistance Tester (42-6000)

Product Code	Product Description
42-6000/11	1.25” Rubber Mounted PSV Slider
42-6000/12	3” Rubber Mounted TRL (55) Slider
42-6000/13	3” Rubber Mounted Four S (96) Slider
42-6000/14	3” Rubber Mounted CEN Slider
42-6000/15	First Traceable Calibration for Pendulum Skid Resistance Tester

Sampling & Preparation Equipment for Aggregates

Product Code	Product	Qty
23-3200	Riffle Box 38 mm Slot Width complete with Three Containers	1
23-3350	Riffle Box 64 mm Slot Width complete with Three Containers	1
81-0220	Aluminium Scoop Large	1
81-0240	Shovel (Flat)	1
81-3060	Sample Container 10 ltr capacity	10
81-4160	Sample Tray 910 x 910 x 76 mm	1
81-4765	Polythene Bag 254 x 380 mm, Pack of 100	100
81-4775	Polythene Bag 450 mm x 1 m x 1000 g Priced each	100

Determination of Moisture Content (Oven-Drying) Method

Standard(s)	EN 1097-5, BS 812-109

This is the definitive method for the determination of water content of aggregates drying in a ventilated oven.

Product Code	Product	Qty
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
78-6020/01	6 kg x 0.1 g Balance	1
78-6040/01	30 kg x 1 g Balance	1
81-0120	Spatula 150 x 25 mm	2
81-0222	Aggregate Scoop with two handles 250 mm long x 125 mm dia, 5 kg capacity	1
81-3040	Sample Container. 2.5 ltr capacity	10
81-3545	22 ltr Transport/Storage Container complete with Snap-on Lid and Handle	5
81-4020	Sample Tray 306 x 306 x 38 mm	6
82-2110	Desiccator Cabinet Non-Vacuum	1
82-7091	Silica Gel 6-16 Mesh Quantity 500 g	1

Determination of Moisture Content, Modified High Temperature Drying Method

This is an alternative test method to the Oven Dry method. Results from this test method should be checked using the Oven Method.

Standard(s)	BS 812-109

Product Code	Product	Qty
78-3104/01	Hotplate Digital Temperature Indication 0 to 300°C 300 x 500 mm heating area 220-240 V AC, 50 Hz, 1 ph.	1
78-6020/01	6 kg x 0.1 g Balance	1
81-0140	Spatula 200 mm Blade	1
81-4700	Stainless Steel Tray 305 mm dia	1

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Determination of Particle Size Distribution

This test method determines the particle size distribution of aggregates using test sieves.
The test method is suitable for natural or artificial aggregates, including lightweight aggregates up to 63 mm nominal size but excluding filler.

Standard(s)	EN 933-1, BS 812-103	
Product Code	**Product**	**Qty**
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
78-6000/01	200 g x 0.001 g Balance	1
78-6020/01	6 kg x 0.1 g Balance	1
78-6040/01	30 kg x 1 g Balance	1
79-0010	200 mm dia Lid	1
79-0020	200 mm dia Receiver	1
79-0070	200 mm dia BS Sieve 63 Mic Stainless Steel Mesh	1
79-0110	200 mm dia BS Sieve 125 Mic Stainless Steel Mesh	1
79-0150	200 mm dia BS Sieve 250 Mic Stainless Steel Mesh	1
79-0190	200 mm dia BS Sieve 500 Mic Stainless Steel Mesh	1
79-0230	200 mm dia BS Sieve 1 mm Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1
79-1500	200 mm dia BS Sieve 4 mm Perforated Plate	1
79-1540	200 mm dia BS Sieve 8 mm Perforated Plate	1
79-2010	300 mm dia Lid	1
79-2020	300 mm dia Receiver	1
79-2580	300 mm dia BS Sieve 16 mm Perforated Plate	1
79-2630	300 mm dia BS Sieve 31.5 mm Perforated Plate	1
79-2670	300 mm dia BS Sieve 63 mm Perforated Plate	1
79-2710	300 mm dia BS Sieve 125 mm Perforated Plate	1
79-7210	Sieve Brush Double-Ended Nylon	3
80-0200/01	ELE Sieve Shaker complete with separate Control Panel, 220-240 V AC, 50 Hz, 1 ph	1
81-4030	Sample Tray 406 x 406 x 50 mm	4

Determination of Flakiness and Elongation

The flakiness index of an aggregate sample is found by separating the flaky particles and expressing their mass as a percentage of the mass of the sample tested.
This test method is not applicable to material passing a 6.3 mm sieve or retained on a 63 mm sieve.

Standard(s)	BS 812-105	
Product Code	**Product**	**Qty**
42-0410	Flakiness Gauge	1
42-0600	Set of Flakiness Sieves comprising 1 each 4.9 mm, 7.2 mm, 10.2 mm ,14.4 mm, 19.7 mm 26.3 mm and 33.9 mm	1
42-0820	Length Gauge	1
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
78-6020/01	6 kg x 0.1 g Balance	1
78-6030/01	Electronic Top Loading Balance 15 kg x 1g	1
79-2010	300 mm dia Lid	1
79-2020	300 mm dia Receiver	1
79-2525	300 mm dia BS Sieve 6.3 mm Perforated Plate	1
79-2555	300 mm dia BS Sieve 10 mm Perforated Plate	1
79-2575	300 mm dia BS Sieve 14 mm Perforated Plate	1
79-2595	300 mm dia BS Sieve 20 mm Perforated Plate	1
79-2615	300 mm dia BS Sieve 28 mm Perforated Plate	1
79-2640	300 mm dia BS Sieve 37.5 mm Perforated Plate	1
79-2655	300 mm dia BS Sieve 50 mm Perforated Plate	1
79-2670	300 mm dia BS Sieve 63 mm Perforated Plate	1
80-0200/01	ELE Sieve Shaker complete with separate Control Panel, 220-240 V AC, 50 Hz, 1 ph	1
81-0240	Shovel (Flat)	1
81-4030	Sample Tray 406 x 406 x 50 mm	4
81-4230	Sample Tray 1200 x 1160 x 50 mm	1

Buyer's Guide

Determination of Flakiness

This test method determines the flakiness index of aggregate and is suitable for natural or artificial aggregates, including lightweight aggregates.
The test procedure is not suitable for particle sizes less than 4 mm or greater than 80 mm.

Standard(s)	EN 933-3	
Product Code	**Product**	**Qty**
42-0300	Grid Sieve 2.5 mm Slot Width for EN Aggregate Flakiness Test	1
42-0302	Grid Sieve 3.15 mm Slot Width for EN Aggregate Flakiness Test	1
42-0304	Grid Sieve 4 mm Slot Width for EN Aggregate Flakiness Test	1
42-0306	Grid Sieve 5 mm Slot Width for EN Aggregate Flakiness Test	1
42-0308	Grid Sieve 6.3 mm Slot Width for EN Aggregate Flakiness Test	1
42-0310	Grid Sieve 8 mm Slot Width for EN Aggregate Flakiness Test	1
42-0314	Grid Sieve 10 mm Slot Width for EN Aggregate Flakiness Test	1
42-0316	Grid Sieve 12.5 mm Slot Width for EN Aggregate Flakiness Test	1
42-0318	Grid Sieve 16 mm Slot Width for EN Aggregate Flakiness Test	1
42-0320	Grid Sieve 20 mm Slot Width for EN Aggregate Flakiness Test	1
42-0322	Grid Sieve 25 mm Slot Width for EN Aggregate Flakiness Test	1
42-0324	Grid Sieve 31.5 mm Slot Width for EN Aggregate Flakiness Test	1
42-0326	Grid Sieve 40 mm Slot Width for EN Aggregate Flakiness Test	1
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
78-6030/01	Electronic Top Loading Balance 15 kg x 1g	1
79-2010	300 mm dia Lid	1
79-2020	300 mm dia Receiver	1
79-2500	300 mm dia BS Sieve 4 mm Perforated Plate	1
79-2515	300 mm dia BS Sieve 5 mm Perforated Plate	1
79-2525	300 mm dia BS Sieve 6.3 mm Perforated Plate	1
79-2540	300 mm dia BS Sieve 8 mm Perforated Plate	1
79-2555	300 mm dia BS Sieve 10 mm Perforated Plate	1
79-2565	300 mm dia BS Sieve 12.5 mm	1
79-2580	300 mm dia BS Sieve 16 mm Perforated Plate	1
79-2595	300 mm dia BS Sieve 20 mm Perforated Plate	1
79-2605	300 mm dia BS Sieve 25 mm Perforated Plate	1
79-2630	300 mm dia BS Sieve 31.5 mm Perforated Plate	1
79-2645	300 mm dia BS Sieve 40 mm	1
79-2655	300 mm dia BS Sieve 50 mm Perforated Plat.	1
79-2670	300 mm dia BS Sieve 63 mm Perforated Plate	1
79-2684	300 mm dia BS Sieve 80 mm Perforated Plate	1
81-4030	Sample Tray 406 x 406 x 50 mm	4

Determination of the Shape Index of Aggregate

This test method determines the shape index of coarse aggregate. It is suitable for aggregates of natural or artificial origin including lightweight aggregates.
The test procedure is not suitable for particle sizes less than 4 mm or greater than 63 mm.

Standard(s)	EN 933-4	
Product Code	**Product**	**Qty**
42-0821	3.1 Shape Index Caliper	1
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
78-6020/01	6 kg x 0.1 g Balance	1
78-6040/01	30 kg at 1 g Balance	1
81-4030	Sample Tray 406 x 406 x 50 mm	4
Also required		
79-0010	200 mm dia Lid	1
79-0020	200 mm dia Receiver	1
79-0070	200 mm dia BS Sieve 63 Mic Stainless Steel Mesh	1
79-0110	200 mm dia BS Sieve 125 Mic Stainless Steel Mesh	1
79-0150	200 mm dia BS Sieve 250 Mic Stainless Steel Mesh	1
79-0190	200 mm dia BS Sieve 500 Mic Stainless Steel Mesh	1
79-0230	200 mm dia BS Sieve 1 mm Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1
79-1500	200 mm dia BS Sieve 4 mm Perforated Plate	1
79-1540	200 mm dia BS Sieve 8 mm Perforated Plate	1
79-2010	300 mm dia Lid	1
79-2020	300 mm dia Receiver	1
79-2580	300 mm dia BS Sieve 16 mm Perforated Plate	1
79-2630	300 mm dia BS Sieve 31.5 mm Perforated Plate	1
79-2670	300 mm dia BS Sieve 63 mm Perforated Plate	1
79-2710	300 mm dia BS Sieve 125 mm Perforated Plate	1
79-7210	Sieve Brush Double-Ended Nylon	3
80-0200/01	ELE Sieve Shaker complete with separate Control Panel, 220-240 V AC, 50 Hz, 1ph	1

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Particle Density & Water Absorption of Aggregate

This test method is used for the determination of particle density and water absorption of aggregate between 63 mm and 5 mm.

Standard(s)	BS 812-2, EN 1097-6	
Product Code	**Product**	**Qty**
42-1000/01	Buoyancy Balance 6 kg x 0.1g, complete with Support Frame Water Tank and Suspension Hook	1
42-1005	Wire Basket Brass with Handle nominal 6000 cm^3 capacity with 1.7 mm Wire Mesh	1
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
81-0518	Timer Clock	1
81-3060	Sample Container 10 ltr capacity	3
81-4030	Sample Tray 406 x 406 x 50 mm	4
82-5420	Digital Pocket Thermometer -49.9˚C to +199.9˚C	1
Also required.		
79-0010	200 mm dia Lid	1
79-0020	200 mm dia Receiver	1
79-0070	200 mm dia BS Sieve 63 Mic Stainless Steel Mesh	1
79-0310	200 mm dia BS Sieve 4 mm Stainless Steel Mesh	1
79-1630	200 mm dia BS Sieve 31.5 mm Perforated Plate	1
79-1670	200 mm dia BS Sieve 63 mm Perforated Plate	1

Particle Density & Water Absorption of Aggregate (Gas Jar Method)

This test method is used for the determination of particle density and water absorption of aggregate between 40 mm and 5 mm.

Standard(s)	BS 812-2	
Product Code	**Product**	**Qty**
24-2830	Gas Jar 75 mm dia x 300 mm with Glass Cover and Rubber Bung	2
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
78-6020/01	6 kg x 0.1 g Balance	1
79-1515	200 mm dia BS Sieve 5 mm Perforated Plate	1
81-3060	Sample Container 10 ltr capacity	3
81-4700	Stainless Steel Tray 305 mm dia	2

Particle Density & Water Absorption of Aggregate (Pyknometer Method)

This test method is used for the determination of particle density and water absorption of aggregate between 4 mm and 0.063 mm.

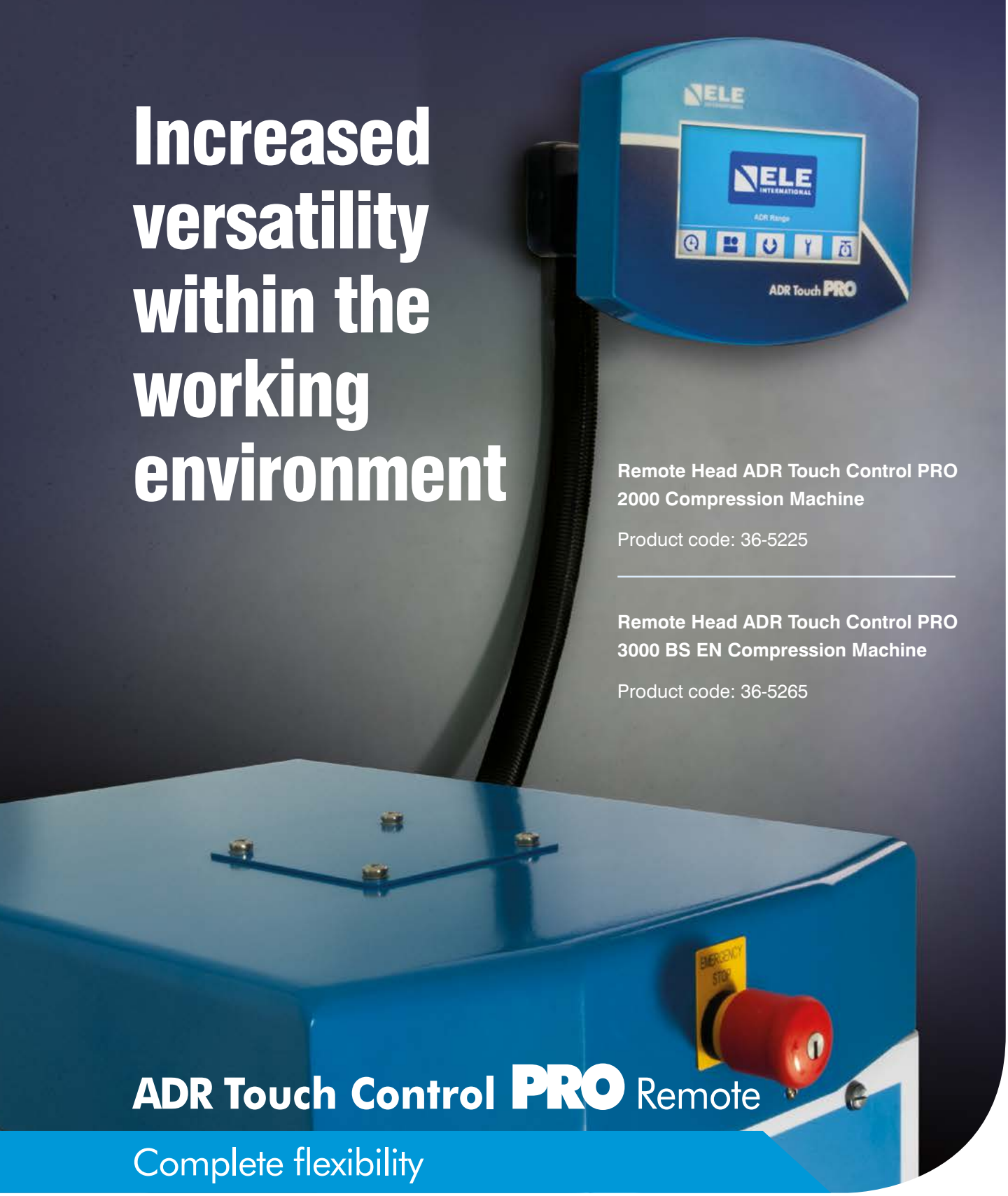
Standard(s)	EN 1097-6, BS 812-2	
Product Code	**Product**	**Qty**
24-2885	Pyknometer complete with Non-Corrodable Cone and Rubber Seal 1 kg capacity	2
42-1700	Sand Absorption Cone	1
42-1720	Tamping Rod	1
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with Shelves and 1 Year Warranty	1
78-6020/01	6 kg x 0.1 g Balance	1
79-0080	200 mm dia BS Sieve 75 Mic Stainless Steel Mesh	1
81-3060	Sample Container, 10 ltr capacity	3
81-3540	Plastic Sample Container 10 cu Decimetre capacity complete with Lid suitable for CBR Soaking Test	1
81-4700	Stainless Steel Tray 305 mm dia	2
82-2660	Polythene Funnel 180 mm dia	1

Aggregate Abrasion Value using Los Angeles Abrasion Machine

This test method determines the resistance to fragmentation of coarse aggregate.
The Los Angeles test method is the reference method and applies to natural or artificial aggregates used in civil engineering.

Standard(s)	EN 1097-2	
Product Code	**Product**	**Qty**
42-5315/01	Los Angeles Abrasion Machine meets ASTM and European Standards, 220-240 V AC, 50 Hz, 1ph	1
42-5305/10	Set of 12 Abrasive Charges (EN)	1
78-1320/01	Drying Oven 220 ltr capacity, Fan-Circulated, complete with 4 Shelves and 1 Year Warranty	1
78-6040/01	30 kg x 1 g Balance	1
79-0010	200 mm dia Lid	1
79-0020	200 mm dia Receiver	1
79-0255	200 mm dia ISO:565 3310/1 Sieve 1.6 mm Stainless Steel Mesh	1
79-1555	200 mm dia BS Sieve 10 mm Perforated Plate	1
79-1565	200 mm dia BS Sieve 12.5 mm Perforated Plate	1
79-1575	200 mm dia BS Sieve 14 mm Perforated Plate	1

Increased versatility within the working environment



Remote Head ADR Touch Control PRO 2000 Compression Machine

Product code: 36-5225

Remote Head ADR Touch Control PRO 3000 BS EN Compression Machine

Product code: 36-5265

ADR Touch Control PRO Remote

Complete flexibility

The ADR Touch Control Pro delivers all the features and quality of the established ADR-Auto range, with its 20 year history.

Now with a new sleek remote head, we can give you even more flexibility in your working environment.

- Remote Head option for ADR Touch Control PRO (TCP) allows a distance of up to 1.3 metres between the console and head.
- Three options available:
  - Desk mounting for ADR TCP head.
  - Desk mounting for Head and PC monitor.
  - Wall mounting option (as shown in the image).

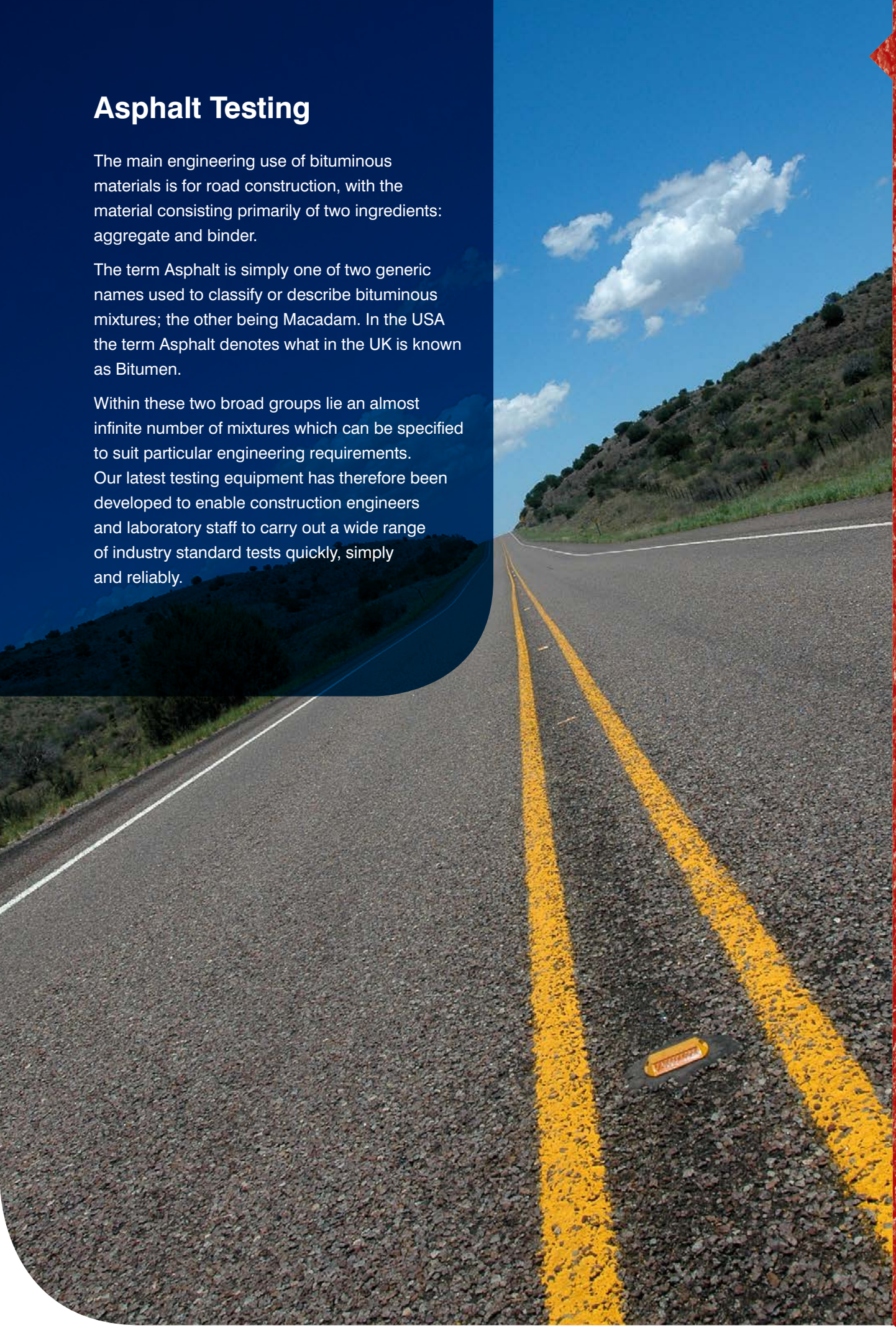
Contact the team now for further information: +44 (0)1525 249 200 • ele@eleint.co.uk

Asphalt Testing

The main engineering use of bituminous materials is for road construction, with the material consisting primarily of two ingredients: aggregate and binder.

The term Asphalt is simply one of two generic names used to classify or describe bituminous mixtures; the other being Macadam. In the USA the term Asphalt denotes what in the UK is known as Bitumen.

Within these two broad groups lie an almost infinite number of mixtures which can be specified to suit particular engineering requirements. Our latest testing equipment has therefore been developed to enable construction engineers and laboratory staff to carry out a wide range of industry standard tests quickly, simply and reliably.



Analysis & Binder Recovery

Ignition Method

Ever-increasing concern over the harmful, environmental effects of solvent-based asphalt extraction methods has led many countries to support the elimination of their use. The new Asphalt Binder Analyser from ELE International provides for an environmentally-friendly and cost-effective solution for determining asphalt content.

Asphalt Binder Analyser

Product Code: 46-6100/01

Product Standards:

EN 12697-39, ASTM D6307, AASHTO T308

Designed to measure the asphalt binder content of hot mix asphalt (HMA) using loss on ignition.

The integral microprocessor controlled weighing and calculation system is configurable to allow variations to the standard test method. Test result reports are available in both printed and software format. The high temperature afterburner minimises the production of noxious waste fumes. Supplied complete with 2 sets of sample baskets.

Features:

- Designed to measure asphalt binder content by loss on ignition.
- Avoids health, environmental and waste management issues.
- Avoids the expense associated with older solvent extraction methods.
- Reduced emissions due to high temperature afterburner.
- Controlled via a multi-lingual touchscreen interface.
- English, Spanish, French, Chinese, Italian and Russian language display.
- Other languages are available to order.
- Automatic calculation of final sample weight and binder % result.
- Adjustable aggregate correction factor.
- Average test times from 20 mins for 6 mm aggregates, to 45 mins for 40 mm aggregates.
- Permanent (dot-matrix) printed reports.
- USB data output compatible with most spread sheets.
- Easy naming, storage and recall of recipes that can be transferred between units.
- Simplified menu structure with secure ‘Supervisor’ and ‘Operator’ settings.
- Metal waste gas extraction pipe.
- Factory fitted thermocouple access port, if temperature calibration is to be carried out.
- Precise weight measurements, displayed to 0.1 g resolution.
- Capacity for large sample sizes for more accurate results (maximum sample is 4.5 kg).

Specifications	
Max Temp (°C)	750
Dimensions: Internal H x W x D (mm)	220 x 450 x 350
Dimensions: External H x W x D (mm)	980 x 600 x 775
Type	Bench-top
Thermocouple Type	K
Max Power (W)	8000
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Accessories:

Gloves (46-6100/10)

Face Shield (46-6100/11)

Asphalt Centrifuge Extractors

The Centrifuge Extractor is used to determine the quantitative amount of bitumen in bituminous paving mixtures whilst providing high safety to the operator.

- Continuously variable speed control from 0 to 3,600 rpm (1500 g capacity model).
- Brake control for rapid deceleration.
- Available in either 1500 g or 3000 g capacity models.

Rotatest 1500 & 3000

Product Codes: 45-3810/01, 45-3815/01

Product Standards:

EN 12697-1, ASTM D2172/D2172M, AASHTO T164

Centrifuge extractor used to determine the quantitative amount of bitumen in bituminous paving mixtures. Variable speed control from 0 to 3600 rpm through the front panel mounted control knob and brake control included for rapid deceleration.

Precision machined aluminium removable cover with integral cup for adding solvent, with sealed cast aluminium housing.

Further Information:

Supplied with 100 Filter Discs.
For 220 V AC, 50-60 Hz, 1 ph.

Specifications		
Dimensions H x W x D (mm)	508 x 305 x 559	
Cover	Precision-machined aluminium; removable, with integral cup for adding solvent	
Housing	Cast aluminium, sealed	
Bowl	Precision-machined aluminium; removable	
Filter Discs	100 included	
Product Code	**45-3810/01**	**45-3815/01**
Control	1500 g: Variable speed, 0-3600 rpm	3000 g: Variable speed, 0-2600 rpm
Weight (kg)	35	41

Accessories:

Desiccator - Non-vacuum (82-2100)
Evaporating Dish - 100 x 40 mm (82-1970)
Hotplate (78-2950/01)
Measuring Cylinder - Glass 100 ml (82-0380)
Measuring Cylinder - Glass 1000 ml (82-0500)
Sample Tray - 306 x 306 x 38 mm (81-4020)
Silica Gel (82-7091)
Volumetric Flask - 100 ml (82-1000)
Volumetric Flask - 1000 ml (82-1060)
Bowl 2.5 litre (81-5020)

Analysis & Binder Recovery

Rotatest Filter Disc Packs

Product Codes: 45-3803, 45-3807

Product Standards:

EN 12697-1, ASTM D2172/D2172M, AASHTO T164

Specifications

Product Code	45-3803	45-3807
Outer dia (mm)	248	295
Hole dia (mm)	44	44
Capacity (g)	1500	3000
Qty per Pack	100	100

Replacement Bowls for Rotatest 1500 & 3000 Centrifuge Extractors

Product Codes: 45-3810/10, 45-3815/10

Product Standards:

EN 12697-1, ASTM D2172, AASHTO T164

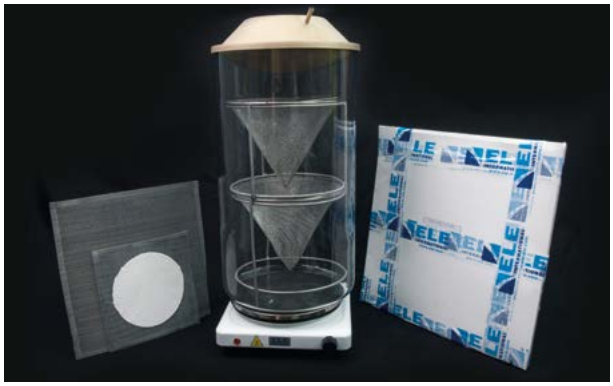
Specifications

Product Code	Capacity (g)
45-3810/10	1500
45-3815/10	3000

Reflux Extraction

Reflux Extractor

Product Code: 45-3855/01



Product Standards:

ASTM D2172/D2172M, AASHTO T164

- 4000 g capacity.
- Glass jar for visual observations.
- Thermostatically controlled hot plate.

The 4000 g capacity of the Reflux Extractor provides higher accuracy for acceptance testing procedures. This extractor has two cone type screens holding 2000 g each. The unit consists of two cone screens, water condenser, pyrex reflux jar, a thermostatically controlled hot plate and a supply of filter paper.

Specifications

Capacity (g)	4000
Baskets (2 included)	Stainless Steel wire, mounted; 2000 g capacity
Condenser	Copper
Jar - Pyrex Glass	280 mm dia x 510 mm height
Hot Plate	Thermostatically controlled
Hot Plate Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Filter Paper	Coarse-textured (Grade 617); 40 mm dia

Spares/Consumables:

Borosilicate Glass Jar (45-3855/14)

Reflux Extractor Filter Paper Packs

Product Code: 45-3857

Product Standards:

ASTM D2172/D2172M, AASHTO T164

Filter papers for 4000 g capacity reflux extractor. Coarse-textured at grade 617 and 400 mm diameter.

Specifications

Pack Qty	50

Asphalt & Bitumen Ovens

The ovens listed here are specifically designed for the testing of bitumen.

Loss on Heat/Thin-Film Oven

Product Codes: 46-4100/01, 46-4100/06

Product Standards:

EN 12607-2, BS 2000-460-2, EN 13303, ASTM D6/D6M, ASTM D1754/D1754M, AASHTO T47, AASHTO T179

The Thin-Film Oven is used for determining the loss in mass of oil and asphaltic/bituminous compounds when heated with the loss on heating test method or the effect of heat and air on semi-solid asphaltic/bituminous materials with the Thin-Film Oven (TFO) test method.

Features:

- The exterior is constructed from sheet steel finished in an easy clean powder-coated paint.
- Interior chamber is made from Stainless Steel.
- The unit is well insulated and has a double glass door for viewing the test chamber.
- The system is controlled by a microprocessor digital controller and overheat thermostat.
- Calibrated scale and tamper-proof lock.
- Temperature is controlled and pre-set at 163°C +/- 1°C.

Two rotating platforms of 13.5 inches diameter are supplied to perform both the tests. Side mounted controls comprise:

- Microprocessor digital control.
- Independent overheat thermostat.
- Mains switch.
- On/off switch for the turntable motor.
- Indicator lamps.

Specifications	
Max Temp (°C)	163
Dimensions: Internal H x W x D (mm)	380 x 520 x 460
Dimensions: External H x W x D (mm)	570 x 870 x 630
Insulation	Double wall
Internal Material	304 Stainless Steel
Turntable Speed (rpm)	5.5
Max Power (W)	1500
Product Code	**Power Supply**
46-4100/01	220-240 V AC, 50 Hz, 1 ph
46-4100/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Spare Turntable for loss on heat test (46-4100/10)

Spare Turntable for thin film test (46-4100/11)

Bitumen & Tar

Rolling Thin-Film Oven

Product Codes: 46-4150/01, 46-4150/06

Product Standards:

EN 12607-1, BS 2000-460-1, ASTM D2872, AASHTO T240

The Rolling Thin-Film Oven (RTFO) procedure provides simulated short term aged asphalt binder for physical property testing. Asphalt binder is exposed to elevated temperatures to simulate manufacturing and placement ageing. The RTFO also provides a quantitative measure of the volatiles lost during the ageing process. The exterior is constructed from sheet steel finished in an easy clean powder coated paint and the interior chamber is made from Stainless Steel. The control system comprises a microprocessor digital controller and overheat thermostat with calibrated scale and tamper-proof lock.

Specifications	
Max Temp (°C)	163°C ± 1°C (preset)
Dimensions: Internal H x W x D (mm)	380 x 480 x 440
Dimensions: External H x W x D (mm)	800 x 710 x 660 (Add 40 mm for door handle)
Insulation	Double wall
Internal Material	Grade 304 Stainless Steel
Max Power (W)	1500
Product Code	**Power Supply**
46-4150/01	220-240 V AC, 50 Hz, 1 ph
46-4150/06	220-240 V AC, 60 Hz, 1 ph

Features:

- Double wall construction with high density thermal insulation.
- Non-rusting grade 304 Stainless Steel interior.
- Easy clean powder painted steel exterior in light grey (RAL 7035) textured finish.
- Top mounted fan constructed with an air plenum as described in ASTM D2872.
- Fitted with a squirrel-type fan blade for better uniformity of air and temperature distribution.
- Equipped with air jet for blowing heating air into each bottle at its lowest point of travel.
- Base mounted elements.
- Vented to atmosphere.
- Single front opening, side hinged door with positive quarter turn latching mechanism.
- Double glazed window in door for viewing the test chamber.

Top mounted controls comprise:

- Dual display microprocessor digital control.
- Independent overheat thermostat.
- Mains switch.
- Flow meter to control air flow.
- Indicator lamps.
- 1500 watts.
- Supplied with built-in 305 mm diameter vertical circulator carriage for 8 sample containers.
- Glass samples rotate at 15 rpm ± 0.2 rpm (glass containers supplied separately).
- Temperature is controlled and pre-set at 163°C ± 1°C.

Required Accessory:

Glass Sample Container - Pack of 8 (46-4150/11)

Pressure Ageing Vessel

Pressure Ageing Vessel

Product Code: 46-5010/01

Product Standards:

EN 14769, ASTM 06521, AASHTO R28

The Pressure Ageing Vessel (PAV) is designed to simulate in-service oxidative ageing of asphalt binder by exposure to elevated temperatures in a pressurised environment.

- Includes a pressure relief valve and high-temperature thermal shut-down.
- Allows remote operation capabilities, and the user to completely control the PAV.
- Operating pressure range of 2.1± 0.1 mPa, and a temperature range of 80°C to 115°C, with resolution of 0.1°C.

Specifications

H x W x D (mm)	710 x 460 x 760
Weight (kg)	195
Power Supply	230 V AC, 50-60 Hz, 1 ph

Required Accessories:

Set of 10 Pans for Pressure Ageing Vessel (46-5010/10)

Pressure Ageing Vessel Calibration/Verification Kit (46-5010/11)

Sample Rack and Specimen Handling Tool for Pressure Ageing Vessel (46-5010/12)

Saybolt-Furol Viscosity

Saybolt Viscometer Two Place Unit with Furol & Universal Orifices

Product Code: 46-7003/01

Product Standards:

ASTM D88, ASSHTO T72

Used to determine the viscosity of petroleum products at specified temperatures between 70°F to 210°F. Stainless Steel made, the Saybolt Viscometer is supplied complete with two interchangeable orifices “Furol” and “Universal”, oil bath, electric heater with digital thermoregulator, stirrer, cooling coil, viscosity flask.

Thermometers, filter funnel and withdrawal tube are not included and must be ordered separately.

The Viscometer is equipped with a dual safety thermostat to prevent accidental over-heating.

Specifications

H x W x D (mm)	270 x 270 x 550
Weight (kg)	12
Power Supply	230 V AC, 50 Hz, 1 ph 500 W

Sampling & Preparation

Hubbard-Carmick Specific Gravity Bottles

Product Codes: 46-2190, 46-2191

Specifications

Product Code	Capacity (ml)
Conical Type (46-2190)	25
Cylindrical Type (46-2191)	24

Product Standards:

ISO 3838, ASTM D70, AASHTO T228

Design & Testing of Bituminous Mixtures

Mixing & Temperature

The density of Marshall specimens has a direct effect on stability and flow, therefore the correct moulding and compaction of laboratory specimens is essential if economical design mixes are to be produced.

Efficient mixing, temperature and compaction control are closely related. Poor coating of the aggregate due to low temperatures during the mixing process will have a major effect on subsequent test results.

Sample Mixers

A regular laboratory requirement is the mixing of samples with water and/or other constituents to provide a homogeneous mixture prior to subsequent testing. The following range of mixers provide an efficient means of mixing samples.

Bench-Mounting Mixer 4.7 Litre Capacity complete with Bowl, Beater & Whisk

Product Code: 23-6191/01, 23-6191/06

Mixer shown with Isomantle Electric Heater accessory.

Product Standards:

BS 598-107, BS 1377-1, BS 1924-1, EN 12697-35

The mixer has three electrically switched mixing speeds which obviates the need to switch off during speed selection. The mixing head comprises a beater which contra-rotates about a central shaft using planetary gearing. A lever-acting lifting device facilitates the insertion and removal of the bowl. This mixer is suitable for the mixing of soil samples, mortar, bituminous mixtures and associated materials where comparatively small samples are being prepared. Supplied with Stainless Steel bowl, beater and whisk.

Specifications	
Dimensions L x W x H (mm)	545 x 380 x 550
Beater Speeds (rpm)	Low 136, Med 281, High 580
Central Shaft Speeds (rpm)	Low 60, Med 124, High 255
Power Supply	220-240 V AC, 50 Hz, 1 ph
Rated Power	500 W
Weight (kg)	20.2
Product Code	**Power Supply**
23-6191/01	220-240 V AC, 50 Hz, 1ph
23-6191/06	220-240 V AC, 60 Hz, 1ph

Spares/Consumables:

Stainless Steel Bowl 4.7 litres (23-6191/10)

Accessories:

Isomantle Electric Heater (45-5580/01)

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Beater (23-6191/11)

Whisk (23-6191/12)

Compaction

The use of automatic compaction will result in consistent and repeatable laboratory specimens. Testing houses and design consultants who use the Marshall method of mix design will benefit from automatic compaction apparatus, which releases staff for other work during the compaction process.

Automatic Compaction

AutoComp 100-A

Product Code: 45-6600/01, 45-6600/06

Product Standards:

EN 12697-10, EN 12697-30, BS 598-107

- Fully automatic, simple to operate.
- Built-in safety features.
- Uniform compaction.
- Automatic blow counter.

This ruggedly constructed Automatic Compactor provides a consistent and even degree of compaction. The unit incorporates a compaction pedestal comprising a laminated hardwood block secured to a concrete base by a 300 mm square x 25 mm thick steel plate. The mechanism lifts the 4535 g hammer and automatically releases it at the specified height of 457 mm. The conveniently positioned control panel comprises a mains light, start and stop buttons and a direct-reading counter used to set the required number of blows. During operation the AutoComp 100-A automatically counts down to zero. Dual rammer pick-ups have been incorporated, reducing stress on the machine's internal mechanism. Particular attention has been paid to operator safety by the inclusion of various in-built safety features.

Specifications	
Dimensions L x W x H (mm)	535 x 535 x 1880
Compaction Foot dia (mm)	98.52
Sliding Weight (g)	4535
Height of Drop (mm)	457
Weight (kg)	278
Product Code	**Power Supply**
45-6600/01	220-240 V AC, 50 Hz, 1 ph
45-6600/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Counter (8438X0017)
Tongue Spring (1108A0037)
Tongue (1108A0033)
Hammer Assembly (1108B0030)
Motor Gear Unit 50 Hz (6031A0092)
Motor Gear Unit 60 Hz (6031A0092-06)
Terminal Block for Power Pack (1312B300A)
Hammer Face (1108A0032)
Rear Cooling Fan 50 Hz (45-6600/10)

Accessories:

Digital Hotplate (78-3104/01)
Paper Discs (45-6462)
Sample Tray 306 x 306 x 38 mm (81-4020)
Marshall Compaction Mould 4 inch (45-6625)
Compaction Mould (45-6310)
Steel Block (45-6463)

AutoComp 100-A Spares Kit

Product Code: 45-6600/K1

Automatic Asphalt Compactor Spares Kit 220 V

Design & Testing of Bituminous Mixtures

Manual Compaction

Compaction Mould

Product Code: 45-6310

Product Standards:

EN 12697-30, BS598-107, ASTM D6926, AASHTO T245

Compaction Mould comprising of mould body, baseplate and combined filling/extraction collar.

Specifications	
Weight (kg)	3.5

Spares/Consumables:

Compaction Mould Body (45-6310/10)

Baseplate (45-6310/11)

Filling/Extraction Collar (45-6310/12)

Compaction Hammer

Product Code: 45-6460

Product Standards:

EN 12697-30, BS 598-107, ASTM D6926, AASHTO T245

Satisfies BS 598. The hammer has a 4535 g sliding weight with a free fall of 457 mm.

Specifications	
Drop	18 inches (457 mm)
Tamping Face	3-7/8 inches (98 mm) dia
Hammer	10 lb (4.54 kg)
Construction	Machined steel; cast aluminium handle
Weight (kg)	7.85

Compaction Pedestal

Product Code: 45-6410

Product Standards:

EN 12697-30, BS 598-107

Comprising a 300 mm² x 25 mm thick steel plate complete with 4 tie rods and securing nuts. A mould clamp and hammer guide are fitted to the plate. The unit is supplied complete with a laminated hardwood block.

Specifications	
Weight (kg)	40

Manual & Automatic Compaction Accessories

Heating Bath 30 Litre

Product Code: 45-6550/01

Product Standards:

BS 598-107, EN 12697-30

Water Bath with LED display, cover and internal perforated shelf. Temperature range ambient to 60°C ± 5°C.
For 220–240 V AC, 50-60 Hz, 1 ph.

Will hold up to 12 Marshall Samples.

Proctor/Core Cutter Extruder

Product Code: 23-4200

Product Standards:

BS 598-107, BS 1377-1, EN 12697-30

Paper Discs

Product Code: 45-6462

Product Standards:

BS 598-107, EN 12697-30

Non-absorbent, 99 mm diameter - Pack of 100.

Steel Block

Product Code: 45-6463

Product Standards:

BS 598-107, EN 12697-30

100 mm diameter x 50 mm height. For heating the compaction hammer foot. Weight 3 kg.

Design & Testing of Bituminous Mixtures

Marshall Stability & Flow

The accurate measurement of stability and flow of specimens tested in a load frame is important if consistent and representative results are to be achieved. The load frames and ancillary items listed have been designed to enable technicians to test specimens quickly and easily with confident recording of results.

Marshall Load Frames

MultiPlex 50 Load Frame

Product Code: 25-3700/01

Compact bench mounting load frame designed for performing laboratory CBR, unconfined compression, consolidated drained, consolidated undrained and Marshall Stability tests. Has a variable speed of 0.5 to 50.8 mm per minute and features rapid approach of platen.

Specifications	
CBR Penetration	Yes
Unconfined Compression	Yes
Consolidated Undrained	Yes
Consolidated Drained	Yes
Marshall Stability and Flow	Yes
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Dimensions L x W x H (mm)	550 x 400 x 1470
Max Vertical Clearance (mm)	800
Horizontal Clearance (mm)	265
Platen dia (mm)	133
Platen Travel (mm)	100
Platen Speed Range	0.5 to 50.8 mm/min
Rapid Approach Speed	40 mm/min
Weight (kg)	100 (shipping 113 kg)

Product Standards:

Marshall

EN 12697-34, EN 12697-12, EN 12697-23, BS 598-107, ASTM D6927, ASTM D6931

CBR

EN 13286-47, BS 1377-4, ASTM D1883, AASHTO T193

Triaxial

BS 1377-7, BS 1377-8, ASTM D2166/D2166M, ASTM D2850, ASTM D4767, ASTM D7181, AASHTO T208, AASHTO T296, AASHTO T297

Spares Kit for MultiPlex 50 Load Frame

Product Code	Product
25-3700/K1	Spares kit for MultiPlex 50 Load Frame

Marshall Test 50

Product Codes: 45-6810/01, 45-6810/06

Product Standards:

EN 12697-34, EN 12697-12, EN 12697-23,
BS 598-107, ASTM D6927, ASTM D6931

This bench-mounting mechanical load frame is ruggedly constructed to encompass the strain and loads involved with the test. The unit is compact in size and can be quickly installed on a bench top, requiring only a power point.
It has been designed for simple operation, is easy to clean and requires minimal maintenance.

- Geared screwjack and motor drive.
- Precise speed.
- Internal limit switch for both directions of travel.
- Easy to use controls.

Further Information:

Load frame, 50 kN capacity. Supplied without breaking head. For 220-240 V AC, 50 Hz, 1 ph.

Specifications	
Marshall Stability and Flow	Yes
Product Code	**Power Supply**
45-6810/01	220-240 V AC, 50 Hz, 1 ph
45-6810/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Jack Sleeve (1871B0045)
Jack Screw (1729B0032)
Nut (1274A0017)
Worm Gear (1274B0014)
Spares Kit (45-6810/K)

Marshall test Accessories

Product Code	Product
45-6850	Breaking Head Stability Mould
45-6880	Flow Meter BS/EN
45-6890	Flow Meter ASTM
78-0860	Clamped Boss Load Ring 50 kN
47-0202	Digital Thermometer -50 to +1000°C
47-0202/10	Asphalt Needle Probe
45-6550/01	30 ltrs Heating Bath
27-1559	S-Type Load Cell 50 kN
45-6860	Lottman Breaking Head

Breaking Head Stability Mould

Product Code: 45-6850

Product Standards:

BS 598

Electronic Instrumentation

Flow Transducer

Product Code: 45-6820/11

Product Standards:

EN 12697-34,
ASTM D6927-15

S-Type Load Cell 50 kN

Product Code: 27-1559

Product Standards: EN 12697-34

Maximum working capacity of 50 kN and excitation 10 V AC/DC with an output of 2.7 mV/V nominal. Aluminium alloy and Stainless Steel construction with IP65 environmental protection. Fitted with 5-pin DIN plug.

Specifications	
Value of CBR %	ALL
Environmental Protection	IP65
Force Capacity (kN)	50

Design & Testing of Bituminous Mixtures

DSU Electronic Readout & Control System

Product Codes: 27-1300/01, 27-1300/02

The Data System Unit (DSU) is a versatile instrument designed to accommodate the general logging requirements of geotechnical and materials testing engineers. Its intelligent interface allows the user to work with a range of different sensors.

- 4 channel automatic control and data-logging unit.
- Automatic, dual-frame control.
- Performs CBR, Marshall, unconfined compression, direct and residual shear, one-dimensional consolidation and unconsolidated undrained tests.
- LAN connection - software can be running anywhere on your server.
- Never lose data from power failures.
- 2 GB of non-volatile memory.
- Extended warranty.

Features:

The DSU has two distinct modes of operation; DS mode (Data System) and DU Mode, for operation with ELE International's established DS7 geotechnical testing software where the unit can be used as a stand-alone device without PC connection.

DS Mode:

- Up to four one dimensional consolidation tests.
- Up to two CBR tests.
- One direct/residual shear test.
- One triaxial quick un-drained test.

DU Mode:

- Up to two Marshall tests.
- Up to two CBR tests.
- Up to two unconfined compression tests.
- Automatic frame control.

Overview:

- Touch Screen data entry for stand-alone operation, Marshall/CBR/quick un-drained.
- Automatic single and dual frame control (with multiplex 50 frame).
- Log memory of 2 GB.
- Non-volatile memory.
- Ethernet TCPIP link and serial comms support.
- Market leading signal stability.
- Certificate and manual calibration features.
- Comes with 27-1510 RS232/USB cable.
- Comes with 27-1300/11 cable, safety/10.
- Comes with 27-1300/12 PC cable.

Specifications

Product Code	Power Supply
27-1300/01	220-240 V AC, 50-60 Hz, 1 ph
27-1300/02	100-120 V AC, 60 Hz, 1 ph

Accessories:

Dual Frame Comms Cable (27-1300/10)

Ductility Testing Machine

Product Code: 46-4120

Product Standards:

EN 13398, ASTM D113, ASTM D6084, AA SHTO T51, EN 13589, EN 13703, AASHTO T300.

The Ductility Testing Machine is used to determine the ductility of bituminous materials in a briquette mould by measuring the breaking elongation at a constant speed of 50 mm/min. It is designed for testing 3 specimens simultaneously. The internal tank is made of Stainless Steel. The bath is fitted with an immersion heater in order to obtain (in normal conditions) the 25°C test temperature.

Specifications	
Dimensions L x W x H (mm)	300 x 1850 x 550
Capacity	3 specimens
Weight (kg)	80
Watts (W)	1000
Power Supply	220 V AC, 50-60 Hz, 1 ph
Load	3 x max 300 N Load Cells
Accuracy	± 0.1 N

Features:

The Ductility Testing Machine comprises a speed control and water circulator to maintain the homogeneous water temperature.

- Elongation measurement through the motor encoder.
- 3 simultaneous load measurements with 18-bit resolution.
- Speed control with servo AC motor between 0.01 to 100 mm/min.
- Ethernet connection for computer interface.
- Has 3 load cells with an accuracy of ± 0.1 N, with a maximum capacity of 300 N.
- Failure conditions can be downloaded to the unit.
- Cooling unit.
- Automatic control and data acquisition.

Accessories:

Briquette Mould ASTM/AASHTO (46-4120/10)

Base Plate for Briquette Mould (46-4120/11)

Specific Gravity

Vacuum Pyknometer Apparatus

Product Code: 45-9305/01

Product Standards:

EN 12697-5, ASTM D2041/D2041M, AASHTO T209

The Vacuum Pyknometer is a large capacity unit used in the Rice Test for determining the maximum specific gravity of bituminous paving mixtures. The Pyknometer has a total volume of approximately 10 litres and will conveniently accept samples of 6000 g to minimise segregation effects. The unit is constructed of lightweight polycarbonate, with the upper half being transparent for visual observation of the effects of the vacuum. The Vacuum Pyknometer Apparatus consists of a 6000 g pyknometer, vacuum pump with control valves/gauges, 1000 ml filter flask, water trap and connection tubing.

- Large capacity design minimises segregation effects.
- Lightweight polycarbonate construction.
- Transparent top for visual observations.

Further Information:

For 220-240 V AC, 50 Hz, 1 ph.

Specifications	
Dimensions (mm) (Outside dia x height)	273 x 406 (outside dia x height)
Capacity	Approx. 10 ltrs, 6000 g sample weight
Connections	Water inlet valve; quick disconnect for vacuum gauge and hose
Weight (kg)	3.6
Power Supply	220-240 V AC, 50 Hz, 1 ph

Spares/Consumables:

Filter Flask 1000 ml (82-2350), 1 metre Red Rubber Tubing (81-3310/10), Vacuum Pump (5020 x 0076)

Vacuum Pyknometer 6000 g

Product Code: 45-9300

Product Standards:

EN 12697-5, ASTM D2041/ D2041M, AASHTO T209

Specifications	
Capacity	Approximately 10 ltrs, 6000 g (13.2 lbs) sample weight
Construction	Lightweight polycarbonate with transparent upper half
Gauge	2 inches (50.8 mm) dia
Aspirator	Plastic; 3/8 inch pipe thread (included)
Connections	Water inlet valve; quick disconnect for vacuum gauge and hose
Dimensions	10-3/4 inches (273 mm) outside dia x 16 inches (406 mm) height
Weight	Net 8 lbs (3.6 kg)

Accessories: 1/4 inch outside diameter Plastic Tubing (45-9301/14), Drierite Desiccant (45-9315/14), Filtering Kit (45-9301)

Rice Test Vibrator

Rice Test Vibrator

Product Code: 45-9415/01, 45-9415/06

Product Standards:

EN 12697-5, ASTM D2041/ D2041M, AASHTO T209

The Rice Test Vibrator is used with the 45-9300 6000 g Vacuum Pyknometer. Adjustable clamps hold the pyknometer securely to the base during vibration.

Further Information:

For 220-240 V AC, 50 Hz, 1 ph.

Specifications	
Dimensions W x H x D (m)	0.31 x 0.51 x 0.31
Weight (kg)	12

Accessories:

Attachment required for 6000 g Pyknometer (45-9315/10)

Timer Clock

Product Code: 81-0518

Specifications	
Main Body Length, Arm, Operating Length (mm)	13 x 64 x 58

Flash & Fire Point

There are a number of test methods using different equipment with closed or open cups. The Cleveland Flash Cup Apparatus is used to test cutback bitumen and may sometimes also be used to test penetration grade bitumen. The apparatus utilises the Open Cup test method. Note that results from different methods cannot be correlated.

Cleveland Flash Cup Apparatus

Product Code: 46-3310/01

Product Standards:

ISO 2592 (EN 22592), BS 2000-36, ASTM D92, AASHTO T48

The ELE Semi-Automatic Cleveland Open Cup Flashpoint Tester is equipped with an electrically heated cup (with a variable control to set temperature rise rate), a button operated and electrically driven sweep arm and a test flame for use on natural gas. Bench mounted, the unit is incorporated in an easy to clean Stainless Steel case.

Further Information:

For 220-240 V AC, 50-60 Hz, 1 ph.

Specifications	
Size H x W x dia (mm)	330 x 310 x 290
Temperature Range	Ambient to 400°C
Power (W)	500 max
Ramp Rate	Variable, manually controlled
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Weight (kg)	6.5

Spares/Consumables:

Test Cup (46-3310/10)

Cryostat (-20°C) (46-3310/11)

Bitumen & Tar

Softening Point

The test is performed in duplicate under closely controlled conditions. Water is used as the bath medium for binders with softening points below 80°C. Above this temperature glycerol is used in place of water. The softening point is a fundamental property of binders other than cutbacks and emulsions. The test is often referred to as the Ring and Ball test.

Ring & Ball Apparatus

Ring & Ball Apparatus BS/EN

Product Code: 46-4605

Product Standards:

EN 1427, BS 2000-58, ASTM D36/D36M, AASHTO T53

To measure softening point with 2 shouldered pattern rings, 2 ball-centring guides and 2 balls. The apparatus has a support frame and is retained in a heat resistant container.

Specifications	
Weight (kg)	0.6

Accessories:

Electric Hotplate (46-4825/01)

Laboratory Thermometer (mercury free) (82-5272)
Range -10°C to +101°C x 0.2°C divisions

Laboratory Thermometer (mercury free) (82-5274)
Range -10°C to +210°C x 1°C divisions

Electrical Hotplate with Integral Magnetic Stirrer

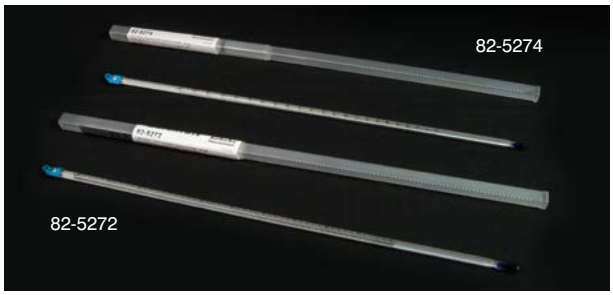
Product Code: 46-4825/01

Product Standards:

EN 1427, BS 2000-58

Utilises a rotating magnetic field to induce variable speed stirring action. A built-in regulating transformer provides fine temperature control of liquid up to a maximum temperature of +150°C. The unit is suitable for use with the Ring and Ball Apparatus.

Specifications	
Weight (kg)	2
Power Supply	220-240 V AC, 50-60 Hz, 1 ph



Thermometer

Product Code: 82-5272

Product Standards:

EN 1427, BS 2000-58

Mercury-free with a range of -10°C to +101°C and graduated every 0.2°C. Immersion up to 76 mm.

Specifications	
Temperature Range °C	-10 to +101

Thermometer

Product Code: 82-5274

Product Standards:

EN 1427, BS 2000-58

Mercury-free with a range of -10°C to +210°C and graduated every 1°C. Total immersion possible.

Specifications	
Temperature Range °C	-10 to +210

Penetration Test

Standard Penetrometer

Product Code: 46-5290

Product Standards:

EN 1426, BS 2000-49, EN 13179-2, ASTM D5/D5M, AASHTO T49

Penetration readings are quickly taken using this simple to operate apparatus. The 150 mm diameter dial is graduated in 400 divisions of 0.1 mm. Supplied without needles and penetration tins.

Further Information:

Model shown with sample container; not included, order separately.

Specifications	
Dial Indicator	6 inches (150 mm) dia
Plunger Weight (g)	47.5
Plunger Release	Manual mechanism
Weight	Net 18 lbs (8.2 kg)

Semi-Automatic Penetrometer

Product Code: 46-5295/01

Product Standards:

EN 1426, BS 2000-49, EN 13179-2, ASTM D5/D5M, AASHTO T49

As 46-5290 but incorporates Digital Automatic Controller which releases the needle assembly. The time set is displayed by a bright, easy to read display.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Penetration Needle

Product Code: 46-5340/C

Product Standards:

EN 1426, BS 2000-49, EN 13179-2, ASTM D5/D5M, AASHTO T49

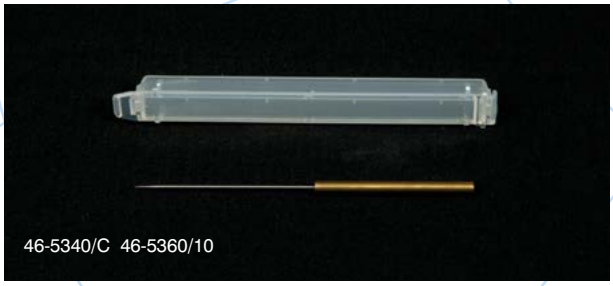
Hardened steel, supplied with a UKAS verification certificate. For testing to BS 2000-49 and ASTM D5. (Pack contains 1 needle only).

Specifications	
Weight (g)	2.5

Penetration Needle

Product Code: 46-5360/10

Unverified Hardened Steel



Bitumen & Tar

Constant Temperature Bath

Product Code: 46-5500/01

Accessories:

Separate Cooling Unit (46-5500/10).

Product Standards:

Conforms to Penetration Testing Standards.

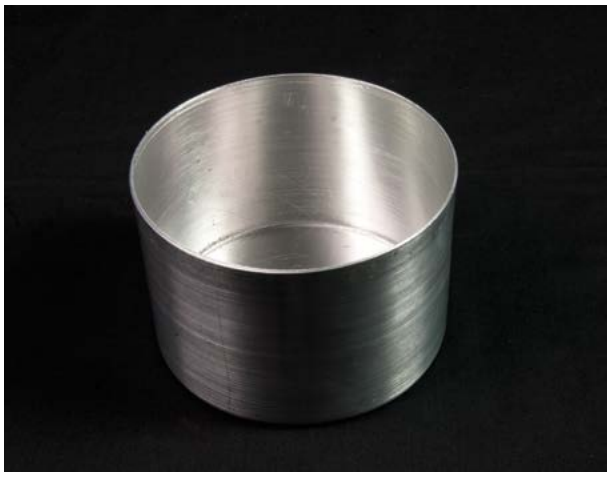
A bench mounting bath specially designed for the conditioning of bitumen samples prior to penetration tests. Incorporating a highly accurate thermostat, the bath maintains a temperature between 21°C and 56°C ± 0.1°C (at ambient). An integral cover and deep tray for penetration testing are supplied as standard.

Specifications	
Weight (kg)	11
Power Supply	220-240 V AC, 50 Hz, 1 ph

- Heater and circulation included.
- Cooling coil incorporated.
- Maximum temperature 100°C.
- Minimum temperature +2°C above water supply.
- Maximum fill volume 38 litres.
- External tank dimensions:
  490 x 335 x 255 mm (L x W x H).
- Internal tank dimensions:
  485 x 330 x 250 mm (L x W x H).

Transfer Dish

Product Code: 46-5800



Product Standards:

EN 1426, BS 2000-49, EN 13179-2, ASTM D5/D5M, AASHTO T49

For use with ELE Penetrometer 46-5295.

Specifications	
Weight (kg)	0.6

Penetration Tins (Two Sizes)

Product Codes: 46-5860/46-5861

Product Standards:

BS 2000-49, EN 1426, EN 13179-2, ASTM D5, AASHTO T49, IP 49

For penetrations up to 200, and between 200 and 350.

Specifications	
Product Code	**46-5860**
Dimensions (mm)	Approx 70 mm dia x 45 mm depth
Penetrations	Between 200 - 350
Weight (g)	30
Product Code	**46-5861**
Dimensions (mm)	Approx 55 mm dia x 35 mm depth
Penetrations	Below 200
Weight (g)	25

Gyratory Compaction

One of the best methods of laboratory compaction is considered to be Gyratory for not only the material's assessment of compactibility, but also the production of test samples. The method achieves this by the application of a vertical stress, typically 600 kPa via platens to a mass of asphaltic mixture inside a 100 or 150 mm diameter mould. Whilst platens are kept parallel and horizontal, the longitudinal axis of the mould is gyrated at a fixed angle to the vertical axis. During the test process, the height of the specimen is measured automatically and the mixture density and void content are calculated. Compaction data is displayed in real time (graphical and tabular) and is available for download to MS Excel™.

The operator has the ability to choose whether to compact for a certain number of gyrations or until a target mixture density or void content is achieved.

Applications:

- Compaction of asphaltic paving material to a target mixture density or void content.
- Assessment of mixture compactibility.
- SHRP Superpave asphalt mixture design.
- Preparation of cylindrical test specimens.

Gyratory Compactor includes PC

Product Codes: 45-6750/01, 45-6750/02, 45-6750/06

Product Standards:

EN 12697-31
EN 12697-10
ASTM D6925
SHRP M-002
AASHTO T312

Features:

- Configurable to comply with SHRP Superpave.
- Both 150 mm and 100 mm moulds can be tested without any modification.
- Automatic mould insertion and retraction.
- Cold mix (emulsion) materials can be compacted, with fluid collection facility.
- Data acquisition and control via host desktop PC.
- Export compaction data to MS Excel™.
- UKAS traceable factory calibration.
- Can accept moulds up to 300 mm in height.

Product Specification:

- High stability steel frame with low flex and distortion.
- A 95 mm pneumatic cylinder.
- Safety gates with interlock.
- Specimen table.
- Accurate stress control via high precision regulator.
- High quality inverter for accurate speed control.
- Specimen height measurement via linear potentiometer.
- Highly durable wheels for ease of movement.
- 16 bit control and data acquisition.

Software:

- User-friendly, intuitive and reliable Windows™ software.
- 2 methods of compaction - number of gyrations and target density.
- User guided step-by-step through compaction.
- Real-time display of current height, density and void content.
- Software communicates with the gyratory compactor via USB interface.
- Utilities included for transducer check, diagnostic routines and calibration.

Specifications	
Stress (kPa)	600 nominal, 1000 max
Mixture Types	Wet and Dry
Machine Speed	30 rpm
Angle of Gyration	0.2 to >2°
Electrical Supply	220-240 V AC, 50 Hz
Sample Sizes (mm)	100 and 150 dia
Compressed Air Supply	7-10 bar, 350 L p/m
Dimensions L x W x H (mm)	790 x 995 x 1920
Product Code	**Power Supply**
45-6750/01	220-240 V AC, 50 Hz, 1 ph
45-6750/02	110-120 V AC, 60 Hz, 1 ph
45-6750/06	220-240 V AC, 60 Hz, 1 ph

Gyratory Compaction

Gyratory Compactor Moulds

Used for preparation of compaction tests.

Product Code	Product	Sample dia
45-6750/10	Mould and Platens	100 mm
45-6750/12	Mould and Platens	150 mm
45-6750/15	Mould and Platens slotted for emulsion mix	150 mm
45-6750/20	Mould and Platens slotted for emulsion mix	100 mm
45-6750/21	Mould and Platens for specimen temperature measurement	150 mm
45-6750/22	Filter Papers (pack of 100)	150 mm
45-6750/23	Mould and Platens for specimen temperature measurement	100 mm
45-6750/24	Filter Papers (pack of 100)	100 mm
45-6750/25	Spacer to compact 63 mm height	100 mm
45-6750/26	Spacer to compact 63 mm height	150 mm
45-6750/27	Split Mould	100 mm

Gyratory Compactor Accessories

Product Code	Product
45-6710	Automatic Specimen Extruder
45-6715	Manual Specimen Extruder
45-6750/11	Calibration Kit for internal angle lead
45-6750/13	Internal angle measuring device
45-6750/14	Internal angle measuring device with hot mix simulator
45-6750/16	Option for 300 mm mould height (cannot be retro-fitted)
45-6750/17	2° angle plate
45-6750/18	Shear Force Display
45-6750/19	Specimen Temperature Measurement
45-6750/28	Air Compressor

Compact Core Drill Machine

This compact and portable core drilling machine is designed to cut cores up to 200 mm diameter from concrete, asphalt and similar hard construction material.

Compact Core Drill

Product Code: 47-6175

Product Standards:

EN 12697-27

This machine is designed to cut cores up to 150 mm diameter from concrete, asphalt and similar hard construction materials. It comprises a vertical support column which carries the drill head/motor assembly. The motor assembly comprises a 6.5 hp petrol engine, a ball screw mechanism enables close control of the drilling pressure and rapid return when drilling is completed. A water spraying assembly is mounted on the machine. The complete assembly is supplied on a rigid wheel mounted metal base frame with levelling and fixing facility during operation.

Core Barrels are available to order separately.

Further Information:

Special Note: Requires a continuous clean water supply via a 12 mm flexible hose (not supplied).

Core Barrels

Suitable for use with the Compact Core Drilling Machine, this range of core barrels comprise a thin-wall tube 450 mm long with a series of cutting segments formed from diamond abrasive set in a specially formulated hard matrix. The cutting face has been carefully designed to remove material rapidly and obtain the highest possible drilling rates. The solid back end includes a threaded fitting to connect to the water-swivel assembly of the core drill.

Core Barrel (Five Sizes)

Specifications

Product Code	Dia (mm)
47-5515	50
47-5525	75
47-5565	100
47-5605	150
47-5705	200

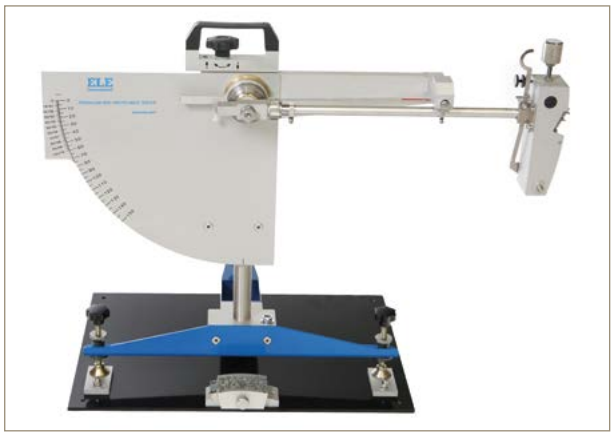
Pavement

Skid Resistance Testing

The Pendulum Skid Resistance Tester was originally designed in the 1940s in the USA, and further developed in the 1960s at the TRL (Transport Research Laboratory) for the testing of road surfaces. The device measures the frictional resistance between a rubber slider mounted on the end of a pendulum arm and the surface to be tested. This provides road engineers with a method of checking the resistance of wet and dry surfaces to slipping and skidding, both in the laboratory and in-situ. It operates by a pendulum rotating about a spindle which is attached to a vertical pillar. At the end of the tubular arm a head of known mass is fitted with a rubber slider. The pendulum is released from a horizontal position so that it strikes the sample surface at a constant speed. The distance travelled by the head after hitting the sample is determined by the friction of the sample surface.

Pendulum Skid Resistance Tester

Product Code: 42-6000



Product Standards:

EN 1097-8, EN 13036-4, EN 1436, BS 812-114, BS 7188, BS 7976-1, EN 14231, ASTM E303, EN 1341, EN 1342, EN 1338

Further Information:

Applications:

- Assessment of surface friction and skid resistance properties.
- Testing of aggregates in the PSV (Polished Stone Value) test.
- Testing of new road surface materials.
- Testing of pedestrian pavements.
- RTA (road traffic accidents).
- Litigation investigations.
- Designed for laboratory and on site road surface testing.
- Factory calibrated to EN 1097-8.
- Low friction arm and lightweight pointer.
- Supplied with 'F' scale for use with small slider set for 76 mm slide length (PSV test).
- Highly repeatable.
- Supplied with carrying case and tool kit.

Specifications	
Dimensions W x D x H (mm)	695 x 295 x 695
Volume (m^3)	0.15
Weight (kg)	30

Spreader Feet for Skid Resistance Tester for In-Situ Testing Set of 3

Product Code: 42-6000/10

Skid Resistance Tester Base Plate for Laboratory Testing

Product Code: 42-6200

Rubber Mounted PSV Slider

Slider for polished stones for use with Pendulum Skid Resistance Tester (42-6000)

Product Code	Product
42-6000/11	1.25 inches Rubber Mounted PSV Slider
42-6000/12	3 inches Rubber Mounted TRL (55) Slider
42-6000/13	3 inches Rubber Mounted Four S (96) Slider
42-6000/14	3 inches Rubber Mounted CEN Slider
42-6000/15	First Traceable Calibration for Pendulum Skid Resistance Tester

Surface Regularity

Benkelman Beam

- Lightweight construction.
- Compact, telescopic design.
- Direct reading of deflection.
- Anti-vibration system.
- Fully extended operating length 3.7 metres.

Designed for maximum operator efficiency, the Benkelman Beam is manufactured from a lightweight, durable material which telescopes into a small, compact unit for ease of storage and transport.

Benkelman Beam

Product Code: 47-1460

Product Standards:

AASHTO T256

Further Information:

Complete with Dial Gauge 25 mm travel x 0.01 mm divisions.

Specifications	
Open Length (ft)	12
Beam Fulcrum Ratio	2:1
Weight (kg)	15.9
Main Body	55 inches (1397 mm) long, black finish aluminium
Probe Beam	Aluminium, 8 ft (2.4 m) long, telescopes into case for storage
Probe Fulcrum	Ball pivot bearing, gives lever ratio of 2:1
Vibrator System	Operating switch mounted on top of instrument section (requires 4 “D” size batteries)
Levelling Wheel	Adjusts beams to proper elevation

Spares/Consumables:

Dial Gauge 25 mm Travel x 0.01 mm Divisions (83-5416)

Travelling Beam Device

Travelling Beam Device

Product Code: 47-3020

The 3 metre long Travelling Beam Device is used to check for any irregularities in both concrete and bituminous road surfaces. A sensing unit comprising a wheel connected to an indicator provides a magnification of 4:1. Deviation of the surface from a straight-line is shown on a scale calibrated in increments of 2 mm up to 10 mm and 5 mm up to 25 mm. A dye-marker is fitted which may be used to identify suspect areas. Outrigger wheels provide mobility on site. The device is supplied as three sub-assemblies which are quickly assembled on site. The Travelling Beam is supplied fitted with an autographic recorder providing a permanent record of the surface profile. Records of up to 1 kilometre can be recorded on the special chart paper rolls used.

Specifications	
Weight (kg)	66

Spares/Consumables:

Fibre-Tipped Pen (47-3131)

Autographic Recorder (35-3100)

Accessories:

Charts for Autographic Recorder - Pack of 10 (47-3130)

Pavement

Surface Dressing

The main purpose of a surface dressing is to prevent weathering, disintegration of the pavement and to increase the resistance to skidding in wet weather. The rate of spread and application of the chippings and binder is specified for most applications. Test methods have been developed to determine the actual rate of spread and are described in British Standards.

Rate of Spread of Coated Chippings

The equipment comprises a tray 300 mm square which, when used in conjunction with a specially graduated spring balance, will determine the rate of spread of coated chippings in terms of kg/m^2.

The spring loaded balance will accept rates of spread between 4 and 16 kg/m^2.

Between 5 and 10 trays are positioned in the path of the spreading machine and after the machine has passed over, each tray is lifted, together with the retained chippings, by means of four chains. The chains are hooked to the spring balance and the rate of spread is read directly from the balance scale.

Tray & Chains

Product Code: 47-0012

Product Standards:

EN 12272-1, BS 598-108

Comprising one 300 mm square tray and four chains.

Spring Balance

Product Code: 47-0011

Product Standards:

EN 12272-1, BS 598-108

Specifications	
Weight (kg)	0.8

Percentage Refusal Density (PRD)

Percentage Refusal Density (PRD) is defined as the ratio of the initial dried bulk density of the sample to the final density (refusal density) expressed as a percentage.

PRD Split Mould & Baseplate

Product Code: 47-0450

Product Standards:

EN 12697-32, BS 598-104

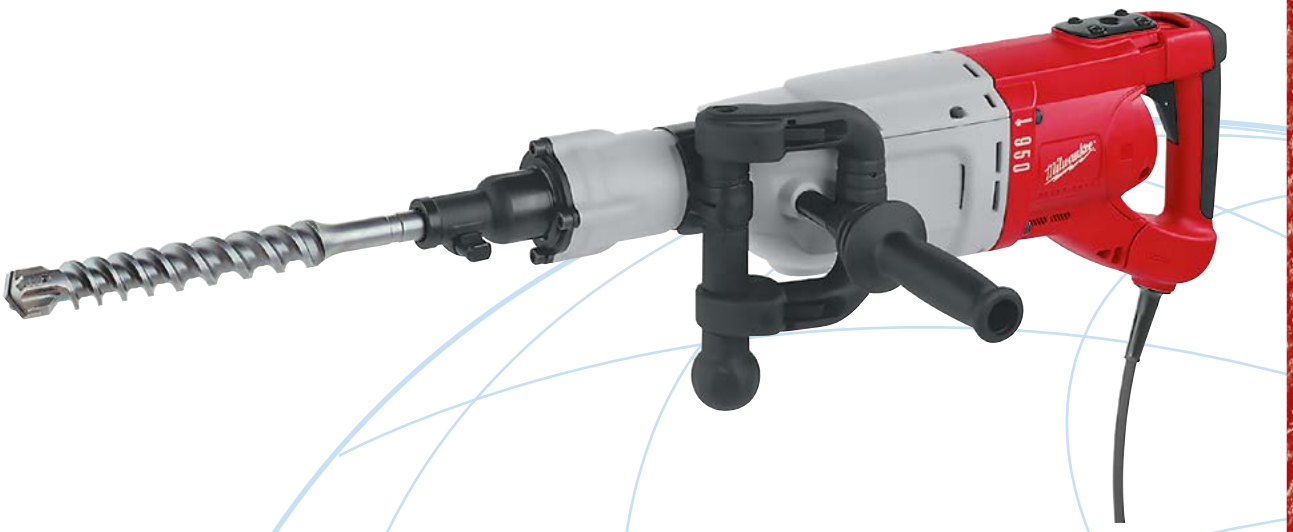
Specifications	
Weight (kg)	10.7

Spares/Consumables:

Base Plate (47-0450/10)

Vibrating Hammer

Product Code: 47-0455/01



Product Standards:

EN 12697-32, BS 598-104

Suitable for compacting asphalt samples.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph

Accessories:

Small Tamping Foot 102 mm (47-0460)

Large Tamping Foot 146 mm (47-0470)

300 mm Shank only (47-0480/80)

300 mm Shank complete with Tamping Feet 102 mm and 146 mm diameter (47-0480)

Temperature & Density

Drying Ovens

Product Codes: 78-1215/01, 78-1225/01, 78-1235/01, 78-1250/01, 78-0135/01, 78-0140/03

225 litre two door and 100 litre single door shown in image.

Product Standards:

EN 12697-32, BS 598-104

This range of bench mounted ovens is designed to perform most materials testing requirements and is an ideal general purpose oven.

The ovens are constructed of mild steel with a powder coated exterior and an aluminium coated steel chamber which is both durable and corrosion resistant. The control system comprises a microprocessor digital controller with overheat safety system. They also include a main switch with indicator and heat and overheat indicators.

Specifications

Product Code	78-1215/01	78-1225/01	78-1235/01	78-1250/01	78-0135/01	78-0140/03
Capacity (ltrs)	50	100	150	225	425	750
Temp Fluctuation (°C)	+0.75°C	+0.75°C	+0.75°C	+/- 0.75°C	+0.75°C	+/- 0.75°C
No. of Doors	1	1	1	2	2	2
No. of Shelves Supplied	2	3	3	3	4	5
No. of Shelf Positions	3	4	5	4	5	8
Internal Dimensions L x W x H (mm)	330 x 490 x 330	450 x 490 x 450	550 x 490 x 530	540 x 920 x 440	760 x 920 x 640	1060 x 920 x 770
External Dimensions L x W x H (mm)	590 x 610 x 470	710 x 610 x 600	810 x 610 x 680	940 x 1090 x 570	970 x 1410 x 810	1420 x 1570 x 950
Temp Range (°C)	40-250°C	40-250°C	40-250°C	0-200°C	0-200°C	0-200°C
Rated Power Heater Elements (W)	750	1000	1500	2000	3000	6000
Weight (kg)	26	44	60	80	120	200
Power Supply	220-240 V AC, 1 ph	220-240 V AC, 1 ph	220-240 V AC, 1 ph	220-240 V AC, 1 ph	220-240 V AC, 1 ph	415 V 50-60 Hz 3 ph

Buoyancy Balance

Buoyancy Balance

Product Code: 34-8100/09

Product Standards:

EN 12390-7 (BS 1881-114), EN 12697-6, EN 1097-6, BS 812-2, ASTM C127, AASHTO T85

Buoyancy Balance 16 kg x 0.1 g auto density calculation. Supplied with frame, water tank and suspension hook. Cradle supplied separately.

Specifications	
Power Supply	110-240 V AC, 50-60 Hz, 1 ph

Spares/Consumables:

Tank 4 gallon capacity (9004X0058)

Buoyancy Balance Cradle

Product Code: 34-8105

Product Standards:

EN 12390-7 (BS 1881-114)

Specifications	
Weight (lbs)	1.5

Paraffin Wax

Product Code: 82-7031

5 kg Block, melting point 50°C-54°C

Temperature & Density

Temperature & Density

Delivery and compaction temperatures are probably the most common measurements taken during the placing of bituminous mixtures.

Digital Asphalt Thermometer

Supplied without probes the LCD display has large 12.5 mm characters and is powered by a standard PP3 battery or equivalent.

Asphalt Probe

Product Code: 47-0202/10

Product Standards:

BS 2000-49, EN 1426, EN 13179-2, ASTM D5, AASHTO T49, IP 49

A heavy-duty and reinforced needle probe, built with a t-shaped polyethylene handle.

Specifications

Product Code	47-0202/10	47-0202/11
Product	250 Probe	535 Probe
Max Temperature (°C)	250	250
Probe length (mm)	300	500
Tip dia (mm) Needle Point	6	6

Surface Probe

Product Code: 47-0202/14

130 mm long Ribbon-Type surface probe with a maximum tip temperature of 500°C.

Product Standards:

BS 2000-49, EN 1426, EN 13179-2, ASTM D5, AASHTO T49, IP 49

Specifications

Max Temperature (°C)	500
Probe length (mm)	100
Tip dia (mm) Needle Point	4

Digital Asphalt Thermometer

Product Code: 47-0202

Product Standards:

BS 2000-49, EN 1426, EN 13179-2, ASTM D5, AASHTO T49, IP 49

Comprises a hand-held digital thermometer with an operating range of -99°C to +1372°C with a switchable resolution between 0.1°C and 1.0°C. Operates on a 9 V battery and utilises K-type thermocouple sensors.

Further Information:

- Power Off: Auto Power off after 10 minutes.
- Battery Life: 5 year battery life with 3 x AAA batteries.
- Function: Hold function freezes current value.
- Calibration: Includes traceable calibration certificate.
- Accuracy: ±0.4°C.

Specifications

Temperature Range (°C)	-99 to 1372
Resolution (°C)	Switchable between 0.1 and 1.0 (after 300°C)
Weight (g)	130

Quantitative Extraction of Bitumen. Centrifuge Extractor Method.

Standard(s)	EN 12697-1	
Product Code	**Product**	**Qty**
45-3800/01	Rotatest 1500 220-240 V AC, 50-60 Hz, 1 ph supplied with 100 Filter Discs	1
78-1300/01	Drying Oven 50 ltr capacity 1 Year Warranty 220-240 V AC, 50-60 Hz, 1 ph	1
78-6020/01	6 kg x 0.1 g Balance	1
81-4020	Sample Tray 306 x 306 x 38 mm	4
82-1000	Volumetric Flask 100 ml capacity with Stopper	1
82-1060	Volumetric Flask 1000 ml capacity with Stopper	1
82-2100	Non-Vacuum Desiccator 200 mm internal dia	1
82-7091	Silica Gel 2.5 - 6.0 mm Qty 500 g	1
Also required for determination of residual mineral matter by incineration		
78-2950/01	200 mm dia Hotplate 220-240 V AC, 50-60 Hz, 1 ph with Simerstat	1
78-6000/01	Electronic Top Loading 200 g at 0.001 g Balance	
81-5020	Bowl 2.5 ltr capacity Stainless Steel	1
82-0380	Measuring Cylinder 100 ml	
82-0500	Measuring Cylinder 1000 x 10 ml Soda Glass Spouted BS 604	2
82-1970	Evaporating Dish 100 mm dia x 40 mm depth	1
83-4140/01	Muffle (Ashing) Furnace with Digital Control PID 1100°C max temp	1

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Determination of Particle Size Distribution

This test method determines the particle size distribution of aggregates of bituminous mixtures using test sieves. The test method is suitable for aggregates recovered after binder extraction in accordance with EN 12697-1.
Note: Fibres, solid additives and binder modifiers can influence test results.

Standard(s)	EN 12697-2	
Product Code	**Product**	**Qty**
78-1320/01	Drying Oven 220 ltr capacity. Fan circulated. Supplied with 4 Shelves. 1-Year Warranty	1
78-6000/01	Electronic Top Loading 200 g Balance Readability 0.001 g	1
78-6020/01	Electronic Top Loading 6 kg Balance Readability 0.1 g	1
78-6040/01	Electronic Top Loading 30 kg Balance Readability 1 g	1
79-0010	200 mm dia Lid	1
79-0020	200 mm dia Receiver	1
79-0070	200 mm dia BS Sieve 63 Mic Stainless Steel Mesh	1
79-0110	200 mm dia BS Sieve 125 Mic Stainless Steel Mesh	1
79-0150	200 mm dia BS Sieve 250 Mic Stainless Steel Mesh	1
79-0190	200 mm dia BS Sieve 500 Mic Stainless Steel Mesh	1
79-0230	200 mm dia BS Sieve 1 mm Stainless Steel Mesh	1
79-0270	200 mm dia BS Sieve 2 mm Stainless Steel Mesh	1
79-1500	200 mm dia BS Sieve 4 mm Perforated Plate	1
79-1540	200 mm dia BS Sieve 8 mm Perforated Plate	1
79-2010	300 mm dia Lid	1
79-2020	300 mm dia Receiver	1
79-2580	300 mm dia BS Sieve 16 mm Perforated Plate	1
79-2630	300 mm dia BS Sieve 31.5 mm Perforated Plate	1
79-2670	300 mm dia BS Sieve 63 mm Perforated Plate	1
79-2710	300 mm dia BS Sieve 125 mm Perforated Plate	1
79-7210	Sieve Brush double-ended, Nylon	3
80-0200/01	ELE Sieve Shaker complete with separate Control Panel 220-240 V AC, 50 Hz, 1 ph	1
81-4030	Sample Tray 406 x 406 x 50 mm	4

Determination of Bulk Density of Compacted Bituminous Specimen

The test methods are for use with laboratory compacted specimens or specimens from cores taken from pavement after laying and compacting.

Standard(s)	EN 12697-6	
Product Code	**Product**	**Qty**
34-6122/01	Melting Pot 4 ltr capacity. 50°C to 300°C temperature range. 220-240 V AC, 50-60 Hz, 1 ph	1
42-1000/01	Buoyancy Balance 6 kg x 0.1 g supplied with Support Frame Water Tank and Suspension Hook	1
42-1005	Wire Basket Brass with Handle nominal 6000 cm^3 capacity with 1.7 mm Wire Mesh	1
45-6550/01	30 ltr Heating Bath with LED Display Cover	1
81-0590	Vernier Caliper (LCD) range 0 to 200 mm x 0.01 mm	1
82-5420	Digital Pocket Thermometer -49.9°C to +199.9°C	1
82-7031	Paraffin Wax in 5 kg Block Melting Point 50°C to 54°C	5

Test Method for Moulding Specimens from Bituminous Mixtures by Impact Compaction

The test method is suitable for bituminous mixtures with a maximum aggregate size of 22.4 mm.

Standard(s)	EN 12697-30	
Product Code	**Product**	**Qty**
45-6310	Compaction Mould BS/EN/AASHTO including Filling/Extraction Collar Mould Body and Baseplate	6
45-6462	Paper Discs Pack of 100	3
45-6463	Steel Heating Block	1
45-6600/01	AutoComp 100A Automatic Marshall Compactor BS 598-107 for 220-240 V AC, 50 Hz, 1 ph	1
78-3104/01	Hotplate digital temperature indication 0-300°C 300 x 500 mm heating area. 220-240 V AC, 50 Hz, 1 ph	1
81-4020	Sample Tray 306 x 306 x 38 mm	3
Alternative hand compaction method.		
45-6310	Compaction Mould BS/EN/AASHTO including Filling/Extraction Collar Mould Body and Baseplate	6
45-6410	Compaction Pedestal to BS 598 fitted with Mould Clamp and Hammer Guide	1
45-6460	Compaction Hammer	1
45-6462	Paper Discs Pack of 100	3
45-6463	Steel Heating Block	1
78-3104/01	Hotplate digital temperature indication 0-300°C 300 x 500 mm heating area 220-240 V AC, 50 Hz, 1 ph	1
81-4020	Sample Tray 306 x 306 x 38 mm	3

Methods of Test for the Determination of Density & Compaction. The Percentage Refusal Density Test.

Standard(s)	EN 12697-32	
Product Code	**Product**	**Qty**
34-6122/01	Melting Pot 4 ltr capacity 50°C to 300°C temperature range 220-240 V AC, 50-60 Hz, 1 ph	1
34-8100/09	Buoyancy Balance 16 kg x 0.1 g auto density calculation 110-240 V AC, 50-60 Hz, 1 ph	1
34-8105	Cradle for Concrete Cubes to 150 mm and Cylinders	1
47-0202	Digital Thermometer -50°C to +1000°C supplied without Probes	1
47-0202/10	Asphalt Needle Probe 300 mm long 250°C max temperature	1
47-0450	Split Mould and Base Plate for PRD to BS 598	6
47-0455/01	Vibrating Hammer 220-240 V AC, 50-60 Hz, 1 ph	1
47-0460	Small Tamping Foot 102 mm dia for PRD to BS 598	1
47-0470	Large Tamping Foot 146 mm dia for PRD to BS 598	1
47-0480	300 mm Shank complete with Tamping Feet 102 mm and 146 mm dia	2
78-1250/01	Drying Oven 225 ltr capacity. Fan circulated. Supplied with 4 Shelves. 1-Year Warranty	1
81-0140	Spatula 200 mm	1
81-0518	Timer Clock	1
81-0590	Vernier Caliper (LCD) range 0 to 200 mm x 0.01 mm	1
81-0805	Engineers' Steel Rule 300 mm	1
82-7031	Paraffin Wax in 5 kg Block Melting Point 50°C to 54°C	4
82-7901	Filter Paper No 74 equivalent to Whatman No 40 150 mm dia Box of 100	1

Determination of Stability, Flow & Marshall Quotient Values of Specimens of Bituminous Mixtures

The test method is for specimens of bituminous mixtures mixed according to EN 12697-32 and is limited to dense graded asphalt concrete and hot rolled asphalt.

Automatic recording

Standard(s)	EN 12697-34	
Product Code	**Product**	**Qty**
23-4200	Proctor/Core Cutter Extruder Frame and Hydraulic Jack Extrudes 100 mm/4 inch dia Specimens	1
27-1300/01	DSU Electronic Data Acquisition and Control System	1
27-1559	S-Type Load Cell 50 kN for CBR or Marshall Tests fitted with 5-pin DIN plug	1
45-6550/01	30 ltr Heating Bath with LED Display Cover and internal Perforated Shelf	1
45-6810/01	Marshall Test 50 Machine 50 kN capacity 220-240 V AC, 50 Hz, 1 ph	1
45-6820/11	Flow Transducer 10 mm pre-calibrated	1
45-6850	Breaking Head Stability Mould	1
47-0202	Digital Thermometer 50 mm dia Dial 0°C to +1000°C	1
47-0202/10	Asphalt Needle Probe 300 mm long 250°C max temperature	1
78-1215/01	Drying Oven 50 ltr capacity 220-240 V AC, 50-60 Hz, 1 ph	1
Also required:		
Determination of bulk density of compacted bituminous specimen EN 12697-6		
Test method for moulding specimens from bituminous mixtures by impact compaction EN 12697-30		

Determination of Stability, Flow & Marshall Quotient Values of Specimens of Bituminous Mixtures

Manual recording

Standard(s)	EN 12697-34	
Product Code	**Product**	**Qty**
23-4200	Proctor/Core Cutter Extruder Frame and Hydraulic Jack Extrudes 100 mm/4 inch dia specimens	1
45-6550/01	30 ltr Heating Bath with LED Display Cover and internal Perforated Shelf	1
45-6810/01	Marshall Test 50 Machine 50 kN capacity 220-240 V AC, 50 Hz, 1 ph	1
45-6850	Breaking Head Stability Mould	1
45-6880	Flow Meter (Dial Gauge) BS supplied complete with Flow Meter Pedestal	1
47-0202	Digital Thermometer -50°C to +1000°C supplied without Probes	1
47-0202/10	Asphalt Needle Probe 300 mm long 250°C max temperature	1
78-0860	50 kN Clamped Boss Load Ring complete with Dial Gauge and Calibration Certificate Height 248 mm	1
78-1215/01	Drying Oven 50 ltr capacity 1 Year Warranty 220-240 V AC, 50-60 Hz, 1 ph	1
Also required:		
Determination of bulk density of compacted bituminous specimen EN 12697-6		
Test method for moulding specimens from bituminous mixtures by impact compaction EN 12697-30		
Test method for laboratory mixing of bituminous mixtures for the manufacture of specimens EN 12697-35		

Test Method for Laboratory Mixing of Bituminous Mixtures for the Manufacture of Specimens

Standard(s)	EN 12697-35	
Product Code	**Product**	**Qty**
23-6191/01	Bench-Mounting Mixer 4.7 ltr capacity complete with Bowl Beater and Whisk 220-240 V AC, 50 Hz, 1 ph	1
45-5580/01	Isomantle Electric Heater for use with 5 ltr Bowl and 23-6191 series Bench Mounting Mixer	1
47-0202	Digital Thermometer -50°C to +1000°C supplied without Probes	1
47-0202/10	Asphalt Needle Probe 300 mm long 250°C max temperature	1
78-1300/01	Drying Oven 50 ltr capacity 1 Year Warranty 220-240 V AC, 50-60 Hz, 1 ph	1
78-3104/01	Hotplate Digital Temperature Indication 0-300°C 300 x 500 mm heating area 220-240 V AC, 50 Hz, 1 ph	1
78-6020/01	Electronic Top Loading 6 kg x 0.1 g Balance	1

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Determination of Ash Content of Bitumen

Standard(s)	BS 4450, ASTM D482	
Product Code	**Product**	**Qty**
81-0480	Crucible Tongs straight 200 mm	1
81-0508	Heat Resistant Gloves with Gauntlet	1
82-3320	Porcelain Crucible 30 ml supplied with Lid	1
82-3325	Porcelain Lid for 82-3320	1
83-4170/01	Muffle (Ashing) Furnace with Digital Control PID 1200°C max temperature	1
Also required:		
78-2950/01	200 mm dia Hotplate 220-240 V AC, 50-60 Hz, 1 ph with Simerstat	1
78-6010/01	Electronic Top Loading 1200 g x 0.01 g Balance	1

Determination of Flash Point by Cleveland Open Cup Method

Standard(s)	BS 4689, ASTM D92	
Product Code	**Product**	**Qty**
46-3310/01	Cleveland Flash Cup Apparatus; Open Cup, electrically operated with Gas Flame 220-240 V AC, 50 Hz, 1 ph	1

Determination of Softening Point Ring & Ball Method

Standard(s)	EN 1427, BS 2000-58	
Product Code	**Product**	**Qty**
46-4605	Ring and Ball Apparatus	1
46-4825/01	Electrical Hotplate with integral Magnetic Stirrer 220-240 V AC, 50-60 Hz, 1 ph	1
82-5261	Thermometer (IP60C) Total Immersion -2°C to 80°C	1
82-5263	Thermometer (IP61C) Total Immersion 30°C to 200°C	1
82-5265	Thermometer (IP89C) -1°C to +175°C to BS 5094 and ASTM D2398 total immersion	1

Determination of Penetration

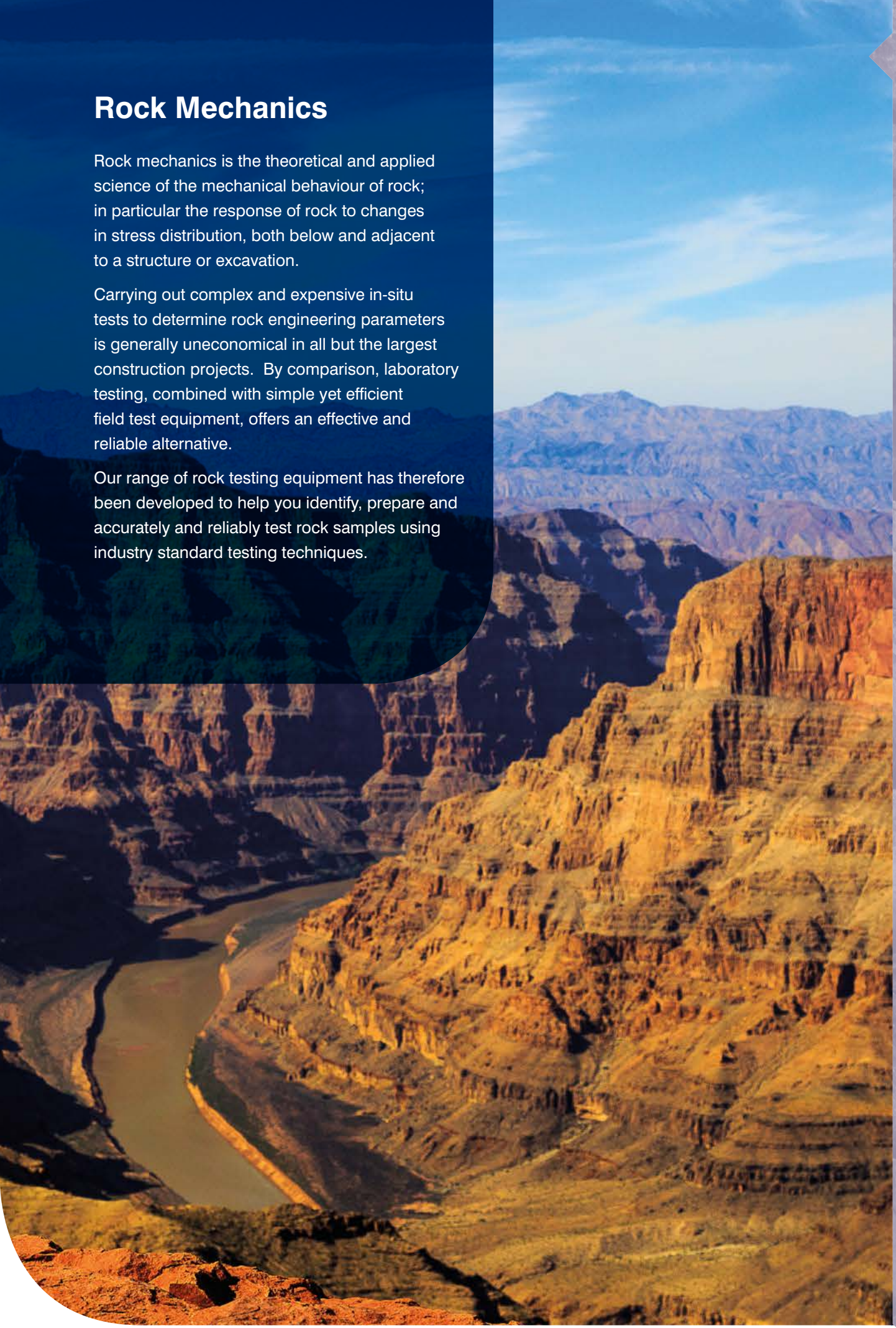
Standard(s)	BS 2000-49, ASTM D5, AASHTOT49	
Product Code	**Product**	**Qty**
46-5290	Standard Penetrometer BS 2000 ASTM D5	1
46-5360/10	Penetration Needle unverified	1
46-5500/01	Constant Temperature Bath 21°C to 56°C +/- 0.1°C	1
46-5800	Transfer Dish	1
46-5860	Penetration Tin 70 mm dia x 45 mm deep	10
46-5861	Penetration Tin for penetrations below 200; Nominally 55 mm dia x 35 mm deep	10
81-0518	Timer Clock	1

Rock Mechanics

Rock mechanics is the theoretical and applied science of the mechanical behaviour of rock; in particular the response of rock to changes in stress distribution, both below and adjacent to a structure or excavation.

Carrying out complex and expensive in-situ tests to determine rock engineering parameters is generally uneconomical in all but the largest construction projects. By comparison, laboratory testing, combined with simple yet efficient field test equipment, offers an effective and reliable alternative.

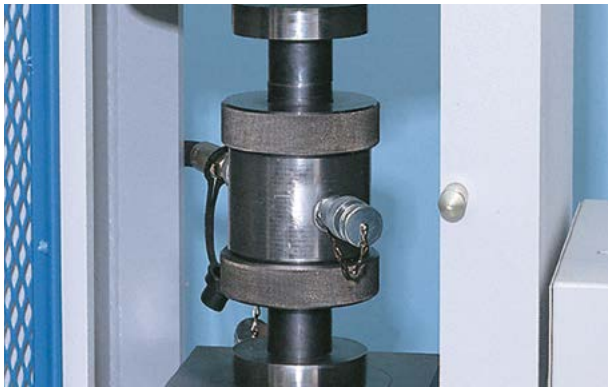
Our range of rock testing equipment has therefore been developed to help you identify, prepare and accurately and reliably test rock samples using industry standard testing techniques.



Triaxial & Permeability

ELE-Hoek Cell ADR Touch 2000 Compression Machine

Product Code: 70-2630/01



Product Standards:

BS EN ISO 7500-1, ASTM E4.

This machine incorporates the ADR Touch Microprocessor System. The ADR is designed to minimise data entry during normal testing procedures. These machines are specially adapted for use with ELE-Hoek Triaxial Cells and feature fixed upper and lower platens with locations to centralise the triaxial cell assembly for maximum stability.

- High stability load frame
- Calibration accuracy satisfies BS EN ISO 7500-1, ASTM E4

Further Information:

Supplied complete with digital readout, power pack, special upper and lower platens and gates.
For 220-240 V AC, 50-60 Hz, 1 ph.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Dimensions L x W x H (mm)	520 x 700 x 1300
Capacity (kN)	2000
Ram Travel (mm)	50
Display	ADR Digital Readout
Platen Dia (mm)	178
Accuracy	Better than ± 1% over upper 90% of working range
Rated Power (W)	1350
Weight (kg)	600

Pressure Test 3500 Oil/Water Constant Pressure System with Digital Pressure Gauge

Product Code: 70-5130/01

The ELE oil/water constant pressure system provides continuous variable pressure. The machine features a clear hydraulic/water interface reservoir and digital pressure gauge range 0-3500 kPa.

- Sealed oil reservoir
- Continuous constant pressure control

Further Information:

Complete with 2 litres of oil and digital pressure gauge.
For 220-240 V AC, 50-60 Hz, 1 ph.

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Dimensions L x W x H (mm)	240 x 400 x 500
Max Pressure	3500 kPa
Usable Oil Capacity (L)	1
Weight (kg)	12

Permeability Test with Pressure Test 3500 Pressure System.

Hoek Cells

ELE-Hoek Cell NX

Product Code: 70-1710

The ELE-Hoek cells in this section have been designed to accept the nominal NX core size as specified in International Standards. The basic cell comprises a steel body and two steel end caps which are screwed to the body of the cell when in use. The body incorporates two self-sealing couplings; one for connecting to the hydraulic pressure system, the other for de-airing the cell chamber and for the attachment of pressure measurement devices if required. Hardened and ground spherical steel pistons and two jackets of the same diameter as the specimen are supplied.

- For use with pressures up to 70 mPa
- Fast and effective specimen handling
- Accessories for permeability testing

Further Information:

Supplied complete with 2 jackets and 1 pair of load spreader pads.

Specifications	
Weight (kg)	14.5
Dia (mm)	54.74

Accessories:

Standard Distance Piece 20 mm depth (37-4980)

Support Assembly (81-0094)

Pair Load Spreader Pads (70-2651)

Specimen Extruder (70-2725)

NX Jacket 55 mm (70-1712)

Permeability of Rock

Investigating the permeability or flow of water through rock subjected to high confining pressures is often necessary. The capacity of a rock mass at depth to transmit or yield water is of particular importance when designing deep structures such as tunnels.

Permeability End Caps NX (One Pair) supplied with Distance Block

Product Code: 70-1750

Permeability end caps used with ELE-Hoek Cells and constant pressure systems are a cost-effective solution suited to investigating the permeability of rock at high confining pressures in the laboratory. To collect and measure the water which permeates through the rock specimen, a suitable burette such as 25-4540 is recommended. Each permeability end cap incorporates a tubing connector which accepts standard 6 mm tubing, 26-1926, used to connect the cell to the pressure system and burette.

Specifications	
Weight (kg)	6.2

Accessories:

10 ml Burette (25-4540)

Nylon Tubing

Product Code: 26-1926

6 mm outside diameter x 4 mm inside diameter. For use up to a pressure of 3500 kPa. Priced per metre.

Triaxial & Permeability

Specimen Extruder Bench Mounting Frame for extruding specimens from Hoek Cells

Product Code: 70-2725

Extrudes the specimen from its jacket without the need to drain the confining fluid. Incorporates a rack and pinion mechanism mounted in a steel body, with adjustable back plate. Supplied with NX extruder adaptor set.

Specifications	
Weight (kg)	11

Hydraulic Constant Pressure Systems

Successful triaxial tests on rock specimens require a means of providing a constant confining pressure. The hand operated system provides an accurate pressure that can be applied quickly and effectively to the ELE-Hoek Cells.

Hand Operated Pressure System complete with Pressure Gauge & Flexible Hose

Product Code: 70-5000

Specifications	
Pump	Single piston
Max Pressure	70 mPa
Gauge	250 mm dia scale marked 0-70 MN/m²
Weight (kg)	14.8

Sample Preparation

Rock Core Drill supplied with 2 x NX Core Drill Bits

Product Code: 70-0095/01

Cores may be cut from regular or irregular samples of rock or other material for end preparation prior to strength testing. Side guards and a drain tray provide protection against water spray and a sliding front allows access to the specimen clamp. The clamp provides maximum orientation for securing irregular block samples.

Further Information:

Supplied complete with 2 x NX Core Barrel.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph
Dimensions L x W x H (mm)	500 x 500 x 1160
Drill Head Travel (mm)	630
Drill Speeds (mm)	350 and 900 rpm
Weight (kg)	80

Accessories:

1 inch Core Drill Bit (70-0125)

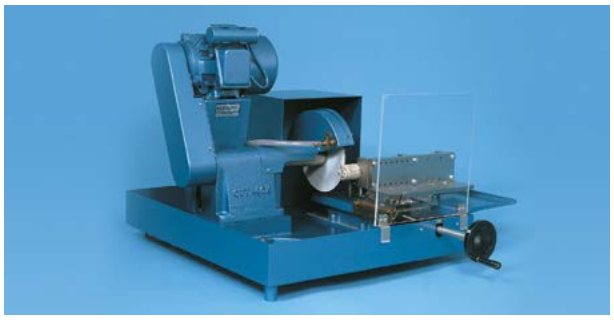
1.5 inch Core Drill Bit (70-0165)

NX Core Drill Bit (70-0195)

HQ Size Core Drill Bit (70-0095)

GSP210/250 Core Trimmer & Cut-Off Machine

Product Code: 70-0250/01 & 70-0250/06



This unit, designed for use in Rock Mechanics, can also be used in mineralogy, ceramics and refractory sample preparation. Cores in excess of 140 mm length and cubes up to 100 mm square can also be prepared.

Further Information:

Supplied complete with coolant recirculation pump/tank unit and 1 each diamond set cutting disc and double faced cup wheel.

Specifications	
Dimensions L x W x H (mm)	406 x 915 x 760 mm
Two Vices Supplied	1- Regular and Irregular samples up to 70 x 125 mm 1- V-vice cores up to 57 mm dia x 140 mm long
Blade Capacity (mm)	200
Rated Power (W)	750
Weight (kg)	118
Blade Speed (rpm)	2800
Product Code	**Power Supply**
70-0250/01	220-240 V AC, 50 Hz, 1 ph
70-0250/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Coolant Recirculation Pump Unit and Tank (70-0310/01)

200 mm diameter Diamond Abrasive Cutting Disc (70-0270)

Double faced Cup Wheel (70-0290)

Slake Durability Apparatus

Product Code: 77-0510/01

Product Standards:

ASTM 04644

This equipment has been developed to assess the durability of rock to weakening and disintegration when subjected to the simulated effects of climatic slaking. The rock samples are dried and then submitted to wear stress inside a drum which is rotated in water. The test is repeated and the wear is given by the loss of weight in the sample.

The system incorporates a motor drive unit mounted on a baseplate which revolves two (or up to four) Stainless Steel drums manufactured from 2 mm mesh, 140 mm diameter x 100 mm long. The tanks are filled with water to a level 20 mm below the drum axis. A digital timer automatically stops the motor after the pre-set time. The equipment is supplied complete with two drums with tanks.

Specifications	
Power Supply	230 V AC, 50 Hz, 1 ph
Dimensions L x W x H (mm)	350 x 740 x 300
Weight (kg)	30 (approx)

Precision Core & Beam Grinder

Product Code: 70-0260/01

- Precision grinding of cores and beams.
- Eliminates the need for capping.
- Preferred technique.
- Environmentally friendly.
- 3 phase.
- Complete with 1 set of abrasive grinding discs.

Accessories:

Diamond Segment Grinding Discs (Set of 8) (70-0260/12)

Strength

Point-Load Strength Test

Digital Point-Load Test Apparatus

Product Code: 77-0115

Product Standards:

EN DD ENV 1997-2, ASTM D5731

Originally developed at Imperial College, London, the apparatus comprises a two-column fixed crosshead frame and a hand operated hydraulic jack.

Pressure applied by the jack extends the piston carrying the lower conical point. The upper point is fixed to the crosshead with a scale mounted on the frame to provide specimen diameter information for use in point-load strength index calculations. Pressure is indicated directly on the digital readout unit. Loads up to 55 kN can be applied to specimens as large as 101.6 mm in diameter. The apparatus is supplied complete with heavy-duty face mask.

Specifications	
Capacity (kN)	55
Max Sample Size (mm)	101.6
Weight (kg)	25
Dimensions L x W x H (mm)	530 x 400 x 720

Spares/Consumables:

Set of Cones for Digital Point-Load Tester (77-0115/10)

Set of 2 Conical Points and 1 set of Seals (77-0115/K)

Stand-alone Display (77-0115/13)

Point Holder (77-0115/14)

Rock Classification Hammer

Product Code: 77-0470

Product Standards:

ASTM D5873, EN 12504-2, ASTM C805

This lightweight and portable impact hammer is used for rock classification tests. The hammer is similar to a device used for many years for strength classification tests of mass concrete. Cylindrical cores, usually NW size, are held in a horizontal position and the hammer mechanism impacted against the core to obtain rebound readings. A series of readings is taken along the length of the core to get the average rebound number.

Specifications	
Body	Aluminium; with indicator scale
Accuracy	Within 15%
Weight (kg)	1.4

Accessories:

NW Rock Cradle (77-0480)

NW Rock Cradle

Product Code: 77-0480

Product Standards:

ASTM D5873

The Rock Cradle is used to hold cores in place during rock classification test procedures. The cradle incorporates a guide for positioning the hammer to allow for a series of readings along the length of the core.

Specifications	
Construction	All metal; treated for rust resistance
Core Size	NW specimens
Weight (kg)	9.1

Hoek Triaxial Cell

Standard(s)	BS EN 1997-2	
Product Code	**Product**	**Qty**
70-2630/01	ELE-Hoek Cell ADR Touch 2000 Compression Machine	1
70-1710	ELE-Hoek Cell NX 54.74 mm dia	1
70-1712	Spare Jacket NX Size	2
70-2725	Specimen Extruder Bench Mounting Frame for extruding specimens from ELE-Hoek Cells	1
70-5000	Hand Operated Pressure System complete with Pressure Gauge and Flexible Hose	1
70-1750	Pair of Permeability End Caps NX supplied with Distance Block	1
25-4540	10 ml Burette Single Tube Drainage	2
26-1926	Nylon Tubing 6 mm outside dia 3500 kPa	4
70-5130/01	Pressure Test 3500 Oil/Water Constant Pressure System with Digital Pressure Gauge	1

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Laboratory Testing Equipment

Construction materials testing laboratories should be equipped with all the accessories and consumables for conducting the required tests, not least because any delay in testing can result in a costly delay to a building project. However, the cost of this equipment is negligible in comparison with project costs so it makes sense to ensure that sufficient stock is in place, both before and during the construction project.

A construction materials testing laboratory represents a potentially harsh environment for laboratory equipment, so it is important that the specified equipment is fit for use. ELE International therefore only supplies robust, high quality equipment that is suitable for the demands of a materials testing laboratory.

Typically, lists of general laboratory equipment include sample handling and preparation equipment in addition to the general items that are necessary for everyday work. Electrical items include balances, ovens, sieves, shakers, stirrers, vacuum pumps, furnaces, water baths, water stills, thermometers, compressors, etc. General hardware includes items such as spatulas, filters and safety equipment, and the required plastic and glassware includes flasks, beakers, bottles, measuring cylinders, pipettes, etc. Chemicals and reference materials are also necessary.

ELE International is able to provide complete equipment lists to meet the requirements of international standard test methods.

Load Measurement

Clamped Boss Load Rings

Product Standards:

ASTM D3080, BS 1377, BS 1924, EN 12697-34

- Repeatability within 0.2% of indicated load.
- Accuracy within ±1% of indicated load.
- Works calibrated.

ELE Clamped Boss Load Rings are available in the range 1 kN to 50 kN. The available capacities and performance of ELE load rings satisfy the requirements for accurate load measurement for a wide range of testing applications. The repeatability and accuracy of all clamped boss load rings comply with the requirements of NIS 0415 Accreditation for the Calibration of Force Measuring Rings and Load Cells used in soil testing. The repeatability of all load rings is within 0.2% of indicated load and accuracy is ±1% of indicated load over the upper 80% of the working range, at the calibration loads. All clamped boss load rings are calibrated in kN and supplied with a calibration chart. Complete with a detachable nipple, all rings are supplied in a protective foam moulding.

Product Code	Product	Capacity			Typical Design Sensitivity			Overall Height (mm)	Approx Weight (kg)
		kN	kgf	lbf	N/div	kgf/div	ibf/div		
78-0060	Load ring - 2 kN	2.0	200	450	1.3	0.13	0.30	248	3.2
78-0160	Load ring - 3 kN	3.0	300	650	2.0	0.20	0.43	248	3.3
78-0260	Load ring - 4.5 kN	4.5	450	1000	3.0	0.30	0.66	248	3.5
78-0460	Load ring - 10 kN	10.0	1000	2250	7.7	0.77	1.73	248	4.6
78-0760	Load ring - 28 kN	28.0	2800	6000	25.5	2.54	5.45	248	5.4
78-0860	Load ring - 50 kN	50.0	5000	11200	45.5	4.54	10.18	248	7.9

Electronic Balances

Product Code	Product
78-5325/01	Electronic Balance - 210 g x 0.1 mg
78-5335/01	Electronic Balance - 220 g x 0.001 mg
78-5405/01	Electronic Balance - 620 g x 0.001 g
78-5430/01	Electronic Balance - 820 g x 0.001 g
78-5447/01	Electronic Balance - 3600 g x 0.01 g
78-5456/01	Electronic Balance - 4600 g x 0.01 g

Product Code	Product
78-5457/01	Electronic Balance - 8000 g x 0.1 g
78-5477/01	Electronic Balance - 16000 g x 0.5 g
78-5485/01	Electronic Balance - 20000 g x 0.1 g
78-5527/01	Electronic Balance - 32000 g x 1.0 g
78-5655/01	Electronic Balance - 75000 g x 5.0 g
78-5657/01	Electronic Balance - 75000 g x 20.0 g
78-6000/01	Electronic Balance - 200 g x 0.001 g
78-6010/01	Electronic Balance - 1200 g x 0.01 g
78-6020/01	Electronic Balance - 6000 g x 0.1 g
78-6030/01	Electronic Balance - 15000 g x 1.0 g
78-6040/01	Electronic Balance - 30000 g x 1.0 g
78-6050/01	Upright Loading Balance - 50000 g x 10000 g

Mechanical Balances

Harvard Trip Balance

Product Code: 78-7090

Specifications	
Specific Gravity	Equipped for specific gravity weighing (components not included, order separately)
Capacity (g)	2000
Resolution (g)	0.1
Pan Size dia (mm)	2 x 150
Overall Dimensions L x W x H (mm)	152 x 356 x 254
Weight (kg)	2.7

Weights for Harvard Trip Balance

Product Code: 78-7110

Product Standards:

ASTM class 6

Triple Beam Balance

Product Code: 78-7140

Specifications	
Capacity (g)	2610
Resolution (g)	0.1
Pan Size dia (mm)	150
Overall Dimensions L x W x H (mm)	451 x 161 x 168
Weight (kg)	2.1
Platform	Stainless Steel plate; 6 inches (152 mm) dia except for scale with scoop models
Damping	Magnetic
Attachment Weights (g)	One 500; two 1,000 (included)

Load Measurement

Heavy-Duty Solution Balance

Product Code: 78-7600

Specifications	
Capacity (g)	20,000
Resolution (g)	1.0
Pan Size dia (mm)	280
Overall Dimensions L x W x H (mm)	279 x 864 x 279
Beams (g)	1,000 x 100; 100 x 1; Two sliding weights
Tare (g)	2,270
Platform	Stainless Steel plate; 11 inches (279 mm) dia
Damping	Magnetic
Attachment Weights (g)	Slotted ratio type; one 1,000; two 2,000; one 5,000; one 10,000 (included)
Weight	Net 44 lbs (19.9 kg)

Digital Hotplate

Digital Hotplate

Product Code: 78-3104/01

Fitted with digital setting of plate temperature controlled via microprocessor. Includes digital temperature indication. Temperature display resolution of ±1°C.

Specifications	
Power Supply	220-240 V AC, 50 Hz, 1 ph
Dimensions (mm)	520 x 360 x 130
Construction	Robust metal with anodised aluminium plate, heated surface
Max temperature (°C)	300 x 1
Rated power (W)	1500

Hotplate

A hotplate offers an alternative method of drying materials in bulk. Even heat distribution is not as good as an enclosed chamber, however sensible use of the hotplate will often enable test requirements to be met satisfactorily.

Hotplate

Product Code: 78-2950/01

Specifications	
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Construction	Cast-iron top and base, ventilated sheet-steel body
Nominal dia (mm)	200
Max Temperature (°C)	500
Rated Power (W)	2000
Weight (kg)	5

Drying & Weighing

Ovens

Product Standards:

BS 1377, BS 1924, BS 2648, BS 598, BS 598-104, EN 12697-32, EN 13280-4

These ovens are designed for drying large quantities of soils and aggregate samples, and maintain temperature in accordance with BS 1377.

Drying Ovens and Specifications

Product Code	Power Supply	Fluctuation Temp.	Shelves	Positions	Capacity (litres)	Internal Dimensions (mm)	Temp. Range
78-1215/01	220-240 V AC, 50-60 Hz, 1 ph	+/- 0.75°C	2	3	50	330 x 490 x 330	40-250°C
78-1225/01	220-240 V AC, 50-60 Hz, 1 ph	+/- 0.75°C	3	4	100	460 x 490 x 450	40-250°C
78-1235/01	220-240 V AC, 50-60 Hz, 1 ph	+/- 0.75°C	3	5	150	540 x 490 x 550	40-250°C
78-1250/01	220-240 V AC, 50 Hz, 1 ph	+/- 0.75°C	3	4	225	440 x 920 x 600	0-200°C
78-0135/01	220-240 V AC, 50-60 Hz, 1 ph	+/- 0.75°C	4	5	425	640 x 920 x 760	0-200°C
78-0140/03	415 V AC, 50-60 Hz, 3 ph	+/- 0.75°C	5	8	750	770 x 920 x 1060	40-250°C

Accessories:

Dial Thermometer 0-300°C, 40 mm diameter, dial with collar fixing, fan door (78-1245).

Particle Size Analysis

Particle Size Analysis is probably performed in most, if not all, laboratories engaged in testing materials for civil engineering applications. The range of sieves offered include ISO, EN, BS and ASTM sieves. Woven wire test sieves are manufactured from Stainless Steel mesh. Perforated plate test sieves are manufactured from tinned steel plate. All test sieves, unless otherwise indicated, are supplied with full-depth frames.

Sieves 200 mm diameter BS

Product Standards:

BS 410-1, EN933-2, ISO 3310, ISO 3310-1, ISO 565

Product Code	Aperture Size	Type
79-0030	32 µm	Mesh
79-0040	38 µm	Mesh
79-0050	45 µm	Mesh
79-0060	53 µm	Mesh
79-0070	63 µm	Mesh
79-0080	75 µm	Mesh
79-0085	80 µm	Mesh
79-0090	90 µm	Mesh
79-0095	100 µm	Mesh
79-0100	106 µm	Mesh
79-0110	125 µm	Mesh
79-0120	150 µm	Mesh
79-0125	160 µm	Mesh
79-0130	180 µm	Mesh
79-0135	200 µm	Mesh
79-0140	212 µm	Mesh
79-0150	250 µm	Mesh
79-0160	300 µm	Mesh
79-0165	315 µm	Mesh
79-0170	355 µm	Mesh
79-0175	400 µm	Mesh
79-0180	425 µm	Mesh
79-0190	500 µm	Mesh
79-0200	600 µm	Mesh
79-0210	710 µm	Mesh
79-0215	800 µm	Mesh
79-0220	850 µm	Mesh
79-0230	1.00 mm	Mesh
79-0240	1.18 mm	Mesh
79-0245	1.25 mm	Mesh
79-0250	1.40 mm	Mesh
79-0255	1.60 mm	Mesh
79-0260	1.70 mm	Mesh
79-0270	2.00 mm	Mesh
79-0280	2.36 mm	Mesh
79-0285	2.50 mm	Mesh

Product Code	Aperture Size	Type
79-0290	2.80 mm	Mesh
79-0300	3.35 mm	Mesh
79-0310	4.00 mm	Mesh
79-0320	4.75 mm	Mesh
79-0340	6.70 mm	Mesh
79-1500	4.00 mm	Perforated
79-1510	4.75 mm	Perforated
79-1515	5.00 mm	Perforated
79-1520	5.60 mm	Perforated
79-1525	6.30 mm	Perforated
79-1530	6.70 mm	Perforated
79-1540	8.00 mm	Perforated
79-1550	9.50 mm	Perforated
79-1555	10.00 mm	Perforated
79-1560	11.20 mm	Perforated
79-1565	12.50 mm	Perforated
79-1570	13.20 mm	Perforated
79-1575	14.00 mm	Perforated
79-1580	16.00 mm	Perforated
79-1590	19.00 mm	Perforated
79-1595	20.00 mm	Perforated
79-1600	22.40 mm	Perforated
79-1605	25.00 mm	Perforated
79-1610	26.50 mm	Perforated
79-1615	28.00 mm	Perforated
79-1630	31.50 mm	Perforated
79-1640	37.50 mm	Perforated
79-1655	50.00 mm	Perforated
79-1660	53.00 mm	Perforated
79-1670	63.00 mm	Perforated
79-1680	75.00 mm	Perforated
79-0010	-	Lid
79-0020	-	Receiver

Particle Size Analysis

Sieves 300 mm diameter BS

Product Standards:

BS 410-1, EN933-2, ISO 3310, ISO 3310-1, ISO 565

Product Code	Aperture Size	Type
79-2040	38.00 mm	Mesh
79-2070	63.00 mm	Mesh
79-2080	75.00 mm	Mesh
79-2085	80.00 mm	Mesh
79-2090	90.00 mm	Mesh
79-2095	100.00 mm	Mesh
79-2110	125.00 mm	Mesh
79-2120	150.00 mm	Mesh
79-2130	180.00 mm	Mesh
79-2135	200.00 mm	Mesh
79-2140	212.00 mm	Mesh
79-2150	250.00 mm	Mesh
79-2160	300.00 mm	Mesh
79-2165	315.00 mm	Mesh
79-2170	355.00 mm	Mesh
79-2175	400.00 mm	Mesh
79-2180	425.00 mm	Mesh
79-2190	500.00 mm	Mesh
79-2200	600.00 mm	Mesh
79-2205	630.00 mm	Mesh
79-2220	850.00 mm	Mesh
79-2230	1.00 mm	Mesh
79-2240	1.18 mm	Mesh
79-2245	1.25 mm	Mesh
79-2255	1.60 mm	Mesh
79-2260	1.70 mm	Mesh
79-2270	2.00 mm	Mesh
79-2280	2.36 mm	Mesh
79-2285	2.50 mm	Mesh
79-2290	2.80 mm	Mesh
79-2300	3.35 mm	Mesh
79-2310	4.00 mm	Mesh
79-2320	4.75 mm	Mesh
79-2500	4.00 mm	Perforated
79-2510	4.75 mm	Perforated

Product Code	Aperture Size	Type
79-2515	5.00 mm	Perforated
79-2520	5.60 mm	Perforated
79-2525	6.30 mm	Perforated
79-2530	6.70 mm	Perforated
79-2540	8.00 mm	Perforated
79-2545	9.00 mm	Perforated
79-2550	9.50 mm	Perforated
79-2555	10.00 mm	Perforated
79-2560	11.20 mm	Perforated
79-2563	12.00 mm	Perforated
79-2565	12.50 mm	Perforated
79-2570	13.20 mm	Perforated
79-2575	14.00 mm	Perforated
79-2580	16.00 mm	Perforated
79-2590	19.00 mm	Perforated
79-2595	20.00 mm	Perforated
79-2600	22.40 mm	Perforated
79-2603	24.00 mm	Perforated
79-2605	25.00 mm	Perforated
79-2610	26.50 mm	Perforated
79-2615	28.00 mm	Perforated
79-2630	31.50 mm	Perforated
79-2640	37.50 mm	Perforated
79-2645	40.00 mm	Perforated
79-2650	45.00 mm	Perforated
79-2655	50.00 mm	Perforated
79-2660	53.00 mm	Perforated
79-2670	63.00 mm	Perforated
79-2680	75.00 mm	Perforated
79-2684	80.00 mm	Perforated
79-2690	90.00 mm	Perforated
79-2710	125.00 mm	Perforated
79-2010	-	Lid
79-2020	-	Receiver

Sieves 450 mm diameter BS

Product Standards:

BS 410-1, EN933-2, ISO 3310, ISO 565

Product Code	Aperture Size	Type
79-3070	63 µm	Mesh
79-3080	75 µm	Mesh
79-3085	80 µm	Mesh
79-3090	90 µm	Mesh
79-3095	100 µm	Mesh
79-3110	125 µm	Mesh
79-3120	150 µm	Mesh
79-3135	200 µm	Mesh
79-3140	212 µm	Mesh
79-3150	250 µm	Mesh
79-3160	300 µm	Mesh
79-3165	315 µm	Mesh
79-3180	425 µm	Mesh
79-3190	500 µm	Mesh
79-3200	600 µm	Mesh
79-3205	630 µm	Mesh
79-3220	850 µm	Mesh
79-3230	1.00 mm	Mesh
79-3240	1.18 mm	Mesh
79-3245	1.25 mm	Mesh
79-3255	1.66 mm	Mesh
79-3260	1.70 mm	Mesh
79-3270	2.00 mm	Mesh
79-3280	2.36 mm	Mesh
79-3285	2.50 mm	Mesh
79-3300	3.35 mm	Mesh
79-3320	4.75 mm	Mesh
79-3500	4.00 mm	Mesh
79-3510	4.75 mm	Perforated
79-3515	5.00 mm	Perforated
79-3525	6.30 mm	Perforated
79-3530	6.70 mm	Perforated
79-3540	8.00 mm	Perforated
79-3550	9.50 mm	Perforated
79-3555	10.00 mm	Perforated
79-3565	12.50 mm	Perforated
79-3570	13.20 mm	Perforated

Product Code	Aperture Size	Type
79-3575	14.00 mm	Perforated
79-3580	16.00 mm	Perforated
79-3590	19.00 mm	Perforated
79-3595	20.00 mm	Perforated
79-3600	22.40 mm	Perforated
79-3605	25.00 mm	Perforated
79-3610	26.50 mm	Perforated
79-3615	28.00 mm	Perforated
79-3630	31.50 mm	Perforated
79-3640	37.50 mm	Perforated
79-3645	40.00 mm	Perforated
79-3655	50.00 mm	Perforated
79-3660	53.00 mm	Perforated
79-3670	63.00 mm	Perforated
79-3680	75.00 mm	Perforated
79-3684	80.00 mm	Perforated
79-3710	125.00 mm	Perforated

Particle Size Analysis

Sieves 8 inch diameter ASTM

Product Standards:

ASTM E11

Product Code	Aperture Size	Type
79-5320	25 µm	Mesh
79-5310	20 µm	Mesh
79-5300	38 µm	Mesh
79-5290	45 µm	Mesh
79-5280	53 µm	Mesh
79-5270	63 µm	Mesh
79-5260	75 µm	Mesh
79-5250	90 µm	Mesh
79-5240	106 µm	Mesh
79-5200	212 µm	Mesh
79-5230	125 µm	Mesh
79-5220	150 µm	Mesh
79-5210	180 µm	Mesh
79-5190	250 µm	Mesh
79-5180	300 µm	Mesh
79-5170	355 µm	Mesh
79-5160	425 µm	Mesh
79-5150	500 µm	Mesh
79-5140	600 µm	Mesh
79-5130	710 µm	Mesh
79-5120	850 µm	Mesh
79-5110	1.00 mm	Mesh
79-5100	1.18 mm	Mesh
79-5090	1.40 mm	Mesh
79-5080	1.70 mm	Mesh
79-5070	2.00 mm	Mesh
79-5060	2.36 mm	Mesh
79-5050	2.80 mm	Mesh
79-5040	3.35 mm	Mesh
79-5030	4.00 mm	Mesh
79-5020	4.75 mm	Mesh
79-5010	5.60 mm	Mesh
79-5000	6.30 mm	Mesh

Product Code	Aperture Size	Type
79-5490	6.70 mm	Mesh
79-5500	8.00 mm	Mesh
79-5510	9.50 mm	Mesh
79-5520	11.20 mm	Mesh
79-5530	12.50 mm	Mesh
79-5540	13.20 mm	Mesh
79-5550	16.00 mm	Mesh
79-5560	19.00 mm	Mesh
79-5570	22.40 mm	Mesh
79-5580	25.00 mm	Mesh
79-5595	31.50 mm	Mesh
79-5610	37.50 mm	Mesh
79-5630	50.00 mm	Mesh
79-5650	63.00 mm	Mesh
79-5660	75.00 mm	Mesh
79-5670	90.00 mm	Mesh
79-5680	100.00 mm	Mesh
79-5400	8 inch	Lid
79-5410	8 inch	Receiver

Sieves 12 inch diameter ASTM

Product Standards:

ASTM E11

Product Code	Aperture Size	Type
79-6100	38 µm	Mesh
79-6090	45 µm	Mesh
79-6080	53 µm	Mesh
79-6070	63 µm	Mesh
79-6060	75 µm	Mesh
79-6050	90 µm	Mesh
79-6040	106 µm	Mesh
79-6030	125 µm	Mesh
79-6020	150 µm	Mesh
79-6010	180 µm	Mesh
79-6000	212 µm	Mesh
79-5990	250 µm	Mesh
79-5980	300 µm	Mesh
79-5970	355 µm	Mesh
79-5960	425 µm	Mesh
79-5950	500 µm	Mesh
79-5940	600 µm	Mesh
79-5930	710 µm	Mesh
79-5920	850 µm	Mesh
79-5910	1.00 mm	Mesh
79-5900	1.18 mm	Mesh
79-5890	1.40 mm	Mesh
79-5880	1.70 mm	Mesh
79-5870	2.00 mm	Mesh
79-5860	2.36 mm	Mesh
79-5850	2.80 mm	Mesh
79-5840	3.35 mm	Mesh
79-5830	4.00 mm	Mesh
79-5820	4.75 mm	Mesh
79-5810	5.60 mm	Mesh
79-5800	6.30 mm	Mesh
79-6190	6.70 mm	Mesh
79-6200	8.00 mm	Mesh
79-6210	9.50 mm	Mesh

Product Code	Aperture Size	Type
79-6220	11.20 mm	Mesh
79-6230	12.50 mm	Mesh
79-6240	13.20 mm	Mesh
79-6250	16.00 mm	Mesh
79-6260	19.00 mm	Mesh
79-6270	22.40 mm	Mesh
79-6280	25.00 mm	Mesh
79-6290	26.50 mm	Mesh
79-6300	31.50 mm	Mesh
79-6310	37.50 mm	Mesh
79-6320	45.00 mm	Mesh
79-6330	50.00 mm	Mesh
79-6340	53.00 mm	Mesh
79-6350	63.00 mm	Mesh
79-6360	75.00 mm	Mesh
79-6370	90.00 mm	Mesh
79-6380	100.00 mm	Mesh
79-6400	125.00 mm	Mesh
79-6150	-	Lid
79-6160	-	Receiver

Particle Size Analysis

Washing Sieve

Washing Sieve 75 µm

Product Standards:

BS 410-1, ISO 3310, ASTM E11

Specifications

Product Code	Dia (inches)	Depth to Mesh (mm)
79-7010	3	76 x 89 x 76
79-7015	8	203 x 114 x 102
79-7020	8	203 x 114 x 102
79-7025	8	203 x 216 x 203
79-7030	8	203 x 216 x 203

Wet Washing Spray Attachment

Product Code: 79-7040

Specifications

Spray Nozzle	Machined Brass
Gauge	30 psi (207 kPa) capacity
Fittings	Standard Pipe
Weight	Net 11 lbs (5 kg)

Sieve Brushes

Sieve Brush Brass & Nylon

Product Code: 79-7200

Product Standards:

ASTM E11

Double-ended, brass and nylon bristle.

Sieve Brush Nylon

Product Code: 79-7210

Product Standards:

ASTM E11

Nylon, double-ended.

Sieve Shakers

Hand sieving of a large number of samples can often be tedious and sometimes lead to inaccuracy of results. The following machine provides a wide choice of options for the busy laboratory.

Sieve Shaker

Product Codes: 80-0200/01, 80-0200/06

The ELE sieve shaker is powered by an electromagnetic drive that has no rotating parts to wear, making it maintenance free and extremely quiet in operation. The unit features a triple Vertical-Lateral-Rotary vibrating action that moves the sample over the sieve producing faster more efficient sieving, while the rapid vertical movements also help keep the apertures from blinding. The shaker is ideal for laboratory or on site use. It is robust, compact and sufficiently lightweight to be portable. The separate digital microprocessor controlled console unit incorporates a keypad for setting the sieving program and is isolated from any effects of vibration from the shaker. As standard the shaker includes a timer, 0-999 minutes, adjustable vibration intensity and adjustable intermittent or continuous operation.

Further Information:

The unit accepts up to ten 200 mm or 8 inch, full height, diameter sieves, lid and receiver, or up to six 300 mm or 12 inch diameter sieves, lid and receiver.

Specifications	
Dimensions L x W x H (mm)	380 x 440 x 1085
Power Supply	
80-0200/01	110-240 V AC, 50-60 Hz, 1 ph
80-0200/06	220-240 V AC, 60 Hz, 1 ph

Accessories:

200 mm Wet Sieving Pan and Lid for Sieve Shaker complete with two Seals (80-0200/11)

300 mm Wet Sieving Pan and Lid for Sieve Shaker complete with two Seals (80-0200/12)

Spring for Sieve Shaker (80-0200/13)

Air Jet Sieves 200 mm diameter x 25 mm

Product Code	Aperture Size
80-0300/10	45 μm
80-0300/11	32 μm
80-0300/12	40 μm
80-0300/13	40 μm
80-0300/14	200 μm
80-0300/15	20 μm
80-0300/16	38 μm
80-0300/17	63 μm
80-0300/18	75 μm
80-0300/19	Adaptor and Covers for Test Sieves
80-0350/01	Industrial vacuum cleaner

Air Jet Sieving Machine

Product Code: 80-0300/09

- Sieving with air jet technology for dispersion and desagglomeration of fine powders.
- Requires suitable industrial vacuum cleaner.

Specifications	
Power Supply	100-240 V AC, 50-60 Hz, 1 ph

Laboratory Hardware

Laboratory Hardware

The laboratory hardware listed provides a comprehensive range of products suitable for most general test applications.

Stand, Bosshead & Clamp

Support Assembly

Product Code: 81-0094

➤ Retort stand, bosshead and clamp for general purpose.

Spatulas

Product Code	Product
81-0100	Spatula 100 mm
81-0120	Spatula 150 mm
81-0140	Spatula 200 mm
81-0160	Spatula 254 mm
81-0180	Chattaway Spatula 125 mm

Scoops & Shovels

Product Code	Product
81-0200	Scoop 70 x 110 x 40 mm, cast aluminium with handle
81-0220	Scoop 120 x 190 x 70 mm, cast aluminium with handle
81-0222	Scoop 250 mm long x 125 mm dia. Stainless Steel, 5 kg capacity
81-0240	Shovel with flat blade 250 x 300 mm, weight 3 kg

Trowels & Floats

Product Code	Product
81-0310	Trowel, gardeners type, Stainless Steel blade
81-0335	Trowel, gauging with steel blade, 200 mm long, complies with BS 4550
81-0340	Float, plasterer's type, with steel blade 280 x 115 mm, weight 450 g

Rubber Tubing

Product Code	Product	Internal Dia	Outside Dia
81-0373	Rubber Tubing	5.0 mm	13.0 mm
81-0375	Rubber Tubing	6.5 mm	16.5 mm

Watches & Clocks

Product Standards:

EN 12697-5

Product Code	Product
81-0518	Timer Clock. Battery-operated. Easy to read digital display of hours, minutes and seconds. Timer counts down and sounds beeping tone. Clock functions independently of timer. Supplied complete with battery. Dimensions 58 x 13 x 64 mm (L x W x H).
81-0521	Stop Watch. LCD quartz watch, features alarm, time/calendar display, 30 minute count in 1/100 seconds. Battery-operated. Dimensions 53 x 19 x 64 mm (L x W x H).

Miscellaneous Laboratory Hardware

Grouped Product Standards:

BS 1377, EN 933-4

Product Code	Product	Size/Capacity
81-0480	Crucible Tongs, Straight	200 mm long
81-0500	Heavy-Duty Rubber Gloves	-
81-0508	Heat-Resistent Gloves with Gauntlet	150 x 0.1 mm
81-0586	Vernier Caliper	150 x 0.1 mm
81-0588	Vernier Caliper	0-200 x 0.02
81-0590	Vernier Caliper	0-200 x 0.01
81-0594	Chisel - Masonry Type	-
81-0705	Wire Brush	-
81-0710	Trimming Knife	130 mm long
81-0713	Straight Edge	300 mm long
81-0715	Straight Edge	455 mm long
81-0805	Engineer's Steel Rule	300 mm long
81-4765	Polythene Bag - Pack of 100	380 x 254 mm
81-4775	Polythene Bag - Pack of 50	450 x 1000 mm
81-5100	Rubber Bucket	9 ltrs (2 gal)
81-0708	Wire Saw	-

Beakers & Bowls

Product Code	Product	Capacity (ltrs)
81-4779	Beaker	0.5
81-5020	Bowl	2.5
81-5040	Bowl	5
81-5060	Bowl	11

Moisture Content Tin & Sample Containers

Product Code	Product	Capacity
81-2979	Moisture Content Tin, Tin Plate, (unnumbered), 90 mm dia x 20 mm deep	90 g
81-3000	Sample Container, Tinned Steel, Lever Lid	0.5 ltrs
81-3040	Sample Container, Tinned Steel, Lever Lid	2.5 ltrs
81-3060	Sample Container, Tinned Steel, Lever Lid	10 ltrs
81-3500	Sample Container, Plastic, Snap-on Lid	1 ltrs
81-3540	Sample Container, Plastic, Snap-on Lid	10 ltrs
81-3545	Transport/Storage Container	22 ltrs

Sample Trays

Product Code	Product
81-4010	Sample Tray, Heavy-duty, Galvanised Steel, nesting 270 x 270 x 38 mm
81-4020	Sample Tray, Heavy-duty, Galvanised Steel, nesting 306 x 306 x 38 mm
81-4030	Sample Tray, Heavy-duty, Galvanised Steel, nesting 406 x 406 x 50 mm
81-4080	Sample Tray, Heavy-duty, Galvanised Steel, nesting 610 x 610 x 63 mm
81-4160	Sample Tray, Heavy-duty, Galvanised Steel, nesting 910 x 910 x 76 mm
81-4230	Sample Tray, Heavy-duty, Galvanised Steel, nesting 1200 x 1160 x 50 mm
81-4700	Sample Tray, Stainless Steel spinning, without seams 305 mm dia x 50 mm

Wire Baskets

Product Code	Product
81-4819	Wire Basket, BS 812 Type 1, EN 1367-2, 65 mm dia x 80 mm deep, 150 μm wire mesh
81-4821	Wire Basket, BS 812 Type 2, EN 1367-2, 95 mm dia x 120 mm deep, 600 μm wire mesh
81-4823	Wire Basket, BS 812 Type 3, EN 1367-2, 95 mm dia x 120 mm deep, 1.18 mm wire mesh
81-4825	Wire Basket, BS 812 Type 4, EN 1367-2, 120 mm dia x 120 mm deep, 3.35 mm wire mesh

Glass & Plastic Ware

Beakers & Covers

Product Code	Product	Capacity (ml)
82-0120	Beaker, Borosilicate Glass, Squat Form	100
82-0140	Beaker, Borosilicate Glass, Squat Form	250
82-0200	Beaker, Borosilicate Glass, Squat Form	600
82-0220	Beaker, Borosilicate Glass, Squat Form	1000
82-0260	Beaker Cover, Watch Glass, Borosilicate Glass, 100 mm dia	-
82-0270	Beaker Cover, Watch Glass, Borosilicate Glass, 125 mm dia	-
82-0276/80	Pyrex Conical Beaker	500

Bottles & Crucibles

Product Code	Product	Capacity (ml)
82-1540	Weighing Bottle, Glass with Stopper, 25 x 50 mm dia x H	-
82-2500	Wash Bottle, Polythene	500
82-3060	Reagent Bottle, Amber Glass Plastic Stopper	1000
82-3120	Polythene Storage Bottle	500
82-3145	Polythene Bottle, Wide Neck, Screw Cap	1000
82-3149	Polythene Bottle, Wide Neck, Screw Cap	5000
82-3320	Porcelain Crucible complete with Lid	30
82-3320/80	Porcelain Crucible	30
82-3325	Porcelain Lid for 82-3320	

Desiccators

Product Code	Product
82-2100/10	Perforated Ceramic Disc for 200 mm Non-Vacuum Desiccator
82-2100/11	Perforated Ceramic Disc for 200 mm Non-Vacuum Desiccator with Centre Hole
82-2100	Desiccator, Non-Vacuum Type, 200 mm internal dia, Borosilicate Glass, supplied with Perforated Zinc Disc
82-2110	Desiccator Cabinet, Non-Vacuum, internal dimensions 300 x 300 mm, Acrylic Plastic with 1 Shelf and 2 Desiccant Trays
82-2170	Desiccator, Vacuum Type, 280 mm internal dia, Soda Glass, supplied with Perforated Zinc Disc and Stopcock
82-2180	Safety Cage for 82-2170

Evaporating Dishes

Product Code	Product	Dia x H (mm)
82-1970	Evaporating Dish, shallow form with Spout, Porcelain	100 x 40
82-2000	Evaporating Dish, shallow form with Spout, Porcelain	150 x 45
82-2010	Evaporating Dish, shallow form with Spout, Porcelain	200 x 55

Funnels & Flasks

Product Code	Product	Capacity (ml)
82-1000	Volumetric Flask, Soda Glass, stoppered to BS ISO 1042 Class B	100
82-1020	Volumetric Flask, Soda Glass, stoppered to BS ISO 1042 Class B	250
82-1040	Volumetric Flask, Soda Glass, stoppered to BS ISO 1042 Class B	500
82-1060	Volumetric Flask, Soda Glass, stoppered to BS ISO 1042 Class B	1000
82-1120	Conical Flask (Erlenmeyer), Borosilicate Glass, wide mouth graduated, 100 ml sub-divisions (nominal)	500
82-1140	Conical Flask (Erlenmeyer), Borosilicate Glass, wide mouth graduated, 50 ml sub-divisions (nominal)	250
82-2200	Buchner Funnel, Size No. 5, accepts 110 mm dia Filter Paper	-
82-2200/81	Vac Ring Filterseal for Buchner Funnel, No. 5	-
82-2330	Filter Flask	500
82-2350	Filter Flask, Conical type with Integral Side Arm	1000
82-2460	Extraction Flask	250
82-2660	Funnel, Polythene, 200 mm dia	-
88-6230	Plastic Filtering Flask	-

Measuring Cylinders, BS

Product Code	Product	Capacity (ml)
82-0380	Measuring Cylinder, Soda Glass, Spouted, BS EN 4788	100
82-0420	Measuring Cylinder, Soda Glass, Spouted, BS EN 4788	250
82-0460	Measuring Cylinder, Soda Glass, Spouted, BS EN 4788	500
82-0500	Measuring Cylinder, Soda Glass, Spouted, BS EN 4788	1000
82-1840	Measuring Cylinder, Plastic with Spout, Graduated to BS 5404	100
82-1860	Measuring Cylinder, Plastic with Spout, Graduated to BS 5404	250
82-1880	Measuring Cylinder, Plastic with Spout, Graduated to BS 5404	500
82-1900	Measuring Cylinder, Plastic with Spout, Graduated to BS 5404	1000
82-1920	Measuring Cylinder, Plastic with Spout, Graduated to BS 5404	1000

Pipettes & Burettes

Product Code	Product	Capacity (ml)
82-1240	Graduated Pipette, Type 1, Class B, BS 700, 0.10 ml sub-divisions	10
82-1260	Graduated Pipette, Type 1, Class B, BS 700, 0.25 ml sub-divisions	25
82-1300	Bulb Pipette, BS 1583	50
82-1320	Bulb Pipette	100
82-1440	Burette, Soda Glass with Single-Bore Stopcock, BS EN ISO 385 Class B, 0.10 sub-divisions	50

Syringe & Stirring Rod

Product Code	Product
82-2820	Syringe with Rubber Bulb, weight 500 g
82-4005	Glass Stirring Rod, 7 mm dia x 200 mm long, Pack of 10

Temperature Measurement

Hydrometers, Aggregate Testing

Product Standards:

BS 812, EN 1367-2, ASTM C88, AASHTO T104

Product Code	Product
82-3505	Hydrometer, type L50, ASTM C88, graduated 1150 to 1200 relative density (used with sodium sulphate method)
82-3510	Hydrometer, type L50, ASTM C88, graduated 1250 to 1300 relative density (used with magnesium sulphate method)

General-Purpose Thermometers

Product Code	Product
82-5310	Maximum and Minimum Thermometer, non hazardous
82-5311	Surface Thermometer, flat surface type with approximately 64 mm dia dial, accuracy ± 3°C

Non Hazardous Glass Thermometers

Product Standards:

BS 2000-58, EN 1427

Product Code	Temp Range (°C)	Divisions	Immersion
82-5005	-10 to +260	1.0°C	76 mm
82-5270	-1 to +51	0.1°C	Total
82-5272	-1 to +101	0.2°C	Total
82-5274	-10 to +210	1°C	Total

Portable Dial-Type Thermometers

Product Code	Product
82-5243	Portable Thermometer, 64 mm dia dial with a 650 mm long stem
82-5244	Portable Thermometer, 25 mm dia dial with a 90 mm long stem and protective sheath
82-5245	Portable Thermometer, 25 mm dia dial with a 100 mm long stem and protective sheath
82-5246	Portable Thermometer, 50 mm dia dial with a 200 mm long stem and protective sheath
82-5247	Portable Thermometer, 50 mm dia dial with a 180 mm long stem
82-5248	Portable Thermometer, complies with BS 598 for temperature measurement of bituminous mixes prior to and during laying. Graduated in 2°C divisions with a stem length of 300 mm and accurate to ± 2°C

Digital Pocket Thermometer

Digital Pocket Thermometer

Product Code: 82-5420

The Stainless Steel probe carries a highly accurate platinum sensor and when not in use folds back into the side of the instrument. With a clear 8 mm high LCD display this instrument is powered by a standard 12 V MN21 battery or equivalent.

Specifications	
Temp Range (°C)	-49.9 to +199.9
Dimensions L x W x H (mm)	150 x 45 x 19
Range (°C)	–49.9 to 199.9
Resolution (°C)	0.1
Accuracy (°C)	±0.4
Weight (g)	105

Hand-Held Digital Thermometers

- Splash-proof membrane circuitry.
- Complete with probes and case.

This Hand-held Digital Thermometer is ideal for laboratory or site use. The unit provides for Celsius and/or Fahrenheit display to a clear LCD, powered by a standard 9 V PP3 battery or equivalent. The thermometer is supplied complete with surface probe, penetration probe, battery and case.

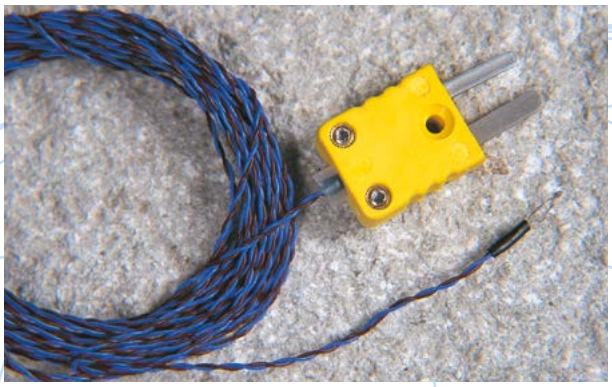
Digital Thermometer

Product Code: 82-5442

Specifications	
Range	-75°C to +1200°C or -30°C to +199.9°C or -75°F to +1999°F
Resolution and Accuracy	1°C (-75°C to +1200°C), 0.2% ± 0.1°C, 0.1°C (-30°C to +199.9°C), 0.2% ± 1.0°C, 1°F (-75°F to +1999°F), 0.2% ± 2.0°F
Cold Junction (Automatic)	0°C to 45°C
Weight (g)	500

Thermocouple Wire

Product Code: 82-5440/10



3 metre length, suitable for 82-5440 Digital Thermometer. The thermocouple is NiCr/NiAi PTFE covered with a naked exposed junction. Supplied with a coupling unit, the maximum reading is 250°C with a tip diameter of 0.5 mm (Pack of 5).

Specifications	
Nominal Dia (mm)	0.5

General

Chemicals, Test & Reference Materials

Product Code	Product
82-7031	Paraffin Wax, no hazard, (congealing point approx 49°C), 5 kg block
82-7091	Silica Gel, Coarse, no hazard, 500 g
82-7171	Sodium Sulphate, Anhydrous, no hazard, 3 kg
82-7341	Mould Oil, no hazard, 25 ltr drum
82-7401	Standard Sand, 600/300 µm, Fraction C, no hazard, 25 kg
82-7441	Standard Sand, ASTM, no hazard, 25 kg
82-7442	Standard Sand to ASTM C778 for use in Test ASTM 20/30
82-7451	Standard Sand, 850/600 µm, no hazard, 25 kg

Filter Papers (Box of 100)

Product Code	Product	Dia (mm)
82-7861	Filter Paper	55 x 400
82-7901	Filter Paper	74 x 150
82-7926	Filter Paper	44 x 150
82-7931	Filter Paper	95 x 110

Air Compressors

Air Compressor Unit 1000 kPa

Product Codes: 83-1735/01, 83-1735/06

Specifications	
Dimensions L x W x H (mm)	1321 x 457 x 914
Free Air Delivery	6.0 cfm
Receiver Capacity (ltrs)	116
Max Pressure	1380 kPa
Continuous Working Pressure	1000 kPa
Water Trap	Yes
Weight (kg)	149
Product Code	**Power Supply**
83-1735/01	220-240 V AC, 50 Hz, 1 ph
83-1735/06	220-240 V AC, 60 Hz, 1 ph

Air Compressor Unit 700 kPa

Product Code: 83-1730/01

Specifications	
Dimensions L x W x H (mm)	483 x 457 x 864
Free Air Delivery	2.0 cfm
Receiver Capacity (ltrs)	50
Max Pressure	1000 kPa
Continuous Working Pressure	700 kPa
Power Supply	220-240 V AC, 50 Hz, 1 ph
Water Trap	No
Weight (kg)	57

Vacuum Pumps

Product Code	Product
82-7700	Filter Pump
82-7720/01	Vacuum Pump
82-7720/02	Vacuum Pump

Vacuum Pumps

Product Codes: 82-7720/01, 82-7720/02

Specifications

Type	Single stage
Pump	Oil filled rotary
Ultimate Vacuum	4 x 10–2 mbar
Displacement	42 ltrs per minute (2.4 m³/hour)
Weight (kg)	12.7
Product Code	**Power Supply**
82-7720/01	220-240 V AC, 50-60 Hz, 1 ph
82-7720/02	110 V, 60 Hz, 1 ph

Spares/Consumables:

Vacuum Oil, 4 litre (82-7720/10)

Accessories:

Rubber Tubing (81-0375)

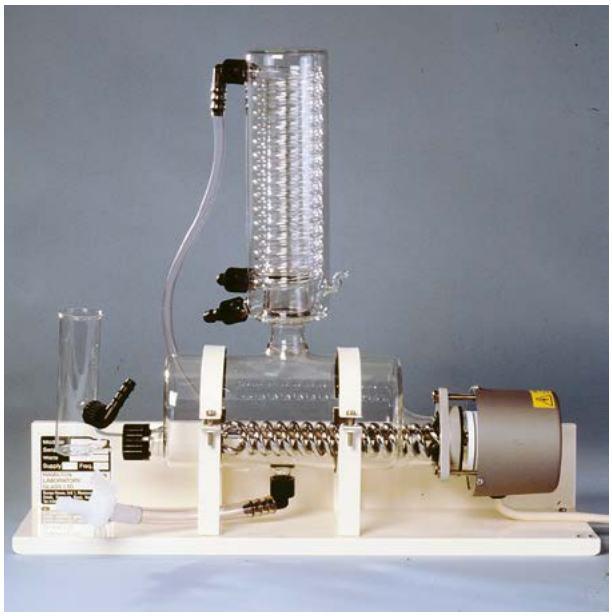
Water Trap Filtering Kit (82-7720/12)

High Vacuum Pump (88-3110/02)

Distilled Water Still

Distilled Water Still

Product Code: 82-8020/01



Specifications

Dimensions L x W x H (mm)	590 x 530 x 940
Boiling Chamber	Glass
Condenser	Borosilicate glass
Output	3.5 ltrs/hr when permanently connected to water supply
Power Supply	220-240 V AC, 50-60 Hz, 1 ph
Rated Power (kW)	2.75
Weight (kg)	12

Accessories:

Heating Element (82-8020/10)

Replacement Condenser (82-8020/11)

Water Baths

Specifications

Product Code	Power Supply	Capacity (ltrs)
82-8500/01	220-240 V AC, 50-60 Hz, 1 ph	12
82-8600/01	220-240 V AC, 50-60 Hz, 1 ph	18
82-8650/01	220-240 V AC, 50-60 Hz, 1 ph	22

General

Masonry Saw

Masonry Saw

Product Codes: 82-8950/01, 82-8950/02, 82-8960/01

Specifications		
Dimensions L x W x H (mm)	1195 x 705 x 1350	
Rated Power (W)	2200	
Weight (kg)	120	
Product Code	**Power Supply**	**Cutting Depth with 300 mm dia Blade (mm)**
82-8950/01	220-240 V AC, 50 Hz, 1 ph	110
82-8950/02	110 V AC, 60 Hz, 1 ph	110
82-8960/01	220 V AC, 50 Hz, 1 ph	150

Diamond Blade

Product Code: 82-8950/12, 82-8960/12

Wet cutting. Depth of cut 110 mm.

Specifications	
Product Code	**Nominal dia (mm)**
82-8950/12	350
82-8960/12	450

Dial Gauges

Product Code	Product	Travel (mm)	Grad (mm)	Back Type
83-5416	Dial gauge	25	0.01	C
83-5451	Dial gauge	10	0.002	B
83-5456	Dial gauge	10	0.01	A

Dial Indicators

Product Code	Product
88-4070	Dial Indicator 0.4 inch Range
88-4080	Dial Indicator 10 inch Range
88-4100	Dial Indicator 1 inch Range
88-4110	Dial Indicator 25 inch Range
88-4120	Dial Indicator 1 inch Range with 0.001 inch Divisions Counter-Clockwise
88-4130	Dial Indicator 25 mm Range with 0.1 mm Divisions Counter-Clockwise
88-4158	Magnetic Dial Indicator

Furnaces

Muffle furnaces are widely used for determining various properties of construction materials.

Muffle Furnace

Product Codes: 83-4170/01, 83-4170/06

Product Standards:

EN 196-2, EN 459-2, EN 13454-2, BS 1016-4, ISO 344, ISO 1171, ASTM D2361, ASTM D2795, ASTM D3714

Specifications	
External Dimensions L x W x H (mm)	545 x 385 x 400
Work Chamber Dimensions L x W x H (mm)	300 x 200 x 120
Internal Volume (ltrs)	6.9
Max Temperature (°C)	1200
Power (kW)	5
Weight (kg)	130
Product Code	**Power Supply**
83-4170/01	220-240 V AC, 50-60 Hz, 1 ph
83-4170/06	220-240 V AC, 60 Hz, 1 ph

Spares/Consumables:

Controller for use in 83-4170/01 (83-4170/11)

Heating Element for use in 83-4170/01 (83-4170/14)

Heating Element and Refractory Brick for use in 83-4170/01 (83-4170/12)

Refractory Brick for use in 83-4170/01 (83-4170/13)

Thermostat, KGrade, 370 mm long x 2.5 mm diameter, for 83-4170/01 (83-4170/10) Product Standards

High Temperature Laboratory Furnace 1600°C (Muffle Furnace Alternative)

Product Code: 83-4180/01

BS EN 61010-2-010:2014, BS EN 61326-1:2013

Features:

- 1600°C maximum operating temperature.
- Controller, with single ramp to set-point and process timer.
- 3 litre chamber volumes.
- Soft closing parallel action door.
- Silicon carbide heating elements provide long life and are able to withstand the stresses of intermittent operation.
- Have a cast alumina hearth.
- Low thermal mass insulation for high energy efficiency.

Specifications	
External Dimensions L x W x H (mm)	655 x 435 x 610 (905 - door open)
Internal Dimensions L x W x H (mm)	120 x 120 x 205
Internal Volume (ltrs)	3
Max Temperature (°C)	1600
Configuration	Bench Top
Max Power (W)	4500
Holding Power (W)	2300
Weight (kg)	42

Environmental
Test Equipment

FIELD & GENERAL LABORATORY INSTRUMENTATION KEY AREAS

Soil
- Sampling
- Classification
- Analysis
- Water
- Physics
- Survey

Water
- Quality
- Flow
- Sampling
- Level

Meteorology
- Rain
- Wind
- Temp/Humidity
- Light
- Evaporation
- Pressure

Crop Science
- Plant Physiology
- Seed Technology
- Crop Processing

Environmental Testing

The Environmental Division at ELE International supplies environmental monitoring equipment for Industry, Education, and Government Institutions. This Division was launched in 1983, and the product range has developed to provide a comprehensive range of high quality instruments for environmental monitoring professionals.

One of ELE's best known environmental products is the Paqualab Water Quality Test Kit, a portable modular system enabling physical, chemical and microbiological analysis of water to be performed.

ELE's main areas of environmental interest focus on:

- Survey
- Soils
- Water
- Meteorology
- Crop Science
- General Laboratory Equipment

Physical Survey

Aerial Survey

Pocket Stereoscope

Product Code: 500-010

- 2x magnification with plastic frame.
- Complete with storage bag.

Mirror Stereoscope

Product Code: 500-012

- 3x binocular eyepiece.
- 1.2x magnification eyepiece.
- Parallax wedge and carry case.

Surveying Equipment

Binoculars, 10 x 50

Product Code: 500-190

- Suited to twilight and night observations.
- Supplied complete with carrying case.

Altimeter/Barometer

Product Code: 500-112

- Monitors barometric pressure, temperature and altitude.
- Built in stopwatch.

Electronic Digital Theodolite

Product Code: 500-175

- Supplied complete with instruction manual, protective cover, carrying case and a heavy duty, aluminium tripod.

Specifications	
Magnification	30x
Clear Objective Aperture (mm)	45
Shortest Focusing Distance (mm)	1.4
Accuracy	2 mgon (10 inches)
Min Reading	1 mgon (5')

Automatic Level

Product Code: 500-170

- Supplied complete with instruction manual, protective cover, carrying case and heavy duty, aluminium tripod.

Specifications	
Magnification	32x
Objective Dia (mm)	38
Shortest Focusing Distance (mm)	0.3
Working Range of Compensator	±15’
Levelling Accuracy	±0.5
Circular Bubble	8’/2 mm
Horizontal Circle	400 gon/360°
Dust/Waster Protection	IP 54
Weight (kg)	1.5

Levelling Staff, 5 metres

Product Code: 500-145

- Aluminium 5 section telescopic, complete with carry bag.

Ranging Pole

Product Code: 500-146

- 2 metres ranging pole, aluminium.
- 2 sections with red/white markings.
- Pack of 6 in a bag.

Ranging Pole Tripod

Product Code: 500-150

- Tripod in bag.

Land Chain

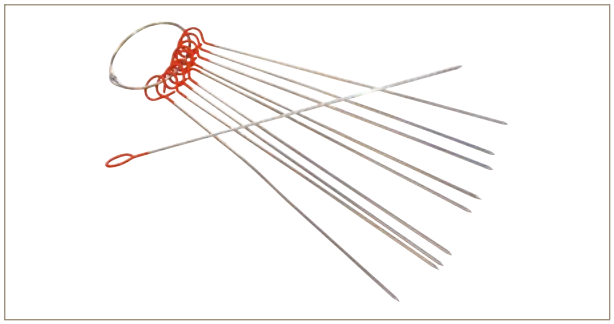
Product Code: 500-154

- 30 metres, black enamelled.

Physical Survey

Land Chain Arrows

Product Code: 500-156



➤ Pack of 10.

Clinometer

Product Code: 500-106

A hand-held precision instrument for determining heights, slopes and vertical angles. The direct sighting device has the peak scale reading visible through the eye piece. Percentage and degree scales permit quick calculation of object heights using a known base line distance. Used by foresters, geologists and surveyors throughout the world.

Sighting Compass

Product Code: 500-108

With inclinometer. A folding pocket instrument with sighting mirror in the lid. Used for defining map locations and measuring geological equipment.

Land Measuring Wheel

Product Code: 500-118

➤ For rough terrain.

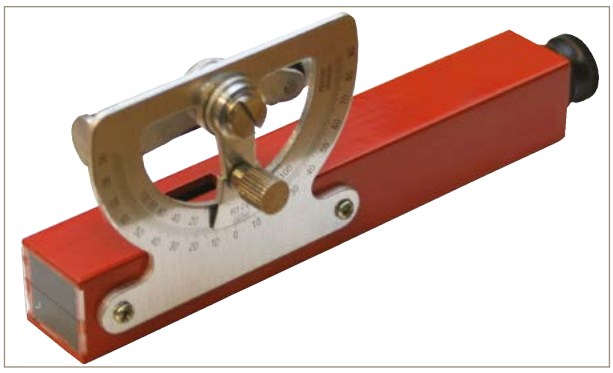
Double Prismatic Square

Product Code: 500-126

➤ Case with plumb bob.

Abney Level

Product Code: 500-132



➤ 133 mm Abney level with belt looped leather case.

Digital Planimeter

Product Code: 500-140

- Lightweight device with an 8 digit LCD display capacity.
- Measures in cm^2, $metres^2$, km^2, $inches^2$, ft^2 and acres.
- Solid plastic carry case supplied.

Specifications	
Accuracy	± 0.2%
Measuring Range (mm)	3000 x 300 (120 x 12 inches)
Power	Internal NiCad or AC adaptor
Operating Hours	30 hours (After 15 hours recharge)
Dimensions (mm)	150 x 240 x 39
Weight (g)	650

Fast Speed Tape

Product Code: 500-162

- 50 metres fast speed tape on open frame winder.

Laser Distance Meter

Product Code 500-116

Soils

Soil Sampling

One Piece Augers

For increased versatility and convenience it may be preferred to have sectional augers. When joined with a bayonet and sleeve connection, the resulting unit has a working length of 1.25 metres. If required the augers may be further extended by either 0.5 or 1 metre increments.

Edelman Auger

One piece model, length 1.25 metres. Suitable for use in most soft soil types. 3 cutting head sizes available.

Specifications

Product Code	Head Size/Dia (mm)	Head Type / Suitability	Weight (kg)
510-078	50	Edelman Auger	1.5
510-080	70	Edelman Auger	1.5
510-082	100	Edelman Auger	2

Riverside Auger (Two Sizes)

One piece model, length 1.25 metres. This auger is used in hard stiff soils above and below ground water level. It is also satisfactory in most fine gravel soils. 2 cutting head sizes available.

Specifications

Product Code	Head Size/Dia (mm)	Head Type / Suitability	Weight (kg)
510-086	70	Riverside Auger	2

Auger for Stony Ground

Product Code: 510-092

One piece model, length 1.25 metres with 70 mm diameter cutting head. Used when the Riverside auger is inadequate to deal with the larger sizes of gravel and stones.

Grass Plot Sampler (Small)

Product Code: 510-106

For collecting samples from the top 50 mm of the turf.

Further Information:

Diameter 23 mm, operating length 50 mm, total length 600 mm.

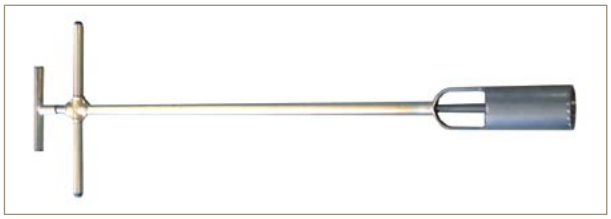
Gouge Auger

Product Code: 510-100

One piece model with 30 mm diameter cutting head. Operating length 1 metre.

Root Auger

Product Code: 510-104



One piece model with 80 mm diameter cutting head. Sample length 150 mm.

Sectional Augers

Spiral Auger

Product Code: 510-119

40 mm diameter cutting head. 600 mm long with bayonet connector. For use with 510-109, 510-110 and 510-111.

Auger for Stony Ground

Product Code: 510-118

70 mm diameter cutting head, 600 mm long with bayonet connector. For use with 510-109, 510-110 and 510-111.

Edelman Clay Auger (Two Sizes)

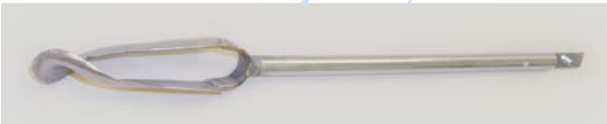
One piece head and rod, approximately 600 mm long with bayonet connector. For use with 510-109.

Specifications

Product Code	Head Size/Dia (mm)	Head Type / Suitability	Weight (kg)
510-112	70	Edelman Clay Auger	0.9
510-113	100	Edelman Clay Auger	1

Edelman Sand Auger

Product Code: 510-117



70 mm diameter cutting head, approximately 600 mm long with bayonet connector. For use with 510-109.

Auger Handles & Extension Rods

Auger Handle & Down-Tube Assembly

Product Code: 510-109

600 mm long with bayonet connector and coupling sleeve.

Auger Extension Rod (Two Sizes)

With coupling sleeve.

Specifications

Product Code	Length (m)	Weight (kg)
510-110	1	2
510-111	0.5	0.8

Edelman Combination Auger

One piece head and rod, approximately 600 mm long with bayonet connector. For use with 510-109.

Specifications

Product Code	Head Size/Dia (mm)	Weight (kg)
510-114	40	0.7
510-115	70	0.85
510-116	100	1.2

Soils

Auger Sets (Two Sizes)

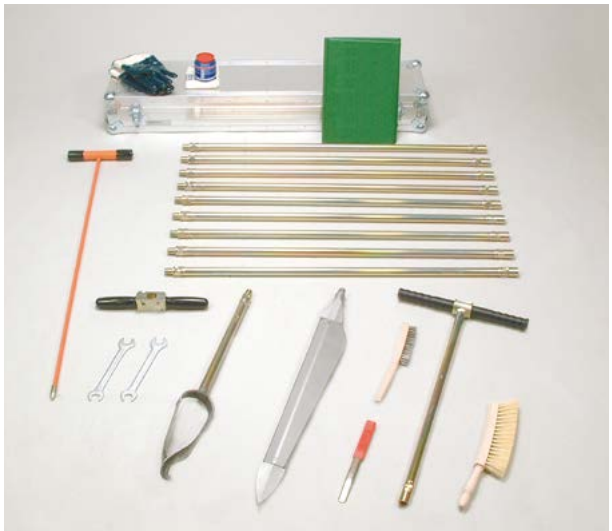
For augering all types of soil above and below the water table to a depth of 5 or 7 metres. Supplied complete in an aluminium transport case with padlock.

Specifications

Product Code	Kit Depth (m)	Case Dimensions (mm)	Weight (kg)
510-124	5	1080 x 230 x 140	33
510-128	7	1120 x 390 x 320	150

Peat Auger Set

Product Code: 510-120



For sampling to a depth of 10 metres. Supplied complete in an aluminium transport case.

Specifications

Kit Depth (m)	Case Dimensions (mm)	Weight (kg)
10	1080 x 230 x 140	32

Sampling Kit with Water Retentivity Rings

Product Code: 510-144

This kit contains the necessary items to sample above and below the water table and comprises the handle and beating head, Edelman auger, a Riverside auger, a closed ring auger and spare cutting shoe, a hammering head and guide cylinder for the rings, a nylon headed hammer, 3 extension rods 500 mm long, 24 numbered sample rings with end caps in an aluminium case, a bent spatula, brush and a carrying bag for all the equipment.

Sample Rings 50 mm Diameter 24 Supplied with Case

Product Code: 510-146

Supplied in a special synthetic case which is strong and resistant against humidity and heat. 50 mm inside diameter, 53 mm outside diameter, 51 mm long. Includes 48 plastic end covers.

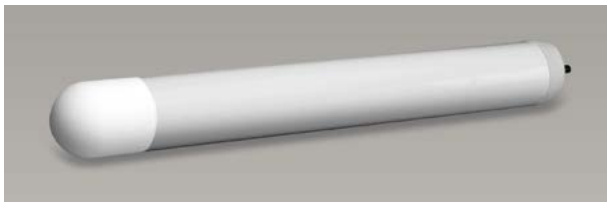
Soils

ELE International are exclusive UK distributors for Soil Moisture Equipment Corp. in a number of countries around the world. See our range of Soil Moisture products in the sub-categories below.

Soil Water Samplers

Samples water from saturated and unsaturated soils. This range of soil water samplers can be installed either above or below the water table. They are designed to collect soil water, which can then be extracted from the device and taken to the laboratory for analysis. The sampler is installed into a hole made with a screw or bucket auger. A negative pressure of up to 85 centibars is applied to the tube using a hand pump. Water enters the sampler through the porous ceramic cup at the end of the sampler. Water samples can be collected as required utilising the universal extraction kit (450-066). The rate of water accumulation depends on the soil type and moisture content. Nitrate leaching from fertiliser applications can be monitored simply and effectively using these instruments. Please note the 450-066 Universal extraction kit is required for the operation of soil water samplers. Each soil water sampler has; plastic tube, ceramic cup, stopper assembly, neoprene tubing and pinch clamp.

Soil Water Samplers (Various Sizes)



- Easy installation.
- Requires no maintenance.
- Ideal for nitrate monitoring.
- 3 sampler sizes available.

Specifications	
Product Code: 450-060	
Sampler Length (mm)	300
Outer Dia (mm)	48
Weight (kg)	0.26
Dimensions (mm)	305 x 127 x 127
Product Code: 450-062	
Sampler Length (mm)	600
Outer Dia (mm)	48
Weight (kg)	0.38
Dimensions (mm)	609 x 127 x 127
Product Code: 450-064	
Sampler Length (mm)	914
Outer Dia (mm)	48
Weight (kg)	0.48
Dimensions (mm)	914 x 127 x 127

Spares/Consumables:

Nylon Tube 7.5 metres (450-060/10)

Stopper Assembly including neoprene tubing and pinch clamp (450-060/12)

Accessories:

Universal Extraction Kit (450-066)

Universal Extraction Kit

Product Code: 450-066

This kit is designed for use with Soil Water Samplers 450-060, 450-062, 460-064 by withdrawing collected samples from near-surface or column soil water samplers. The Extraction Kit comes with a 50 ml syringe, 3.16 inches outside diameter tubing, 3.32 inches outside diameter nylon tubing and luer connectors, a vacuum dial gauge, capable of developing vacuums to 800 kPa. Rugged portable design for prolonged use in the field. Field repairable valve and pump pad pressures to +50 PSI, vacuums to 0.8 bars suction. All parts are Brass, Stainless Steel or rugged plastic for long service.

Soils

Soil Analysis

Soil Test Kits

No weighing required. Safe and accurate to use. Consistency of test results. No storage or shipping hazards. Our range of soil test kits enables people without access to normal laboratory facilities to obtain accurate information about the nutrient status of a soil sample. The tests are based on a system which uses reagents compressed into stable tablet form. The tests are conducted without the intricacies of weighing out chemicals or dispensing liquid reagents. Applications include soil classification, identification of nutrient deficiencies, routine soil analysis, field and educational uses.

Soil pH & Lime Requirement Test Kit

Product Code: 513-012

The Soil pH and Lime Requirement Kit includes reagents for 50 tests.

Further Information:

Includes a soil scoop, de-ion pack, crush/stir rod and cuvette brush.

Soil Analysis Test Kit For Major Nutrients

Product Code: 513-016

Test Kit includes
Soil pH Test
Lime Requirement Test
Nitrate Nitrogen Test
Phosphate Phosphorous Test
Potassium Test

Further Information:

Includes a soil scoop, de-ion pack, soil tester for pH, nitrogen and phosphorous. Double tube assembly for potassium.

Soil Management Test Kit

Product Code: 513-018

This test kit measures soil pH, conductivity, N/P/K, magnesium and calcium using simple visual test methods. It is durable, designed for field use and includes:

Pocket conductivity sensor for soil conductivity and soluble salt testing for areas of salinisation concern. Provided in a shoulder bag and hard case containing all components required to commence soil testing immediately.

Visual Testing Hardware: Soil tester for soil pH. Soil tester for nitrogen (N), phosphorous (P) and magnesium (Mg). Double tube assembly for potassium (K). Tablet count container for calcium (Ca).

Electrochemical Testing Hardware:
Pocket conductivity sensor for soil conductivity and salinity including calibration standard.

Reagents:
Complete reagent set for 50 tests for soil pH, lime requirement, nitrogen, phosphorous, potassium, magnesium and calcium including extraction and test reagents.

Sample Preparation/Accessories:
De-ion pack, soil sample bags, soil scoops, filter funnels and paper, sample container/dilution tubes, syringe, crush/stir rods, cuvette brush.

Test Kit includes
Soil pH Test
Lime Requirement Test
Conductivity Test
Nitrate Nitrogen Test
Phosphate Phosphorous Test
Potassium Test
Magnesium Test
Calcium Test

Soil Management Test Kit For Principal Nutrients

Product Code: 513-019

For 50 tests of each of the principal nutrients.

Test Kit includes
Soil pH Test
Lime Requirement Test
Conductivity Test
Salinity Test
Nitrate Nitrogen Test
Phosphate Phosphorous Test
Potassium Test
Magnesium Test
Calcium Test

Further Information:

Includes soil scoop, de-ion pack, multi parameter pocket sensor.

Soil Analysis Test Kit

Product Code: 513-024

Test Kit includes
Soil pH Test
Lime Requirement Test
Conductivity Test
Salinity Test
Nitrate Nitrogen Test
Phosphate Phosphorous Test
Potassium Test
Magnesium Test
Calcium Test
Aluminium Test
Ammonia Test
Copper Test
Iron Test
Manganese Test
Sulphur Test

Soils

Soil Water

Permeability

Double Ring Infiltrometer Kit

Product Code: 514-440

A comprehensive kit used for the determination of infiltration capacity above the water table. Allows synchronous determination of infiltration capacity in triplicate. The components are manufactured from high-quality materials for exhaustive field use.

Kit includes	Qty
Double Ring Infiltrometers	3
Inner Ring 280 mm, Outer Ring 530 mm Dia	1
Inner Ring 300 mm, Outer Ring 550 mm Dia	1
Inner Ring 320 mm, Outer Ring 570 mm Dia	1
Driving Plate with Handle for Inner and Outer Rings	1
Adjustable Measuring Bridges	3
Floats with Measuring Rods	3
Nylon Headed Hammer	1
Stop Watch (0-30 sec x 0.1 sec accuracy)	1

Specifications	
Measured Parameters	Infiltration Ratio
Reading Accuracy (mm)	1
Registration Type	Manual
Package Size (mm)	650 x 650 x 500
Weight (kg)	56

Spares/Consumables:

Soft Headed Mallet (29-5020)

Stopwatch (81-0521)

Accessories:

Club Hammer (29-5040)

Double Ring Infiltrometer

Product Code: 514-444

With measuring bridge and float.

Infiltration Ring Driving Plate

Product Code: 514-446

With handle for placing. For hammering in infiltration rings with 280 to 570 mm diameter.

Driven Wellpoint Piezometer Tip

Product Code: 514-380

Comprising a porous plastic element. 19 mm diameter x 300 mm long, in a perforated steel tube with hardened steel driving point. Terminates in a 3/4 inch BSP pocket.

Soil Moisture

Soil Moisture Meter

Product Code: 514-126

This instrument is rugged, hand-held for field derivation of soil moisture. Buriable soil moisture blocks allow moisture levels to be measured throughout the soil profile. It is easy to use and battery operated. This instrument is the ideal companion for the new, slim design moisture blocks, which are placed in the soil and leads connected in turn to the meter. The measured resistance of the block, in ohms, is converted to a corresponding reading between 0 and 100 on an empirical scale. In practical terms this empirical range covers the soil suction range 0.2 to 15 bar, and using the calibration graphs of soil moisture content (dry weight percentage) against soil suction in bars, the soil moisture content may be determined. In practical situations, resistance blocks are often placed at various depths in the soil to monitor soil moisture content profiles across the root zone. Experience will determine the optimum depth of placement depending on the particular soil type. The soil moisture blocks are designed for use with this particular meter and give a uniform and quick response, made possible by their slim design (20 mm diameter).

Specifications	
Measuring Range	0-100 empirical range corresponds to 0.2-15 bar
Power Requirements	1 x 9 V battery (supplied)
Weight (kg)	0.90

Accessories:

Product Code	Product	Lead Length (m)
514-128	Soil Moisture Block	0.9
514-130	Soil Moisture Block	2.7
514-132	Soil Moisture Block	4.5

Soils

TDR

Trase Soil Moisture Analyser

Product Code: 514-160/01

- Measures volumetric water content of soil.
- Time Domain Reflectometry yields an unsurpassed level of accuracy.
- Direct readout of volumetric water content.
- Rugged, waterproof and portable.
- Graph display for in-depth soil physics studies.

The Trase system uses Time Domain Reflectometry (TDR) to measure the volumetric water content of soils and other moist media. Waveguides for depth measurement ranging from 150 mm to 700 mm are available. The volumetric moisture content is displayed, and the graph of the TDR pulse can also be displayed. The moisture reading and the graph of the TDR pulse can be tagged for identification and stored for later analysis. The Trase system can be programmed to auto log moisture readings. All stored data can be transferred via an RS 232 port to an external printer or computer for further processing. The Trase is designed for rugged field use and is environmentally sealed to prevent damage to sensitive electronic components.

Specifications	
Dimensions (mm)	540 x 440 x 380
Measuring Range	0-100% volumetric moisture content
Measuring Accuracy	+/- 2% FS or better
Operating Temperature	-5°C to +45°C Autologging without use of display
Power Supply (supplied)	2 x 7 amp hr, sealed electrolyte batteries
Recharge Time (hrs)	12
Auxillary Power Input	18-24 V AC or DC, 1.5 amp, for battery recharge or operation from mains
Operating Temperature	0°C to 45°C Do not store below -20°C
Memory	256 Kb, capacity for 180 graphs/5600 readings
Graphic Display	128 x 256 dot, black lit LCD
Weight (kilos)	11.92

Spares/Consumables:

Buriable Wave Guide (514-166)

Accessories:

20 metre Cable Extension (514-168)

Alignment Block (514-169)

Insertion Tool (514-167)

Wave Guide 150 mm (514-160/10)

Wave Guide 300 mm (514-162)

Wave Guide 600 mm (514-164)

Wave Guide 700 mm (514-165)

Buriable Wave Guide

Product Code: 514-166

2 x 200 mm long parallel Stainless Steel tubes with 2 metre coaxial lead.

MiniTrase Kit with Bluetooth & Android

Product Code: 514-190/01

The MiniTrase uses Time Domain Reflectometry (TDR) to measure instantaneously the volumetric water content of soils and other moist media. A variety of connectors and waveguides for depth measurements ranging from 150 mm to 700 mm are available, and can be used in a portable manner or permanently installed for periodic moisture monitoring. The volumetric moisture content is displayed on the Android tablet, and the graph of the TDR pulse can also be tagged for identification and stored for later viewing and analysis on the tablet or a PC. All stored data can be transferred either by hotsyncing the Android to your PC or via an RS 232 port connection from the MiniTrase to the PC. The MiniTrase unit is designed for rugged field use and is environmentally sealed to prevent damage to sensitive electronic components. Kit includes: Multiplexer card, cables, chargers, Android tablet, and software.

Kit includes	Qty
MiniTrase with Multiplexer Card	1
Android Tablet	1
Flash Drive with WinTrase and Android to PC Software	1
WinTrase Software on CD	1
Standard Waveguide Connector	1
Set of 150 mm long Waveguides	1
Internal Bluetooth Module	1
Connector Cable from MiniTrase to PC RS 232	1
Power Supply Unit for MiniTrase	1
MiniTrase Backpack	1
Set MiniTrase Operating Instructions on Mini CD	1
Set of 3-Letter Code Instructions	1

Specifications	
Dimensions (mm)	540 x 440 x 380
Measuring Range	0-100% volumetric moisture content
Measuring Accuracy	+/- 2% FS or better
Operating Temperature	0° to +45°C
Power Supply (supplied)	1.7 amp hr, sealed NiCad battery
Recharge Time (hrs)	12
Auxillary Power Input	18 V DC, 2.2 amp AC
Connecting Ports	BNC (waveguide connection) DB-9 Serial (data transfer) DB-15 Multiplexer (multiplexing) Power (8-pin DIN)
Memory	256 Kb, capacity for 180 graphs/5610 readings
Measuring Pulse Amplitude	1.6 volt peak
Sampling Resolution	10 picoseconds
Hardware	5 slot card cage: 3 system boards, 1 optional slot, and multiplexing board
Weight (kilos)	7

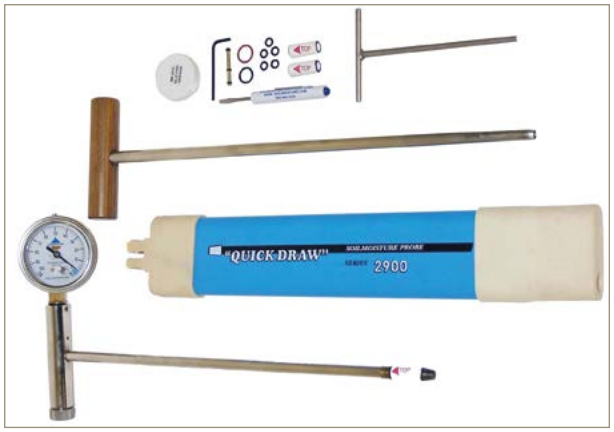
Soils

Tensiometers

Tensiometers are used to measure soil tension, which is directly related to the amount of soil moisture available to plants. Capillarity is established between the waterfilled tensiometers and the soil water via a ceramic cup or tip. As soil water tension increases, water is drawn by suction from the tensiometer and the negative pressure created, which is representative of soil tension, may be read from a vacuum gauge.

Quickdraw Soil Moisture Probes (Two Sizes)

Product Codes: 514-010, 514-012



The world's only portable, fast reading tensiometer. Accurately measures soil water tension. Supplied with coring tool and carrying case. 2 sizes available. The quickdraw soil moisture probe is an accurate, portable, inexpensive means for measuring the moisture available in the soil for plant uptake. The quickdraw probe is ready for immediate use and requires no adjustment or calibration. No batteries are required and its ease of maintenance means that these tensiometers give years of continuous, trouble free service. Used extensively and accepted enthusiastically by farmers, growers, groundsmen and agronomists, world-wide. The coring tool is first used to core an access hole to the desired depth of measurement. The tensiometer is then inserted into the access hole and the ceramic sensing tip is placed in contact with the soil. The Null knob can be used to reach equilibrium and provide a measurement more rapidly.

Specifications	
Tensiometer Type	Quickdraw
Product Code: 514-010	
Length (mm)	305
Dimensions L x W x H (mm)	635 x 230 x 230
Weight (kg)	1.04
Product Code: 514-012	
Length (mm)	460
Dimensions L x W x H (mm)	762 x 230 x 230
Weight (kg)	1.31

Spares/Consumables:

Replacement Dial Gauge (514-010/12)

Dial-Type Gauge Tensiometer (Various Sizes)

Product Codes: 514-020, 514-021, 514-022, 514-024

Durable weather and soil resistant tensiometer. Designed for permanent installation. Rapid response. Accurate yet inexpensive, this tensiometer is ideal for long term deployment in both field and greenhouse environments. The tensiometer is easy to install, via the use of the custom insertion tool (514-030), and maintain, with a full range of spares available. Rapid response is ensured by the sensitive 0-100 centibar dial gauge, having a re-calibration facility. For convenience, a range of lengths are available for monitoring at variable depths. Note: For operating these tensiometers, a Service Kit (514-034) is required. The Insertion Tool (514-030) is used to provide a clearance hole and also to maintain existing hole diameter for the tensiometer.

Further Information:

Requires Service Kit (514-034)

Specifications	
Tensiometer Type	Dial-Type
Product Code	**Length (mm)**
514-020	300
514-021	450
514-022	600
514-024	900

Spares/Consumables:

Screw-Top Porous Ceramic Cup with O-Ring Cup Seal (514-020/11)

Vacuum Dial Gauge (514-020/13)

Accessories:

Insertion Tool (514-030)

Service Kit (514-034)

Jet Fill Tensiometer (Various Sizes)

Product Codes: 514-035, 514-036, 514-037, 514-038 514-040, 514-041

The most advanced and sensitive instrument available for the field measurement of soil moisture. The Jet fill range includes patented features for superior accuracy and even faster response time whilst retaining the ease of use, maintenance and durability of its counterparts. At the push of a button, the Jet fill action releases water into the tensiometer body with no disturbance of the surrounding soil. The large volume, detachable water reservoir enables the unit to be left in place for several months. The recalibrator-style gauge permits zero-point adjustments for research applications.

- Advanced, sensitive tensiometer.
- Patented Jet fill system.
- High accuracy.
- Fast response.
- 6 length options available.

Further Information:

Requires Service Kit (514-034)

Specifications	
Tensiometer Type	Jet Fill
Product Code	**Length (mm)**
514-035	152
514-036	300
514-037	457
514-038	609
514-040	914
514-041	1220

Accessories:

Insertion Tool (514-030)

Service Kit (514-034)

Tensiometer Extension Tube (514-042)

Tensiometer Service Kit

Product Code: 514-034

This kit is designed to service and maintain soil moisture tensiometers. Kit includes a vacuum hand pump, 455 ml natural colour plastic bottle, rubber washer, 3 mm outside diameter nylon tubing, spout/cap assembly, herbicide/ algaecide additive and 12 monthly chart forms.

Specifications	
Weight (kg)	0.77
Dimensions (mm)	330 x 330 x 170

Tensiometer Spare Parts

Replacement Dial Gauge

Product Code: 514-010/12

Vacuum dial gauge

Product Code: 514-020/13

Insertion Tool

Product Code: 514-030

To provide clearance hole and maintain hole diameter for tensiometers.

Specifications	
Length (mm)	1370

Soils

Soil Physics

Density Measurement

In this method of determining the dry density of in-situ soil, a core-cutter of known volume is driven into the soil by a rammer. The core-cutter is dug out, trimmed and the soil inside weighed and dried for a moisture and density check.

Core-Cutter Apparatus

Sample Ring

Product Code: 530-175

53 mm outside diameter. 50 mm inside diameter.
Content 100 cc. Made from Stainless Steel.

Sample Ring Plastic Covers

Product Code: 530-176

For Sample Rings 53 mm. Pack of 2.

Sample Ring Hammering Head

Product Code: 530-178

For Sample Rings 53 mm.

Sample Ring Guide Cylinder

Product Code: 530-179

Penetrometer

Computerised Cone Penetrometer complete with GPS Receiver 128K

Product Code: 516-045

Supplied complete with rechargeable battery, case and 64K memory.

Spares/Consumables:

Spare Cone and Shaft Assembly (516-045/10)

Spare Cone & Shaft Assembly

Product Code: 516-045/10

Pressure Plate Extractors

Used to determine available water capacity, water retentivity, hydraulic conductivity and field capacity. Applications include soil classification and survey, optimisation of irrigation and drainage, calibration of soil water and measuring apparatus for field use. The pressure plate apparatus is used to determine soil water retention and suctions greater than 0.4 bar. The apparatus consists of strongly built metal chambers containing one or more ceramic plates onto which uniform soil samples are placed. Having attained maximum moisture retention (field capacity) the samples within the cells are then subjected to controlled positive air pressures and water is gradually removed. By careful control of pressure, the various equilibrium conditions of pressure and soil water tension or suction are obtained. The air pressure is provided either from a compressor, compressed air bottle or nitrogen bottle, but must always be routed through a manifold having pressure regulators and gauges. ELE can supply three types of pressure plate extraction systems which cover the pressure range 0-15 bar.

Pressure Plate Extractor 5 Bar

Product Code: 532-100

Specifications	
Capacity	4 pressure plate cells (Up to 48 samples)
Pressure	0-15 bar (75 psi)
Closure	6 bolts with wing nuts; O-ring seal on lid
Support Clips	Stainless Steel, adjustable
Outflow	4 tube assemblies with 3 plug bolts; screw into side wall
Dimensions (mm)	300 dia x 220 depth
Weight (kg)	18.6

Spares/Consumables:

Hose Manifold to 15 Bar Extractor (532-112)
Hose Manifold to 5 Bar Extractor (532-111)
O-Ring Lid Seal, Pack of 2 (532-100/10)
Outflow Tube Assembly with Seal (532-120/14)
Plug Bolts with Seal (532-120/16)
Right-angle Outflow Adaptor Kit (532-120/12)

Accessories:

1 Bar Pressure Plate Cell (532-104)
15 Bar Ceramic Cup (532-124)
3 Bar Pressure Plate Cell (532-106)
5 Bar Pressure Plate Cell (532-107)
Electrical Lead-through (532-126)
Soil Sample Retaining Rings, Pack of 12 (532-108)

Pressure Plate Extractor 15 Bar

Product Code: 532-120

Specifications	
Capacity	4 pressure plate cells (Up to 36 samples)
Pressure	0-15 bar (220 psi)
Closure	8 bolts with wing nuts; O-ring seal on hinged lid
Outflow	5 ports with outlet tubes NPT outlet
For Electrical Leads	1/4 inch (6.45 mm)
Internal Dimensions (mm)	305 dia x 101.6 depth
Weight (kg)	40.4

Spares/Consumables:

Hose Manifold to 15 Bar Extractor (532-112)
O-Ring Lid Seal, Pack of 2 (532-100/10)
Outflow Tube Assembly with Seal (532-120/14)
Plug bolts with Seal (532-120/16)
Right-angle Outflow Adaptor Kit (532-120/12)

Accessories:

1 Bar Pressure Plate Cell (532-104)
15 Bar Ceramic Cup (532-124)
15 Bar Pressure Plate Cell (532-120/10)
3 Bar Pressure Plate Cell (532-106)
5 Bar Pressure Plate Cell (532-107)
Electrical Lead-through (532-126)
Soil Sample Retaining Rings, Pack of 12 (532-108)

Soils

Pressure Plate Cells

Pressure Plate Cell 1 Bar

Product Code: 532-104

Developed from a high fired Alumina body. Extremely porous, inert to most solutions, possesses hard exterior and interior surfaces, and pure white in colour. Recommended for standard differentials under 1 Bar.

Specifications	
Pressure (Bar / PSI)	1 / 14.5
Approx. Bubbling Pressure (PSI)	28 - 32
Effective Pore Size (micron)	2.5
Hydraulic Conductivity (cm/sec)	0.0000086
Approx. Porosity	45% by volume
Weight (kg)	1.18

Pressure Plate Cell 3 Bar

Product Code: 532-106

Developed from a complex mixture of ball clays fired to a ceramic body. Good porosity and good hydrologic flow capability. The material is moderately hard and tannish-white in colour. Not recommended for fluid. Recommended for specialised applications where the pressure differentials are under 3 Bar.

Specifications	
Pressure (Bar / PSI)	3 / 43.5
Approx. Bubbling Pressure (PSI)	46 - 70
Effective Pore Size (micron)	0.7
Hydraulic Conductivity (cm/sec)	0.00000025
Approx. Porosity	34% by volume
Weight (kg)	1.18

Pressure Plate Cell 5 Bar

Product Code: 532-107

Developed from a complex mixture of ball clays fired to a ceramic body. Good porosity and good hydrologic flow capability. The material is very hard and brownish-white in colour. Not recommended for fluid sampling. Recommended for specialised applications where the pressure differentials are under 5 Bar.

Specifications	
Pressure (Bar / PSI)	15 / 217.5
Approx. Bubbling Pressure (PSI)	220
Effective Pore Size (micron)	0.16
Hydraulic Conductivity (cm/sec)	0.00000000259
Approx. Porosity	32% by volume
Weight (kg)	1.05

Pressure Plate Cell 15 Bar

Product Code: 532-120/10

Developed from a proprietary mixture of ball clays fired to a ceramic body. Pinkish-tan in colour, moderately hard and will withstand pressure differentials of 15 Bar.

Specifications	
Pressure (Bar / PSI)	15 / 217.5
Approx. Bubbling Pressure (PSI)	220
Effective Pore Size (micron)	0.16
Hydraulic Conductivity (cm/sec)	0.00000000259
Approx. Porosity	32% by volume
Weight (kg)	0.82

Soil Sample Retaining Rings (Pack of 12)

Product Code: 532-108

Extractor Hose Manifolds

Specifications

Product Code	Product	Length (m)
532-111	Hose Manifold to 5 Bar Extractor	1.5
532-112	Hose Manifold to 15 Bar Extractor	1.5

Low Pressure Manifold

Product Code: 532-110

Required to regulate gas pressure source in pressure plate extraction systems. 3 types available to cover all requirements. Enables precise control of pressure. The 532-110 Pressure Control Manifold is designed for regulating and monitoring the pressure supplied to pressure extractors. It is comprised of an air filter, pressure regulators, control valves, and test gauges. Mounted by standoffs to a 19 mm 3/4 thick baseboard suitable for mounting on a laboratory wall. (The connecting hose, from the manifold to the compressor, is ordered separately). Precise low-pressure control manifold designed for use with the 532-100 5 Bar Pressure Plate Extractor. Output pressure can be regulated from 3 to 60 psi (0.2 to 4 bars). Double regulation is provided. Readout pressure test gauge is graduated from 0 to 60 psi (0 to 4 bars) in 0.2 psi and 0.02 bar intervals.

Specifications

Dimensions (mm)	635 x 482 x 330
Output Pressure Range	3-60 psi (0.2 to 4 bars)
Double Regulation Pressure Range	0-60 psi (0 to 4 bars)
Readout Pressure Test Gauge	0-60 psi (0 to 4 bars)
Weight (kg)	5.6

Low to High Pressure Manifold

Product Code: 532-128

Required to regulate gas pressure source in pressure plate extraction systems. 3 types available to cover all requirements. Enables precise control of pressure. Pressure manifolds are an essential component in pressure plate extraction systems. They are required to control the air pressure, from a compressor or compressed air vessel, into the extractor. ELE can supply three different types to cover all requirements; low pressure manifold, for 0.5 bar systems, low to high pressure manifold, for 1-15 bar systems, combination manifold, for both 0-5 and 1-15 bar systems running in parallel. The combination manifold combines both the low pressure and low to high pressure manifolds.

Specifications

Dimensions (mm)	635 x 482 x 330
Output Pressure Range	10 to 250 psi (0.7 to 16 bars)
Double Regulation Pressure Range	5-150 psa (0.3 to 10 bars)
Readout Pressure Test Gauge	0-300 psi (0-20 bars)
Weight (kg)	6.6

Soils

Combination Manifold

Product Code: 532-136

This is required to regulate gas pressure source in pressure plate extraction systems. There are 3 types available to cover all requirements and they enable precise control of pressure. Pressure manifolds are an essential component in pressure plate extraction systems. They are required to control the air pressure, from a compressor or compressed air vessel, into the extractor. ELE can supply three different types to cover all requirements; low pressure manifold, for 0-5 bar systems, low to high pressure manifold, for 1-15 bar systems, combination manifold, for both 0-5 and 1-15 bar systems running in parallel. The combination manifold combines both the low pressure and low to high pressure manifolds.

Specifications	
Dimensions (mm)	939 x 452 x 330
Pressure Range	1 to 75 psi
Weight (kg)	12.7

PM Compressor 220-240 V AC, 50 Hz, 1 ph

Product Code: 532-180/01

Ideal for pressure plate extraction systems. Electrically powered and fully accredited. Conforms to EC Directive 98/37/CE. This unit provides compressed air for all ELE's pressure plate apparatus. The compressor is designed for sustained, continuous operation and provides up to 20 bar operating pressure. These compressors are compact and can be transported easily by one person. The compressor consists of a motor and block, which is cast in one piece. This improves heat dissipation considerably. Pistons, piston rings, con-rod, bearings and crank flange have been designed with efficiency and durability in mind. Valves in the compressor block are machined in non-corrosive Stainless Steel and the valve reeds are fitted with heat dissipating lift limiters. This ensures air-tight valves and longer life. The robust electric motor features strengthened bearings and a generously-sized winding which lengthens motor life considerably. The motors start without problem even if the supply voltage is low. Every compressor is filled with special temperature resistant, top performance lubricating fluid. The result is almost no oil carbon deposits on the valves. This compressor must be used in conjunction with a manifold assembly if intended for use in pressure plate extraction systems.

Specifications	
Max Gauge Working Pressure	20 bar
Dimensions (mm)	525 x 260 x 430
Air Receiver Capacity (ltrs)	4
Highest Sound Pressure Value	75 dB when tested to DIN 45635
Theoretical Inlet Capacity	160 l/ min
Free Air Delivered	20 bar (at 8 bar working pressure)
No. of Cylinders	1
Oil Capacity (ltrs)	0.13
Oil Top-Up Qty (ltrs)	0.05
Max Mains Fusing (slowblow or gl glass)	16 amp
Max Rated Current	6.2 amp
Rated Power (kW)	1.1
Rated Speed (rpm)	2850
Protection Class	IP54
Max Cut-in Frequency	30 times / hour
Weight (kg)	29.5

Accessories:

Connection Set for 532-180 series (532-182)

Connection Set for 532-180 Series

Product Code: 532-182

Ceramic Cup 15 Bar

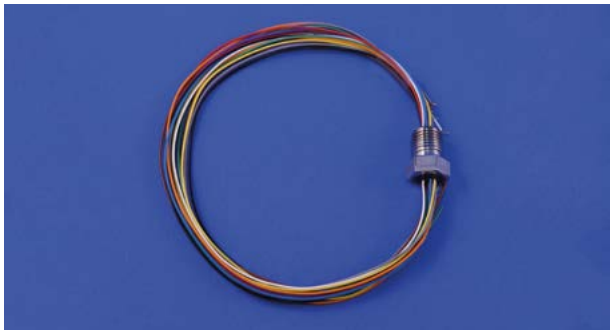
Product Code: 532-124

Used to calibrate all types of electrical moisture measuring blocks. The Cup Extractors are (83 mm) 3-1/4 inch overall height by (64 mm) 2-1/2 inch outside diameter and will fit into the 532-120 and 532-100 extractors. Inside cup dimensions are (45 mm) 1-3/4 inch diameter by (51 mm) 2 inch deep.

Specifications	
Outer Dia (mm)	61
Inner Dia (mm)	44.7
Outer Height (mm)	81.3
Interior Height (mm)	56.1

Electrical Lead Through

Product Code: 532-126



This Stainless Steel 1/4 NPT fitting leads through 10 electrical wires (26 AWG), connected to the fitting with epoxy seal. Handles up to 300 PSI.

Specifications	
Dimensions (mm)	77 x 77 x 25.4
Weight (kg)	0.03

Outflow Tube Assembly with Seal

Product Code: 532-120/14

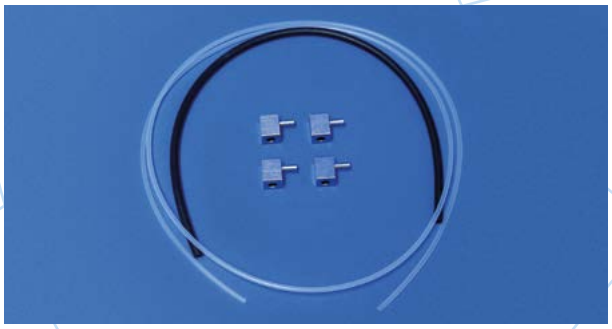
Plug Bolts with Seal

Product Code: 532-120/16

Set of 5.

Right Angle Outflow Adaptor Kit

Product Code: 532-120/12



Set of 4.

Water Level Measurement

Water Level Indicators

Water Level Indicator (Dipmeter) with Audio & Light Indicator

Product Codes: 450-008, 450-010, 450-011, 450-012, 450-013, 450-015, 450-017

Portable, lightweight, simple, reliable and easy to operate. Clear interval markings. Audible and visual water level alert signals. Dipmeters are portable instruments for measuring the water level in wells, standpipes and boreholes. They are simple to use, portable and can be used at many locations. The tape design prevents it from sticking to wet surfaces, such as the lining of a borehole, ensuring accurate measurements. The dipmeters have a Stainless Steel probe fitted to a flexible graduated cable which is wound onto a hand reel containing a transistorised switched circuit, audio (buzzer) and visual (LED light) indicators and a battery. Sensitivity adjustment for variations in water conductivity, non-stretch polyethene coated steel tape. The sensor probe incorporates an insulating gap which acts as a switch, the circuit being completed when contact is made with the water. The cable consists of non-stretch contoured tape with standard steel conductors, graduated at one millimetre intervals. The probe is lowered down a borehole on the end of the tape. When it makes contact with water a buzzer sounds and an LED light comes on, both located on the reel. A reading can then be taken from the tape at the top of the borehole to indicate the water depth. A sensitivity control is accessible inside the hand reel to enable adjustment to suit the water conductivity.

Available Lengths:

See Specifications table below.

Further Information:

Graduated every 10 mm.

Specifications		
Indicator	Audio and visual	
Tape Graduation	m/cm/mm	
Product Code	**Tape Length (m)**	**Weight (kg)**
450-008	30	1.7
450-010	50	2.0
450-011	100	3.0
450-012	150	3.8
450-013	200	4.6
450-015	300	7
450-017	500	11.5

Water & Sediment Sampling

Water Samplers

Water samplers fall into 3 main categories: those which collect an heterogeneous sample from, at, or just below the water surface; those which collect a sample from a specific depth in still water; and those which collect a mid-stream sample from a river, stream or irrigation channel. The ELE selection of samplers covers all applications.

Tube Water Sampler

Product Code: 520-200

To collect up to 250 ml. Complete with Stainless Steel measuring tape with grip and eye (20 metres).

Water Trap Sampler

Product Code: 520-215

This sampler is designed to be used in a flowing river or stream at any desired depth to 25 metres. The design is such that the open ends through which the water flows can be simultaneously closed, thus retaining the 1250 ml sample which may then be raised to the surface. The accessories include a hand winch, 25 metres of steel wire and a depth meter. The complete set is contained in a wooden transport case with padlock.

Further Information:

Case dimensions: 700 x 370 x 270 mm

Combination Sampling & Measuring Outfit

Product Code: 521-020

With colour scale, water sampling bottle, plankton net, bottom sampling dredge, sounding lead and calibrated line, 20 metres long marked at 1 and 5 metre intervals, armoured thermometer and Secchi disc (for turbidity check).

Further Information:

Supplied with carrying case.

Flow Measurement

Flow Meters

The method used for measuring the rate of a particular flow is determined by the course rate of flow and by the nature of the flow channel. The ELE range therefore encompasses equipment for measuring the faster flows encountered in rivers and streams, down to the low rates occurring during run-off from field drains.

Miniature Current Flow Meter Wading Set

Product Code: 520-265

For velocities 0.025 up to 5.0 metres/second. Consisting of current meter, revolution counter, wading rods, base and knob, 3 metre wading cable.

Further Information:

Complete with carrying case 850 x 180 x 220 mm.

Specifications	
Velocity Range (m/s)	0.025 to 5

Accessories:

PC Download Cable for Current Flow Meter (520-261)

Water

Large Current Flow Meter Wading Set

Product Code: 520-260

Consisting of current meter, revolution counter, wading rods, base and knob, 3 metre wading cable.

Further Information:

Complete with carrying case 850 x 180 x 220 mm.

Specifications	
Velocity Range (m/s)	0.025 to 10

Gauging Weirs & Flumes

Water is a precious agricultural resource. Careful monitoring is essential to ensure that it is used as effectively as possible. The comprehensive range of equipment offered has been specifically designed to measure or estimate the mass flow in both natural, or man-made, irrigation and drainage channels.

Parshall Flume (Small)

Product Code: 520-360

Having a throat width of 25 mm for flows 0.3 to 5 litres/second.

Further Information:

Overall dimensions 710 x 360 x 270 mm.

Parshall Flume (Large)

Product Code: 520-365

Having a throat width of 50 mm for flows 0.5 to 14 litres/second.

Further Information:

Overall dimensions 860 x 420 x 305 mm.

WSC Flume (Small)

Product Code: 520-375

For flows 0.1 to 2 litres/second.

Further Information:

Overall dimensions 500 x 250 x 175 mm.

WSC Flume (Large)

Product Code: 520-380

For flows 1 to 7.5 litres/second.

Further Information:

Overall dimensions 780 x 350 x 230 mm.

Weir Plate Set with Weir Plate Carrier & Four Interchangeable Weir Plates

Product Code: 520-390

1200 mm wide x 750 mm high x 5 mm thick.

Simple Cut-Throat Flume

Product Code: 520-345

Throat width 100 mm, for measuring flows in the range 0 to 15 litres/second.

Water Quality Testing

Comparator Reagents

Where only a few chemical tests need to be done, and accuracy is less important, it is cost-effective to use a colour comparator. These units can be used to perform the following tests: Ammonia, Chlorine, Iron, Nitrate, Manganese and pH.

Chlorine Starter Pack including Colour Disk & Reagents. Sufficient for 50 Tests.

Product Code: 432-032

Specifications	
Measurement Range (mg/l)	0-5.0

Chlorine Reagent Pack for Comparator. Sufficient for 250 Tests.

Product Code: 432-032/10

Specifications	
Measurement Range (mg/l)	0-5.0

Water

Paqualab Standard Systems

The two Paqualab systems are designed so that all the necessary equipment to determine the physical, chemical and microbiological parameters can be stored in one easily carried case. Results are obtained within 16 hours. The numerical results have precision and reproducibility. The method is simple and economical, enabling regular analysis to be carried out. This technique is accepted worldwide and Paqualabs are used in over 50 countries. Reusable components can be sterilised in the field. Consumables are pre-sterilised and have a long shelf life. Sample deterioration through transport and handling is eliminated.

Paqualab System 50 & 25 for Analysis of Drinking Water to EC Standard Categories 1 & 2

Product Codes: 418-160, 418-150

Portable drinking water quality testing system. Microbiological - Coliform and E.Coli. Physical - temperature, conductivity and turbidity. Chemical - pH, Cl, NH3, NO2 and NO3 plus over 40 chemical tests available. AC/DC and rechargeable battery powered incubator. On-site testing for fast, accurate results. Long-term monitoring and emergency testing of drinking water to EC and WHO guidelines. Comprising of the ELE Paqualab incubator 25 and 50, pH/temperature/mV meter, conductivity/temperature meter, turbidity meter, 0-1000 FTU, ELE Paqualab photometer, and consumables for 200 tests on faecal or total coliforms, chlorine, ammonia, nitrates and nitrites. The Paqualab is a portable testing system for the key drinking water quality parameters. The Paqualab allows the laboratory to be carried to water so that accurate results are obtained sooner, even in remote areas. Laboratory standard results can be obtained by operators with the minimum of training.

The equipment provided in each Paqualab has been specifically designed for field use. Aluminium replaces glass for many components for improved strength and lighter weight. The incubators have 2 pre-set temperatures that are usually set to 37°C and 44°C. The internal battery provides sufficient power for a full incubation cycle. Over 1000 Paqualabs are in use throughout the world for monitoring drinking water in remote areas, emergency situations, research and education. The Paqualab is a completely modular system. Standard kits are available as shown below. All items are also available individually to enable the user to build a system to meet their specific requirements. In addition, Paqualab Incubator systems contain all the hardware required for microbiological tests. Paqualab standard systems are based on the Incubator systems and also include tests for other parameters as shown below.

Further Information:

418-150: Overall dimensions 335 x 230 x 275 mm

418-160: Overall dimensions 475 x 230 x 275 mm

Standard System	50	25
Item Supplied	Product Code	
	418-160	418-150
(420-035) Universal and Incubator 50	Yes	-
(420-030) Universal Incubator 25	-	Yes
(430-020) pH/Temp/mV Meter	Yes	Yes
(513-160) Conductivity/TDSTemp Meter	Yes	Yes
(430-260) Turbidity Meter	Yes	Yes
(430-550) Photometer	Yes	Yes
(433-115/10) Chlorine Reagent System, Free, Total. Pack sufficient for 250 tests.	Yes	Yes
(433-102/10) Ammonia Reagent System, Pack sufficient for 250 tests.	Yes	Yes
(433-166/10) Nitrate Reagent System, Pack sufficient for 200 tests.	Yes	Yes
(433-168/10) Nitrite Reagent System, 4 Packs of 50 tests.	Yes	Yes
(422-010) Coliform Starter Pack sufficient for 200 tests.	Yes	Yes

Spares/Consumables:

Aluminium Petri Dishes (Pack of 25) (422-560)

Coliform Starter Pack, sufficient for 200 Tests (422-010)

Filtration Unit Aluminium Construction complete with Sampling Cup (420-450)

Membrane Lauryl Sulphate Medium 38.1 g Pack sufficient for 200 Tests (422-110)

Pad Dispenser (422-515)

Sterile Filter Membranes and Absorbent Pads (Pack of 200) (422-508)

Water

Paqualab Portable Incubators & Filtration Unit

The ELE Paqualab incubators are fully portable which enables microbiological water analysis to be carried out in remote locations which lack normal laboratory facilities. Various power supply options are available including internal rechargeable batteries or an external 12 V DC, 24 V DC, 110 V AC, or 240 V AC supply. This flexibility means that samples can be incubated on-site, in a car or in a laboratory thereby producing accurate results in the shortest possible time.

Paqualab Incubator 50:- Dual Incubator Filtration Unit 50 Aluminium Petri Dishes & Paqualab Incubator 25:- Single Incubator Filtration Unit 25 Aluminium Petri Dishes

Product Code: 420-035, 420-030

The ELE Paqualab 50 includes two incubators - the standard and universal (each with 2 pre-set temperatures, normally 37°C and 44°C), a membrane filtration unit, microbiological accessories kit, connecting cables and operating manual. All components are housed in a convenient rigid carrying case which can also accommodate a number of electronic meters from the ELE Paqualab range.

The ELE Paqualab 25 includes a universal incubator with 2 pre-set temperatures (normally 37°C and 44°C), a membrane filtration kit, connecting cables and operating manual. All components are housed in a convenient rigid carrying case which can also accommodate a number of electronic meters from the ELE Paqualab range.

Further Information:

The system will operate on 12 V or 24 V DC, 110 V or 240 V AC, or the internal 12 V rechargeable battery supplied.

Spares/Consumables:

Filtration Unit, aluminium construction complete with Sampling Cup (420-450)

Incubator System	50	25
Item Supplied	Product Code	
	420-035	420-030
Large Rigid Carrying Case	Yes	-
Standard Rigid Carrying Case	-	Yes
Universal Incubator	Yes	Yes
Standard Incubator	Yes	-
Incubator Linking Lead	Yes	-
Filtration Unit	Yes	Yes
Mains Lead	Yes	Yes
Battery Lead	Yes	Yes
Cigar Lighter Plug	Yes	Yes
Aluminium Petri Dishes	Yes	Yes
Plastic Autoclavable Bottles (x4)	Yes	Yes
Dropping Pipettes (x2)	Yes	Yes
Forceps	Yes	Yes
Magnifying Glass	Yes	Yes
Thermometer (Spirit)	Yes	Yes
Trim Tool	Yes	Yes
Grease	Yes	Yes
Instruction Manual in Binder	Yes	Yes

Filtration Unit, aluminium construction complete with Sampling Cup

Product Code: 420-450

- Anodised Aluminium Membrane Filtration Unit.
- Light compact and field sterilisable.
- Fits together for storage into a size of 120 mm high x 80 mm diameter.
- Supplied with sampling cup and nylon cord.
- Filtration unit graduated with 50 ml and 100 ml levels.
- Supplied with hand-operated suction pump.

Spares/Consumables:

Spare Parts Kit for Filtration Unit (420-451)

Membrane Filtration Unit Spare Parts Kit

Product Code: 420-451

For Filtration Unit (filter disc, gasket kit and 0-ring).

Water

Microbiological Starter Packs & Consumables

Coliform Starter Pack

Product Code: 422-010

Sufficient for 200 tests. Comprising 200 grid membranes and absorbent pads, one pad dispenser and 38.1 g membrane Lauryl Sulphate broth.

Spares/Consumables:

Membrane Lauryl Sulphate Medium 38.1 g Pack. Sufficient for 200 Tests (422-110)

Pad Dispenser (422-515)

Sterile Filter Membranes and Absorbent Pads. Pack of 200 (422-508)

Faecal Streptococci Starter Pack

Product Code: 422-020

Suitable for 200 tests. Comprising 200 grid membranes and 200 sterile plastic Petri dishes, 100 g Slanetz and Bartley medium.

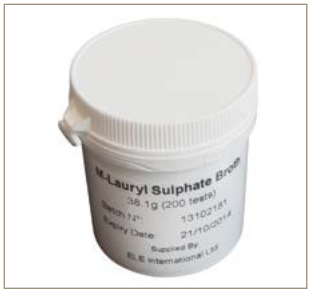
Aluminium Petri Dishes

Product Code: 422-560

Reusable pack of 25.

Membrane Lauryl Sulphate Medium

Product Code: 422-110



38.1 g to make approximately 500 ml of medium (200 tests).

Spares/Consumables:

Coliform Starter Pack. Sufficient for 200 tests (422-010)

Slanetz & Bartley Medium

Product Code: 422-120

21 g to make approximately 500 ml of medium (200 tests)

Sterile Plastic Petri Dishes

Product Code	Product	Pack Size
422-569	Plastic Petri Dishes	200
422-570	Plastic Petri Dishes	700

Pad Dispenser

Product Code: 422-515

Spares/Consumables:

Coliform Starter Pack. Sufficient for 200 tests (422-010)

Sterile Filter Membranes & Absorbent Pads

Product Code	Product	Pack Size
422-510	Filter Membranes and Absorbent Pads	1000
422-508	Filter Membranes and Absorbent Pads	200

Spares/Consumables:

Coliform Starter Pack. Sufficient for 200 tests (422-010)

Paqualab Test Meters

Digital pH/mV/Temperature Meter with Electrode, Carrying Case & pH 4 & 7 Buffers

Product Code: 430-020

- Robust waterproof case offering IP66/67 protection.
- Manual/automatic temperature compensation.
- Easy to use re-calibration function The 430-020 pH meter is a three-in-one instrument that features a large easy to read, LCD display which indicates pH over the range of -2 to 16 pH with a resolution of 0.01 pH, mV over the range of -1000 to 1000 mV and temperature over the range of -39.9°C to 149.9°C with a resolution of 0.1°C. The LCD display features both low battery indication and a user selectable backlight. The pH readings are either manually or automatically temperature compensated over the range of 0°C to 100°C. To automatically compensate it is necessary to utilise a thermistor temperature probe.

Each unit incorporates a power-off facility that automatically turns the instrument off after ten minutes, maximising battery life. The 430-020 has an integrated rubber seal to ensure complete water resistance and help to reduce the possibility of damage in harsh environments. At the touch of a button the instrument will automatically re-calibrate itself (two-point autocal) when used in conjunction with pH buffer solutions. Each unit incorporates an easy to use BNC connector and Lumberg screw-locking type connector.

Specifications	
Range	Resolution, Accuracy
-2 to 16 pH	0.01 pH, ± 0.02 pH
± 1000 mV	1 mV, ± 1 mV
-39.9°C to 149.9°C	0.1°C, ± 0.4°C (-10°C to 70°C)
Battery	3 x 1.5 volt AAA
Battery Life	Max 5 years (2500 hours)
Sensor Type	Combination electrode/thermistor
Display	12 mm LCD
Dimensions (mm)	32 x 71 x 141
Weight (g)	230

Spares/Consumables:

pH Electrode for use with 430-020 meter (430-020/10)

Spare pH Electrode for use with 430-020 Meter

Product Code: 430-020/10

General purpose, epoxy bodied electrode with gel fill solution (maximum temperature 60°C).

Water

Portable Conductivity/TDS Meter with Electrode & Carrying Case

Product Code: 513-160

Dissolved Oxygen/Temperature Meter with Electrode & Carrying Case

Product Code: 521-050

Portable Turbidity Meter, Range 0-1000 FTU, supplied with Carrying Case, Batteries & Calibration Solutions

Product Code: 430-260

Suitable for testing either natural and treated water, or waste water and effluents. This portable microprocessor-based turbidity meter provides lab-grade accuracy even in the field. With 4 keys and weighing only 510 g, the meter measures turbidity from 0 to 1000 FTU (NTU). For best field accuracy, it measures from 0 to 50 FTU in steps of 1/100th of FTU. Unlike standard lamps, the infra-red LED has a long life. More significantly, it maintains constant emission for the entire life of the instrument. The wavelength peaks at 890 nm, which provides the required intensity of diffused light even in samples with low turbidity values, and also reduces the interference from any colours. The meter is very easy to use. All operations can be carried out with only four keys and troubleshooting functions can be performed with error code on LCD. Moreover, the meter's versatility and durability ensure low maintenance. The meter can store and retrieve the last calibration data.

At the touch of a key the last calibration data, together with time and date, are displayed, allowing the user to maintain an accurate calibration schedule. Auto shut-off turns the meter off after 5 minutes of non-use to save batteries. The turbidity meter comes supplied with 2 cuvettes, tissues, cleaning solution and calibration solutions for 0 and 10 FTU.

- Easy to use.
- High range.
- Calibration data storage facility.
- Results displayed as FTU.
- Water resistant.

Specifications	
Range	0.00 to 50.00 FTU; 50 to 1000 FTU.
Resolution	0.01 FTU (0.00 to 50.00 FTU); 1 FTU (50 to 1000 FTU).
Accuracy	± 0.5 FTU or ± 5% of reading (whichever is greater)
Battery Life	60 hours or 900 measurements. Automatic shut-off after 5 minutes of non-use. (4 x 1.5 V AA batteries)
Dimensions (mm)	220 x 82 x 66
Weight (g)	510 g (including case and calibration solutions)

Turbidity Tube

Product Code: 430-250

The turbidity test is designed to give a measure of the suspended solids content of the final effluent. It is also useful in following the day to day variation in quality of sewage and effluent.

- Two-part tube 660 mm long.
- Range 5 to 500 JTU.
- Weight: 217 g.

Paqualab Photometer

Product Code: 430-550

Lightweight and portable for laboratory or field use. Accurate results using tablet reagents which have a long shelf-life. Over 40 different water tests available for use with the photometer. Ideal for use with ELE's Paqualab systems. This Paqualab photometer is simple to use, robust in construction and designed for on-site analysis. The photometer provides dependable results to enable decisions on water quality to be made instantly and with confidence. Simple operation with automatic set-up for each test.

Designed for reagent systems in tablet form. Rapid access to frequently used tests from a choice of over 100 parameters/methods. With dilution tube, 8 glass cuvettes, operating instructions and hard carrying case.

Further Information:

Test reagent tablets are not supplied. Available separately under Photometer Reagents.

Specifications	
Instrument Type	Dual light source photometer offering direct-reading of pre-programmed test calibrations, absorbance and transmittance
Wavelengths (nm)	450, 500, 550, 570, 600, 650
Accuracy	± 1.0% T
Display	320 x 240 pixel LCD with backlight and contrast adjustment
User Interface	On-screen prompts available in English, French, Spanish, German, Italian, Turkish and Mandarin (Chinese)
Dimensions L x W x H (mm)	250 x 150 x 70
Weight (g)	975
IP Rating	IP67
Power Supply	3 x 1.5 V AA batteries (typically 40 hours)
Test Cuvettes	Automatic centring for cylindrical cuvettes from 13 to 20 mm outside diameter

Standard Colour Comparator Kit in Carrying Case

Product Code: 432-020

Supplied without Colour Disks and Reagents.

Water Test Kit, includes tests for pH, Chloride, Total Hardness & Iron

Product Code: 521-080

Test Kit includes	Range (mg/l)
pH	4 to 11
Chloride	0 to 5000
Total Hardness	0 to 500
Iron	0 to 10

Supplied complete in a carrying case with reagents for 50 tests of each parameter.

Water

Photometer Reagents

Over 40 different water tests are available. The chemical reagents required for each water test are compressed into stable tablet form eliminating the possible errors that can result when measuring out chemical solutions.

Table of Photometer Reagents

* Reagent Systems contain reagents for 50 tests together with test instructions and plastic calibration chart
** 200 Reagent Refill Test Pack
*** Sufficient for 150 Tests

	Measurement Range	50 Test Reagent System*	150/200/250 Test Reagent Refill Packs**	Details
Alkalinity	0 – 500 mg/l $CaCO_3$	433-094 433-098	433-094/10 433-098/10	Natural and treated waters contain a variety of dissolved alkaline substances (e.g. bicarbonate).
		433-096	433-096/10	Test for Alkalinity P in boiler water and other industrial waters.
Aluminium	0 – 0.5 mg/l	433-100	433-100/10	Aluminium salts are found in natural waters. High levels can be toxic to fish. Aluminium Sulphate is used in drinking water treatment.
Ammonia	0 – 1.0 mg/l	433-102	433-102/10	Occurs when nitrogenous products break down in water. Ammonia is harmful to aquatic life, particularly fish.
Boron	0 – 25 mg/l	433-103	433-103/10**	Normally found as calcium or sodium borate. Some crops are very sensitive to Boron. Widely used in industrial processes so may be present in effluent discharges.
Bromine	0 – 6.0 mg/l	433-105	433-105/10	A powerful disinfectant used for water treatment and swimming pool management.
Calcium Hardness	0 – 500 mg/l $CaCO_3$	433-108	433-108/10	Test for Calcium hardness in natural and treated waters.
Chloride	0 – 50,000 mg/l NaCl	433-110	433-110/10	Test for Chloride salt in water.
Chlorine (DPD)	0 – 5.0 mg/l	433-115	433-115/10	Free, total and combined Chlorine test. Chlorine is used for the disinfection of drinking water and swimming pools.
Chlorine	0 – 250 mg/l	433-118	433-118/10	Total Chlorine test. High levels of Chlorine are used to disinfect or sterilise water distribution systems.
Chromium	0 – 1 mg/l Cr	433-120	433-120/10	Test for soluble Chromium in natural and industrial waste water.
Copper	0 – 5.0 mg/l Cu	433-130	433-130/10	Test for free, chelated and total Copper in natural and treated waters.
Cyanuric Acid	0 – 200 mg/l	433-134	433-134/10	Used as a Chlorine stabiliser in swimming pool water treatment.
Fluoride	0 – 1.5 mg/l	433-138	433-138/10**	Found naturally in some waters, but more usually introduced into drinking water to prevent tooth decay.
Hardness	0 – 500 mg/l $CaCO_3$	433-139	433-139/10	Test for Hardness in natural and treated waters.
Hydrazine	0 – 0.5 mg/l N_2H_2	433-141	433-141/10***	Test for Hydrazine in industrial water.
Hydrogen Peroxide	0 – 2.0 mg/l	433-142	433-142/10**	Used in water treatment processes.
Hydrogen Peroxide	0 – 100 mg/l	433-146	433-146/10	High levels of hydrogen peroxide are used in many industrial processes such as textile bleaching and paper making.
Iron	0 – 1.0 mg/l	433-150	433-150/10	Widely found in natural water. Affects the taste of water and causes staining. Insoluble iron deposits can cause small pipes to block.
Iron	0 – 10 mg/l	433-152	433-152/10	In industry, high levels of iron may occur due to corrosion or as a result of industrial processes.
Magnesium	0 – 100 mg/l	433-154	433-154/10	Magnesium salts contribute to the hardness of water.
Manganese	0 – 0.3 mg/l	433-156	433-156/10	Commonly found in many natural waters. Causes staining to laundry and plumbing fittings.
Molybdate	0 – 100 mg/l MoO4	433-160	433-160/10	Used as a corrosion inhibitor in industrial water treatment and so may be present in effluent discharges.
Nickel	0 – 10 mg/l Ni		433-164/10	Test for Nickel in natural and treated water.
Nitrate	0 – 1.0 mg/l N	433-166	433-166/10**	Nitrates are found in many natural and waste waters. They originate from chemical fertilisers, breakdown of vegetation and the oxidation of nitrogen compounds in effluents.
Nitrite	0 – 0.5 mg/l N	433-168	433-168/10	Nitrites are an intermediate product in the nitrogen cycle. Nitrites are harmful to fish and aquatic organisms.
Organophosponate	0 – 20 mg/l PO_4	433-170	-	Test for Organophosponate in cooling water.
Ozone	0 – 2.0 mg/l	433-172	433-172/10	Ozone is used in water treatment and swimming pool water disinfection.
pH	6.8 – 8.4	433-180	433-180/10	Uses the phenol red method to determine hydrogen ion activity.
Phenol	0 – 5 mg/l C_6H_5OH	433-182	433-182/10	Test for Phenol and ortho meta substituted Phenols in natural drinking and industrial waste waters.
Phosphate	0 – 4.0 mg/l	433-186	433-186/10**	Used extensively in food processing. Also present in many detergents and fertilisers. Not directly toxic, but phosphates are associated with the eutrophication of rivers and lakes.

	Measurement Range	50 Test Reagent System*	150/200/250 Test Reagent Refill Packs**	Details
Phosphate	0 – 10 mg/l	433-188	433-188/10	High levels of phosphates are used to treat water in industrial boilers so may be present in effuents.
Potassium	0 – 12mg/l	433-189	433-189/10	An abundant natural element. High levels can be an indication of brackish waters.
Silica	0 – 4.0 mg/l SiO2	433-190	433-190/10**	Colloidal silica and soluble silicates are abundant in many natural waters. Causes scale problems in many industrial processes.
Sulphate	0 – 200 mg/l	433-192	433-192/10	Occurs naturally in water, but often introduced during water treatment. High levels can cause corrosion to metalwork by sulphate reducing bacteria. Damage to cement can also take place.
Sulphide	0 – 0.5 mg/l	433-194	433-194/10**	Found in many natural waters, particularly hot springs. Present in many industrial effluents especially tanneries. Toxic to fish and aquatic organisms.
Sulphite	0 – 500 mg/l Na_2SO_3	433-196	433-196/10	Test for Sulphite in boiler water.
Zinc	0 – 4.0 mg/l	433-198	433-198/10	Used as a corrosion inhibitor in industrial cooling water so may be present in effluent discharges.

Daily Raingauges

De-Luxe Plastic Raingauge

Product Code: 460-010

Made from strong UV stabilised plastic. The detachable internal collecting jar is calibrated in mm and inches of rain.

Further Information:

Supplied with fixing bracket.

Copper Raingauge

Product Code: 502-012

127 mm diameter rim with inner can and measuring cylinder calibrated in mm.

Splayed-Base Daily Raingauge

Product Code: 502-013

British Meteorological Office MK 2 model, constructed from copper with splayed base to provide extra stability, and bevelled brass rim of 127 mm diameter. The inner copper can has a pouring lip and crass handle. Supplied with Meteorological Office pattern taper-base glass measure graduated in mm.

Specifications	
Dimensions (mm)	490 x 216
Weight (kg)	3

Raingauge

Product Code: 502-040

Meteorology

Wind Measurement

Hand-Held Anemometer

Product Code: 503-062

A robust, easy to use instrument of durable plastic construction. Wind strength/speed is clearly and accurately displayed on 4 scales (m/s, km/h, knots and Beaufort). A secure fitting transparent cap protects the cups when not in use.

Further Information:

Measurement Range 0 to 35 m/s, 0 to 120 km/h, 0 to 12 Beaufort, 0 to 70 knots.

Accessories:

Anemometer Cups. Set of 3 (503-062/10)

Digital Hand-Held Anemometer

Product Code: 460-050

The battery operated digital hand-held anemometer is particularly suited to site investigations, environmental surveys and meteorological observations. It is lightweight, manufactured from non-corrosive materials and has replaceable cups. At least 2000 readings can be obtained from a single battery, and an error message is shown when the power is low. When the instrument is switched on the wind speed is averaged over a 12 to 15 second period after which the result is shown on the display.

- Displays maximum gust.
- 4 selectable measuring units.
- Clear LCD display.

Further Information:

Complete with 2 support legs, storage bracket and spare cup.

Temperature Measurement

Maximum Thermometer -20°C to +55°C Mercury Filled

Product Code: 504-014

Stem divided, mounted on a strong weather-resistant plastic scale with indelible figures; two drilling holes for fixing to a wall. Records maximum temperature since last reset. Usually mounted inside a meteorological screen at about 5° to the horizontal. Range -20°C to +55°C, expected accuracy +- 0.2°C; divided to 0.5°C.

Specifications	
Dimensions (mm)	340 x 13
Weight (kg)	0.07

Minimum Thermometer -35°C to +40°C Spirit Filled

Product Code: 504-016

Mounted on plastic scale to match maximum thermometer. Specification as maximum thermometer but recording minimum temperature since last reset, in the range of -35°C to +40°C x 0.5°C.

Portable Soil Thermometer -10°C to +50°C

Product Code: 504-024

Range -10°C to +60°C, in a rugged brass case with stem graduated at 5, 10, 15, 20, 30 cm to enable measurement at various depths. Ideal for use in education.

Sheathed Earth Thermometer 300 mm

Product Code: 504-032

Temperature recordings are made by lowering the thermometer down a tube with a rope or chain. The thermometer bulb is encased in wax to allow a slow change of temperature to be recorded and when the instrument is recovered retaining the reading.

Further Information:

The tube is supplied with a solid brass sealing cap. Measuring range from -10°C to 45°C x 0.5°C.

Insulated Earth Thermometer

The insulated pattern themometer is left in the soil, with the added advantage that readings can be taken in-situ without disturbing the instrument. The lower portion is placed vertically in the earth with the bulb at the required depth, and the insulated thermometer stem and opal scale are supported on a black-enamelled mild steel angle bracket. The range is -10°C to +55°C divided into 0.2°C intervals.

Further Information:

For use from 50 to 1000 mm depth.

Specifications

Product Code	Length (mm)
504-038	50
504-040	100
504-042	200
504-044	300
504-045	500
504-047	1000

Earth Thermometer Support Bracket

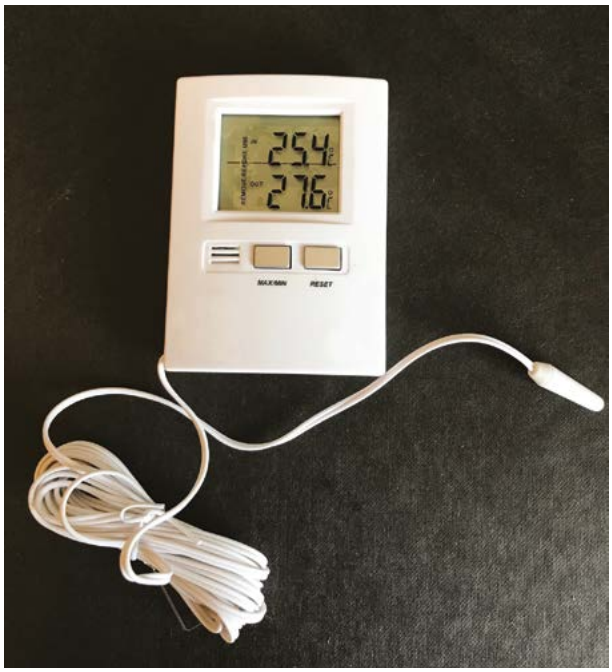
Product Code: 504-046

Metal support frame for use with Earth Thermometers.

Meteorology

Digital Inside/Outside Thermometer

Product Code: 504-019



This digital thermometer can be wall-mounted or free standing to display the ambient temperature. A plug-in probe with 3 metres of cable can be used to obtain the temperature in another area or from outside. The instrument has a memory to recall the maximum and minimum inside and outside temperatures since the last reset. Switchable between °C and °F.

- Remote temperature probe.
- Digital display.
- Maximum/minimum memory.

Further Information:

Supplied complete with display unit, remote temperature probe and 3 metres of cable.

Laboratory Thermometer with Low Toxicity Filling

Product Code: 504-023

General purpose insertion type thermometer containing no toxic filling. This thermometer features a reinforced stirring tip and an integral bulb. Ideal for propagators, greenhouses and laboratories.

Further Information:

Length 305 mm.
Range -10°C to 110°C.
Supplied in plastic tube.

Light Measurement

Campbell-Stokes Sunshine Recorder complete with 1 year's supply of charts

Product Code: 505-062

This instrument is used to record the duration of sunshine each day. The sun's rays are focused by a precision glass sphere onto a curved card. The intense heat burns a trace on the card. As the sun moves across the sky, so does the position of the spot across the card. If the sun is obscured by cloud then no trace is made. At the end of the day, the length, less gaps, is proportional to the duration of sunshine.

- Records duration of sunshine.
- Accurate measurements.
- Simple to use.

Further Information:

For latitudes 0° to 40° North or South.
Complete with one year's supply of cards.

Accessories:

Cards (one year's supply) for 505-062 (505-062/10)

Accupar Ceptometer with 800 mm Probe Datalogger & RS 232 Interface, Battery Powered

Product Code: 505-067

Digital Lux Meter

Product Code: 505-092

This portable lightmeter is for monitoring illuminance and gives a digital display in Lux. This simple to use instrument has only two controls; a power button and a range switch. It is ideal for field survey work and initial investigations.

- High accuracy and wide range.
- Remote sensor head.
- Ideal for field work.

Further Information:

Supplied complete with sensor head.

Light Measuring Unit (Lux Meter) with Sensor

Product Code: 505-106

General measurement for human activities. The visible light is that part of the wavelength spectrum received by the human eye. The peak sensitivity is 555 nm for the adapted eye but with ‘dark adaption’ a peak response is 507 nm. The ranges allow for readings between 0 to 200 K Lux. The sensor has a cosine-corrected head, and the FET input circuitry of the cc measuring and display unit preserves linearity. The unit also incorporates dual slope integration with “auto zero” for A/D conversion.

- Direct readout in energy units of visible light.
- Range 0 to 200 K Lux in 3 ranges of sensitivity.
- Used for siting of buildings, measuring light variations.

Further Information:

Complete with sensor, 1.2 metre cable, carrying case and battery.

Meteorology

Humidity Measurement

Hand-Held Therma-Hygrometer

Product Code: 506-150

Remote or integral % RH and temperature probe. Displays maximum/minimum humidity or temperature. Optional backlit display. The therma-hygrometer is an easy to use, relative humidity and air temperature measuring instrument. The units measure % RH over the range of 0% to 100% RH with a resolution of 0.1% RH and temperature over the range of -20°C to 70°C with a resolution of 0.1°C. It incorporates a custom LCD, displaying % RH, °C/°F, dew point indication, maximum/minimum and hold.

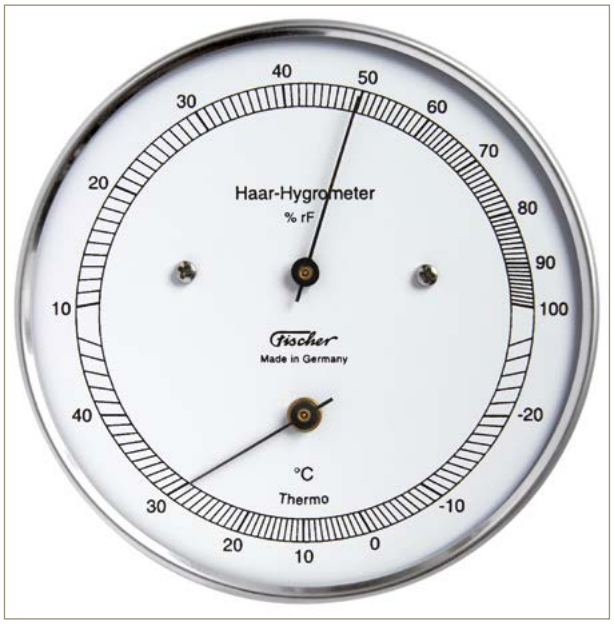
There is an automatic display of both open circuit and low battery. The 506-150 displays the temperature and humidity at the push of a button separately. The 506-150 is powered by three AAA batteries with a minimum life expectancy of 10,000 hours. An auto power-off facility turns the therma-hygrometer off automatically after ten minutes, maximising battery life. This hand-held battery operated instrument is operated by a single keypad button. It is suitable for a wide variety of applications where fast and accurate measurements of relative humidity and temperature are required. The probe is connected to the display unit via a one metre flexi-cable which enables its measurements to be taken in areas where access is limited.

Specifications	
Range	-20°C to 70°C, 0% to 100% RH
Resolution	0.1°C/°F, 0.1% RH
Accuracy - Temperature:	Accuracy ±0.4°C over the range 10°C to 40°C otherwise ±1°C ±1 digit
Accuracy - Humidity:	±2% RH (10% to 90% RH)
Hysteresis	± 1% RH
Sensor Type	Silicone bandgap, capacitance polymer
Battery	3 x 1.5-volt AAA
Battery Life	Min 5 years (10,000 hours)
Display	12 mm LCD
Dimensions (mm)	25 x 56 x 128
Weight (g)	130/160

Hygrometer/Thermometer 100 mm Diameter Dial 10% to 100% RH -25°C to +45°C

Product Code: 506-122

A precision instrument using specially treated strands of human hair to measure relative humidity. The 100 mm diameter gauge covers the range 10% to 100% RH. A separate set hand with a centre button is fitted to the case to enable the user to monitor changes. Can be wall-mounted or fitted inside a Stevenson screen.



Digital Electronic Temperature/Humidity Meter

Product Code: 506-124

This simple to use instrument shows both temperature and relative humidity on a clear LCD display. The internal memory stores the maximum and minimum temperature since the last reset. Ideal for installing in a greenhouse, propagator or vegetable store.

- Designed for wall-mounting.
- Shows temperature and humidity.
- Maximum/minimum internal memory.

Kew Pattern Masons Hygrometer supplied with Conversion Chart

Product Code: 506-104

A high quality hygrometer with accurate, stem-divided, mercury-filled thermometers made to British Meteorological Office design. The thermometers are fitted to laminated plastic mounts with indelible dividing and figuring. The mounts themselves are fitted to a laminated plastic back-plate which will not warp and is very strong. The water reservoir is supported by a metal strip attached to the back plate, and the bulb of one thermometer is kept constantly wet by capillary action. A cotton wick runs up from the reservoir and is threaded round a circle of muslin covering the bulb.

Further Information:

Temperature ranges -20°C to +55°C, complete with simple slide rule.
360 x 160 x 50 mm

Accessories:

Threaded Muslins and Wicks (506-104/12)

Wet & Dry Bulb Hygrometer

Product Code: 506-106

The wet and dry bulb hygrometer is designed for general use and consists of two undivided thermometers mounted on a printed plastic scale. Between the thermometers is a unique slide pointer which allows relative humidity to be easily read. The scale is housed in a plastic case which also holds a reservoir with anti-frost device.

- Easy to read.
- Use outdoors in a screen.

Further Information:

Easy to read pattern, range -5°C to +50°C.

Portable Humidity & Temperature Meter with Dewpoint & Wet Bulb Temperature Measurement

Product Code: 506-160

A hand-held instrument that displays relative humidity, temperature and dew point.

Specifications	
Range	-10°C to 60°C / 0% to 100% RH
Accuracy	23°C ± 5 K: 1% RH, 0.2 K

Meteorology

Evaporation Measurement

Hook Gauge Evaporimeter with Aluminium Pan

Product Code: 506-250

Because of the recognition of the accuracy of this instrument, reliable equations have been devised by which the readings obtained may be converted into useful figures for evaporation from lakes and reservoirs. The water level in a standard cylindrical tank (1220 mm diameter) is measured, usually every 24 hours, by adjusting the height of a hook until its point just breaks the surface. The measurement is taken inside a still-well which provides a small area of water surface free from ripples. The still-well, made of brass, stands on three levelling screws and has an opening in the base to equalise the water levels inside and out. The hook gauge, also brass, rests on top of the well supported by three horizontal arms, and has a micrometer head to provide very fine adjustment. A useful accessory is a maximum/minimum thermometer which floats just under the water surface in the main tank. A magnet is supplied for resetting the indices.

- Measures evaporation rate from a free water surface.
- Used by meteorologists and water engineers throughout the world.
- Manufactured to the American Weather Bureau pattern.

Further Information:

Consisting of hook gauge, still-well and galvanised iron tank as specified. Supplied without floating thermometer.

Spares/Consumables:

Class A Evaporation Tank (506-250/10)

Hook Gauge (506-250/14)

Still-Well (506-250/12)

Class A Evaporation Tank

Product Code: 506-250/10

Specifications	
Dimensions (mm)	1220 diameter x 254 height
Weight (kg)	64

Still-Well

Product Code: 506-250/12

Specifications	
Dimensions (mm)	215 x 254 x 254
Weight (kg)	18

Hook Gauge

Product Code: 506-250/14

Specifications	
Dimensions (mm)	165 x 115 x 115
Weight (g)	340

Atmospheric Pressure Measurement

Precision Aneroid Barometer 890-1050 mb

Product Code: 506-042

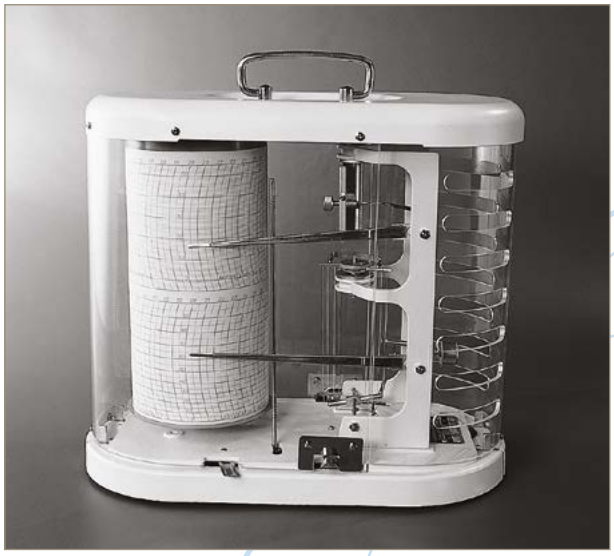
The precision aneroid barometer is used for measuring the absolute atmospheric pressure. The motion of the aneroid barometer is conducted to the axle of the pointer by driving a segment and wheel with an excellent fine finish of the gearing and bearings. This instrument has only got a minimum of idle friction because of the advantageous shape of the bearings and levers. Housing chromed brass with screw on flange diameter 165 mm.

Specifications	
Measuring Range	760 to 960 hPa / 570 to 720 mm Hg (800 to 2000 m above sea level)
Accuracy	± 0.7 hPa / ± 0.5 mm Hg
Scale Division	0.5 hPa / 0.5 mm Hg
Dial (mm)	130

Chart Recording Instruments

Thermo-Hygrograph -15°C to +65°C 0-100% RH, complete with 1 Year Supply of Charts & 2 Spare Pens

Product Code: 506-206



This combination instrument records both temperature and relative humidity on the same chart.

Further Information:

Mechanical movement, supplied with 52 weekly charts and a bottle of ink.

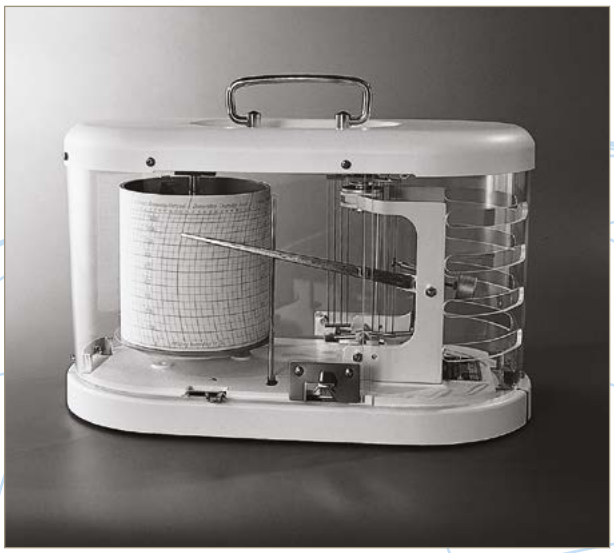
Spares/Consumables:

Weekly Charts for Thermo-Hygrograph Pack of 52 (506-206/12)

Refillable Black Fibre Pen for Chart Recording Instruments. (506-212)

Hygrograph 0-100% RH complete with 1 Year Supply of Charts & Spare Pen

Product Code: 506-203



The hygrograph uses hair to detect changes in humidity. The expansion or contraction of the hair is transferred into a vertical movement which is recorded on the revolving drum.

Further Information:

Mechanical movement, supplied with 52 weekly charts and a bottle of ink.

Spares/Consumables:

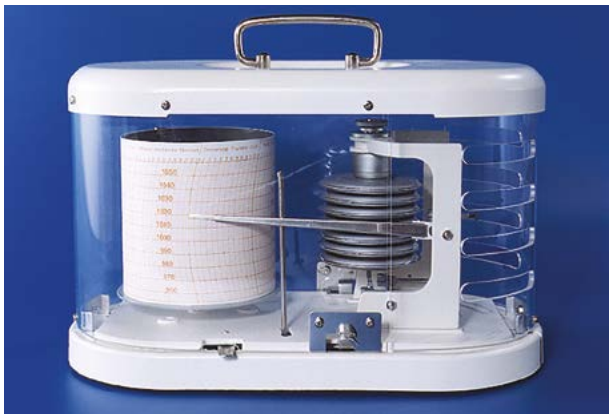
Weekly Charts for Hygrograph Pack of 52 (506-203/12)

Refillable Black Fibre Tip Pen for Chart Recording Instruments (506-212)

Meteorology

Barograph, 955-1055 mb complete with 1 Year Supply of Charts & Spare Pen

Product Code: 506-204



The barograph uses a vacuum capsule to detect changes in atmospheric pressure. The expansion or contraction of the capsule is transferred into a vertical movement which is recorded on the revolving drum.

Further Information:

Mechanical movement, supplied with 52 weekly charts and a bottle of ink.

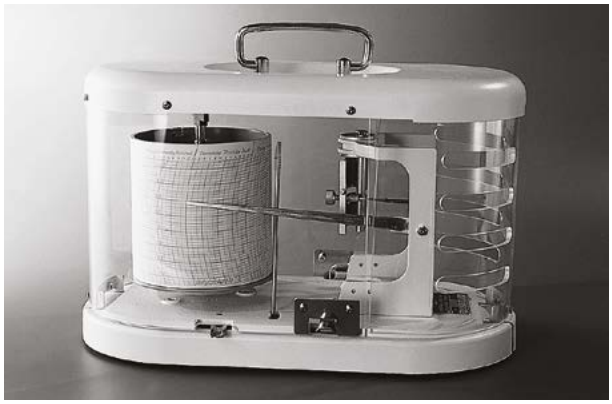
Spares/Consumables:

Weekly Chart for Barograph Pack of 52 (506-204/12)

Refillable Black Fibre Tip Pen for Chart Recording Instruments (506-212)

Thermograph -15°C to +65°C complete with 1 Year Supply of Charts & Spare Pen

Product Code: 506-201



The thermograph uses a bi-metallic element to detect changes in temperature. The expansion or contraction of the element is transferred into a vertical movement which is recorded on the revolving drum.

Further Information:

Mechanical movement, supplied with 52 weekly charts and a bottle of ink.

Spares/Consumables:

Weekly Chart for Thermograph Pack of 52 (506-201/12)

Refillable Black Fibre Tip Pen for Chart Recording Instruments (506-212)

Manual Weather Stations

Stevenson Screen

Product Code: 504-120

The Stevenson screen is designed to hold maximum and minimum thermometers, and a wet-and-dry bulb hygrometer. It is available either in the finished form, ready for use, or more cheaply as a make-it-yourself kit. Both are suitable for use in all climates. The screen is made from top quality seasoned wood, with double-louvred sides, a double layer roof, and a floor of overlapping boards separated vertically by an airspace. The front panel is hinged at the bottom to form a door, and is retained in the horizontal position by two chains; it may be padlocked shut.

Further Information:

Supplied without instruments or stand, painted white to reflect radiation.

Interior dimensions 435 x 250 x 445 mm.

Accessories:

Iron Stand for Stevenson screen (504-120) (504-124)

Budget Weather Station

Product Code: 461-050

This package of equipment provides low cost but accurate instruments to enable daily weather readings to be taken. Instruments include a maximum and minimum thermometer, soil thermometer, wet and dry bulb thermometer and Rain-o-matic electronic raingauge. A simple DIY screen is provided to house the thermometers.

Weather and Monitoring Stations

Environmental Weather Station

The Environmental Weather Station provides an automatic method of recording a wide range of meteorological and environmental data. It overcomes the problem of manual recording methods and replaces them with a simple to use data logging system which can be left unattended in remote areas and harsh environments. The data can be collected at convenient intervals using a portable computer.

Environmental Monitoring Station

Product Code: SP509-103

9 Channel Logger:

- Anemometer (Wind Speed) with 3 metre Cable Connector.
- Wind Direction Vane with 3 metre Cable and Connector.
- Relative Humidity and Temperature Probe.
- Pyranometer Sensor with Levelling Unit, 3 metre Cable and Connector.
- Raingauge with 6 metre Cable and Connector.
- Barometer with 3 metre Cable and Connector.
- Evaporation Pan and Gauge with 3 metre Cable and Connector, Solar Power System, 2 metre Portable Mast Mounted on Meta; Plate with Guylines and Pegs.

Accessories:

Wind Monitoring System (509-110)

Wind Monitoring System with Solar Panel

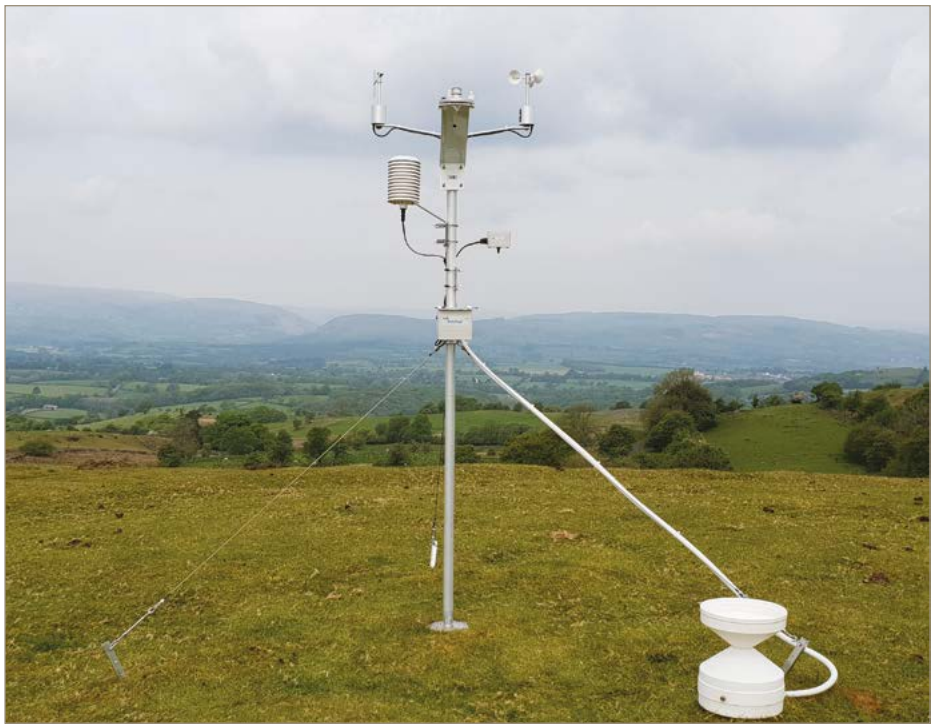
Product Code: 509-112

- Wind Monitoring System, comprising Logger with batteries, Wind Sensors and Pole Mounts.
- Solar Power Pack.
- Portable 2 metre Mast mounted on Metal Plate, with Guylines and Pegs.

Meteorology

Automatic Weather Station

Product Code: 509-105



Comprising of:

- 8 Channel Logger.
- Anemometer.
- Wind Vane.
- Relative Humidity and Temperature Probe.
- Pyranometer.
- Barometer.
- Rainguage.
- Soil Temperature Probe.
- 2 Metre Mast and Solar Panel.

Wind Monitoring System

Product Code: 509-110

Comprising of:

- Logger with batteries.
- Windspeed and Wind Direction Sensors.
- Pole Mounts.
- 2 Metre Mast with Metal Plate.
- Guylines and pegs.

Microbiology

Hand Lens

Product Code: 535-208

Complete with 15 mm diameter achromatc lens mounted in metal case.

Further Information:

Magnification x10.

Colony Counter

Product Code: 535-210/01

The petri dish is placed on the viewing screen and every time a colony is pressed a count is registered and accompanied by an audible tone. Both the amount of pressure needed to register a count and the volume of the tone are adjustable. The built-in adjustable magnifier enables samples to be examined more easily. For use with up to 100 mm glass or plastic petri dishes.

- Uniform glare-free illumination.
- Angled front for operator comfort.
- Counter triggered by depressing petri dish.
- Digital display of results.
- Built-in magnifier.

Further Information:

220-240 V AC, 50 Hz, 1 ph.

Single Tullgren Funnel

Product Code: 535-245/01

This apparatus is used for both dry and wet extraction of soil organisms. A soil or leaf litter sample is placed in the removable upper part of the funnel. Heat and light from the lamp creates a temperature gradient of approximately 14°C in the soil sample. This stimulates the downward movement of soil arthropods, and similar organisms, through the gauze to a receiver attached to the base of the funnel. The position of the lamp is adjustable to enable the temperature of the soil to be raised gradually, thus preventing the slower moving species from becoming trapped in hard dry cakes of soil. For wet extraction, the funnel is filled with water and the gauze is placed in position. Nematodes and other swimming forms collect in the base of the funnel and can be drawn off at intervals (this method is suitable for collecting potato eel worm). This method can be used either with or without the use of the lamp.

- Wet or dry extraction of soil organisms.
- Precision aluminium funnel construction.
- Stoppered collection vessel prevents loss of creatures.

Further Information:

220-240 V AC, 50 Hz, 1 ph.

Complete with funnel, wire gauze, soil retaining cylinder, length of rubber tube, lamphouse with lampholder, retort stand and instructions.

Spore Sampler complete with Sampler, Wind Vane, Rain Shield, Drum, Cutting Block, 1 kg Gelvatol, Tape, Scalpel

Product Code: 535-260/01

The spore sampler uses a pump to draw air through an orifice. Fungal spores and pollen are impacted onto a strip of adhesive coated plastic strip fitted to the clockwork driven drum. The sampling head can revolve and a large fin is fitted so that air is always drawn from upwind.

- Continuous sampling for up to 7 days.
- Built-in vacuum pump.
- 7 jewel clockwork recording drum.

Further Information:

220-240 V AC, 50 Hz, 1 ph.

Crop Science

Plant Physiology

Plant Water Status Console (No Tank)

Product Code: 540-310

12 inch Pressure Vessel, G4 Specimen Holder, 40 Bar Gauge. Tension in plant xylem can be measured using a plant water status console device. The petiole of a leaf or stem is placed in a rubber grommet so the leaves are inside the pressure chamber and the stem is outside at atmospheric pressure. By pressurising the chamber and watching the point where the sap oozes out of the stem at atmospheric pressure, the two forces are in balance.

Further Information:

Various sizes of Specimen Holders, Pressure Vessels and Gauges are available upon request.

Plant Water Status Console with Tank

Product Code: 540-315

The Plant Water Status Console is supplied with a compressed gas cylinder and connected to a pressure regulator for field operation. The pressure regulator has been set at the factory for the maximum operation pressure of the unit which, for standard units, is 600 psi.

Further Information:

Various sizes of Specimen Holders, Pressure Vessels and Gauges are available upon request.

Portable Leaf Area Meter

Product Code: 470-010/01

The portable leaf area meter enables samples to be measured without detaching them from the plant. The unit is operated using only two buttons to select options from the display. Individual readings can be stored, or areas can be accumulated as a running total. The unit is supplied with an RS 232 cable and IBM compatible software. This enables data to be transferred to a computer for further analysis if required. A full range of parameters can be measured including leaf area, width, perimeter length, shape factor and ratio. The sensitivity of the scanner can be adjusted so that healthy or diseased parts of the leaf can be recorded. This flexibility makes the instrument ideal for the field scientist investigating the effects of pollution on plants. The leaves do not have to be removed for measurement so the same plant can be monitored over a period of time in detailed experiments.

- Enables non-destructive measurements.
- Lightweight and fully portable.
- No calibration required.
- 32 K internal memory.
- Rechargeable battery.

Further Information:

For 220-240 V AC, 50 Hz, 1 ph.

Chlorophyll Content Meter for Plants & Crops with Battery, RS 232 Cable & Software

Product Code: 470-045

This instrument has been designed to accurately determine the chlorophyll content in plants and crops. Especially useful for improving Nitrogen management programs and is ideal for research and teaching. The ample on-board data storage and hand-held design makes this meter the most field efficient chlorophyll content meter on the market.

- Accurate and reliable results.
- Non-destructive.
- Lightweight, hand-held design.
- Storage of 160,000 data sets.

Plant Photosynthesis Analyser with Battery, 120-240 V AC, 50-60 Hz, 1ph

Product Code: 470-020/09

The plant photosynthesis analyser enables the scientist to investigate growing plants either in the field or laboratory. Since the plant is not damaged by the analysis it can be repeatedly tested under different conditions to observe the results. The leaf chamber is placed over the selected sample and a measured flow of air is pumped over the leaf surface. Sample data is typed into the keypad when requested. This includes leaf area details which can be estimated or measured using the Portable Leaf Area Meter. The concentrations of the carbon dioxide and water vapour in the incoming air are measured. By comparing these with the outgoing concentrations, the gas exchange rate and photosynthetic rate are calculated and shown on the display. Data is stored on removable cards and can be transferred to a computer via the built-in RS 232 port.

- Fully portable.
- Built-in self-checking system.
- Data storage.
- Automatic atmospheric pressure compensation.

Further Information:

Complete with battery, charger, carrying bag, harness, air probe and spare parts. Requires a leaf chamber for use.

Plant Efficiency Analyser with Control Unit & Sensor, Field Neck Support & Strap, Charger

Product Code: 470-040

When light shines on a plant it is absorbed by the chlorophyll molecules in the leaf. The absorbed energy is then utilised in a variety of ways including photosynthesis, the process by which carbon dioxide in the atmosphere is converted by the plant to organic compounds. A proportion of the absorbed energy is re-emitted as chlorophyll fluorescence. The Plant Efficiency Analyser measures this fluorescence and calculates key parameters to provide a direct measurement of photochemical efficiency and thus indicate stress conditions at an early stage. Many factors may influence the well-being of plants including the temperature and light conditions, shortage of water or nutrients, contaminated soil, air pollution and acid rain. All of these have an effect on chlorophyll fluorescence making this an ideal instrument for the serious study of plant health, crop selection or plant breeding.

- Lightweight, compact, portable field instrument.
- No moving parts for reliable operation.
- State-of-the-art microprocessor and logic control.
- Fast accurate measurement and calculations.
- PC link and analysis software included.

Further Information:

Includes carrying bag, sensor unit, battery charger unit, serial cable, analogue lead, instruction manuals, 20 leaf clips, and data analysis software for IBM PC compatible computers supplied on 5.25 inch and 3.5 inch discs.

Spares/Consumables:

Leaf Clips 4 mm Pack of 10 (Spare for 470-040). (470-040/10)

Crop Science

Porometer complete with Sensor Head 220-240 V AC, 50-60 Hz, 1 ph

Product Code: 540-026/01

When the sensor head is clipped onto a leaf, a small cup is gently pressed onto the leaf surface. Water vapour diffuses out of the leaf via the stomata and this raises the humidity in the cup. The instrument times the rise in humidity between two electronically preset levels. This RH transit time is a measure of water vapour loss and is automatically converted into diffusion resistance or conductivity. Calibration should be carried out at the start of each session and when environmental conditions change significantly. A polypropylene plate with 6 groups of precisely moulded holes is used to simulate a leaf. The diffusion resistance of each group is known from the physical dimensions of the holes. The instrument is calibrated using these values, and will also give a warning if changing conditions require recalibration.

- Direct readout of conductance or resistance.
- Simple field calibration.
- Stores up to 1500 readings.
- Leaf stress minimised during measurements.

Further Information:

Includes calibration plate, rechargeable battery, carrying case, RS 232 cable, adapter, data collection software, consumables and battery charger.

Spares/Consumables:

Porometer Spares Kit including Electronic Components, Pump Cables and Fuses (540-026/10)

Seed Technology

Laboratory Seed Blower

Product Code: 542-044/01

The Laboratory Seed Blower is a precision built laboratory machine designed to separate light and heavy fractions of a great variety of seeds. The blower is equipped with a synchronous motor to ensure uniform RPM and therefore consistent test results. Air flow is regulated with a calibrated vernier gate and adjusted with a calibrated hand wheel for precise adjustments that can be easily repeated. Large tube kit is standard with the Seed Blower.

Further Information:

For 220 V AC, 50-60 Hz, 1 ph

Specifications	
Dimensions (mm)	580 x 560 x 460
Weight (kg)	32

Jacobsen Seed Testing Bath

Product Code: 542-100/01

The Jacobsen Seed Testing Bath provides the conditions specific for seed testing according to the regulations of the International Seed Testing Association.

Further Information:

Includes Stainless Steel water bath with cooling coil, floor standing frame (can also be bench mounted), 13 Stainless Steel shelves for maximum thermal transfer, and cold water feed hoses.

Capacity for 65 cones (90 mm diameter).

For 220-240 V AC, 50 Hz, 1 ph.

Accessories:

Glass Plate for Jacobsen Seed Testing Bath (13 Plates required for each bath) (542-104)

Plastic Covers, Pack of 10, for Seed Testing Bath (7 Packs required for each bath) (542-106)

Stand for Jacobsen Seed Testing Bath (542-102)

Germination Cabinet with Sealed Stainless Steel Chamber

Product Code: 542-124/01

This robust germination unit is constructed in white polyester powder-coated steel, for a smooth, tough, easy-to-clean finish. The plastic coated wire mesh shelves are fully adjustable with 32 shelf positions at 29 mm centres. The dual temperature controller and thermistor system enable two temperatures to be set to correspond with “day” and “night” environments. An adjustable over-temperature safety cut-out protects the contents from accidental overheating.

- Electronic sensing of temperature with digital indication.
- Cooling provided by a built-in refrigeration unit.
- 24 hour timer on temperature and fluorescent lighting.

Further Information:

With sealed Stainless Steel chamber.
220-240 V AC, 50 Hz, 1 ph.

Crop Science

Crop Processing

Laboratory Winnower

Product Code: 543-820/01

This machine is suitable for pre-cleaning a large number of agricultural products including hulled rice and coffee, wheat, barley and vegetable seeds, by removing light extraneous material such as shrivelled seed, chaff and leaf. Heavy particles including metal and stones can also be eliminated. It consists of an aspirated column with an adjustable flow rate, expansion chamber, air-return ducts and motor driven fan. The fan can easily be removed for cleaning. The unit is bench mounted.

Further Information:

For 220-240 V AC, 50 Hz, 1 ph.

Grinder for Sample Preparation of Grains

Product Code: 543-860/01

Further Information:

For 220-240 V AC, 50 Hz, 1 ph.

Micropropagation

Laminar Flow Cabinet

Product Code: 548-550/01

Laminar flow cabinets force sterile air over the work surface and minimise the risk of external contamination and cross-contamination between samples which is essential for sterile inoculation of media during techniques such as tissue culture and micropropagation.

- Self-contained unit.
- Requires no external ducting.
- Variable fan speed controller.
- Pressure gauge.

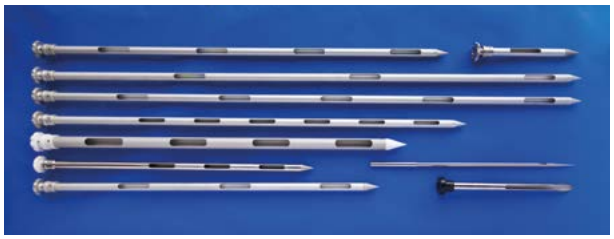
Specifications	
Pre-filter	92% efficient at 5.0 micron
HEPA Filter	99.995% efficient
Air Velocity	0.45m/sec
Work Surface Lit To	1000 lux by internal lights
Controls	Front mounted 13 amp power outlet
Dimensions: Internal W x D x H (mm)	1190 x 505 x 579
Dimensions: External W x D x H (mm)	1290 x 720 x 1145
Weight (kg)	150
Power Supply	230-240 V Ac, 50-60 Hz, 1 ph

Seed Samplers

Once a grain crop has been harvested and put into store, tests need to be carried out periodically to measure the quality and to check for pest or disease attack. Such samples must be representative of the bulk material and so need to be taken at various depths and from different locations.

Sack Spear Samplers

Product Codes: 560-210, 560-212



Specifications

Product Code	Dimensions Dia x Length (mm)
560-210	12.7 x 650
560-212	19 x 650

Sampling Spear, Double Tube 32 mm outside diameter

Supplied with carry case.

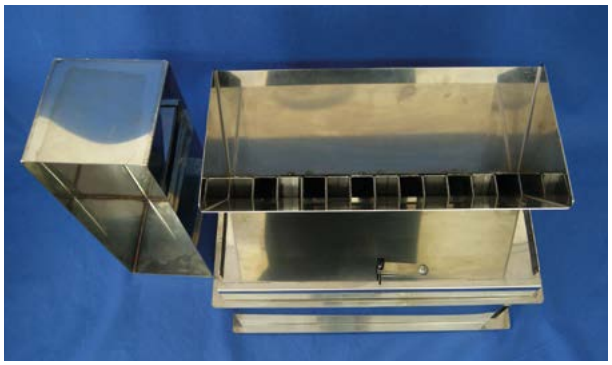
Specifications

Product Code	Length (m)	Slots
560-220	1	1
560-226	2	5

Sample Dividers

Sample Dividers

Product Codes: 560-194, 560-196



Specifications

Product Code	Slot Width (mm)
560-194	12 x 12.7
560-196	12 x 6.35

Harvesting & Storage

Moisture Meters

Protimeter Grainmaster Moisture Meter with 15 Pre-Programmed Crop Calibrations

Product Code: 560-020

A completely portable unit suited to in-store or field use. Incorporates instant digital-readout of moisture content and automatic temperature compensation for rapid and accurate moisture determinations.

- Microprocessor controlled.
- Automatic temperature compensation.
- Instant LCD readings for many crops.
- Temperature measurement facilities.

The simple 4 stage operation takes less than a minute per sample:

- Insert the program key for the crop to be tested.
- Place grinder over sample cell and grind sample.
- Compress the sample.
- Press “ON” switch and read moisture content.

The unit is battery powered and can be used with a wide variety of crops using interchangeable program keys for direct readings. In addition, by using the probe accessory the meter may also be used to measure the temperature of stored grain, thus enabling the principle grain quality and storage checks to be carried out with one instrument.

Further Information:

Supplied in a hard carrying case, compressor, hand grider, quick check standard, high check standard, storage case for program keys, calibration chart and program keys for ground samples of wheat and barley to ISO standard. Requires one PP3 battery - not included.

Accessories:

Fast Response Temperature Probe, 1 metre length (560-022)

Moisture Meter for Baled Hay & Straw complete with 600 mm Long Probe

Product Code: 560-038

This lightweight hand-held instrument can be used for the rapid moisture measurement of baled hay or straw. The strong Stainless Steel probe is inserted into the bale and the test button pressed. The result is shown instantly on the clear analogue display. A separate button can be used to check the calibration and battery voltage.

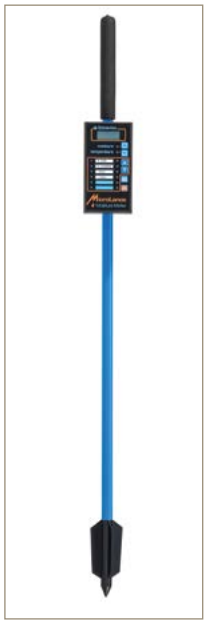
- Fast measurement of baled hay or straw.
- Easy to read analogue display.
- Built-in battery and calibration check.

Further Information:

Supplied complete with probe and operating instructions.

Universal Moisture Meter

Product Code: 560-095



The universal insertion moisture meter has been designed to measure the moisture content of powders, grain and granules. It has applications throughout industry but is particularly suited for use with stored seeds and grains. It can be used both for batch testing materials as they are loaded or unloaded as well as periodic checks while in storage. The probe is inserted into the sample and the result is shown instantly on the display. No weighing, grinding or other sample preparation is required. By pressing the membrane keypad the temperature of the sample can also be measured. The instrument can be programmed by the user for use with up to six crops. The simple calibration procedure means that data for new crops can be added as required.

- Microprocessor controlled.
- User programmable.
- Displays temperature and moisture content.
- 1 metre long insertion probe.

Further Information:

Complete with 1 metre long insertion probe and operating instructions.

Grain Airflow Meter

Product Code: 560-050

An essential aid for monitoring the airflow through stored crops to ensure adequate ventilation and prevent spontaneous heating and associated condensation in grain stored slightly warm or above optimum moisture content. The information provided by this device will help prevent mildew development in store and the associated loss of revenue or benefit from cash and feed crop. The instrument is simply placed upon the stored grain and the upward airflow can then be read off one of two scales ranging from 8 to 30 ft/minute or 2.5 to 9 m/minute.

Seed Counters

Precision Seed Counter with Container for Cereals 220-240 V AC, 50 Hz, 1 ph

Product Code: 560-105/01

The precision seed counter is invaluable for laboratory work, research applications, 1000 grain counting and packaging of costly seeds. A special feature of the instrument is the very wide range of seed sizes which can be processed from 0.3 to 15 mm in diameter. The built-in vibrating unit automatically determines the optimum seed counting rate, although this can be set manually if required. The seed size can also be selected so that the damaged seeds or fragments of husk are eliminated from the result. Various count modes can be selected including normal, aggregate and differential. The unit is extremely quiet in operation, has an easy to read LCD display, RS 232 output and a membrane key pad.

- Automatic feed rate selection.
- Very accurate results with small seeds.
- Filter for under-sized or damaged seeds.

Further Information:

Supplied with counting head for cereals and grains.

Accessories:

Small Counting Head for small seeds down to 0.3 mm diameter (560-105/10)

Large Counting Head for large seeds up to 15 mm diameter (560-105/12)

Small Counting Head for Small Seeds Down to 0.3 mm Diameter

Product Code: 560-105/10

Large Counting Head for Large Seeds Up to 15 mm Diameter

Product Code:560-105/12

Harvesting & Storage

Yield Quality

Hectronic Test Weight Kit

Product Code: 560-115

- Rapid and consistent results.
- Compact and easy-to-use.
- Accurate for all grains.

This instrument will benefit growers and merchants alike, providing useful feedback for the grower and easy-to-use method of grain quality for the merchant. The kit comprises an accurately measured cylinder and hopper (chondrometer) ensuring that a precise and replicable volume of grain is measured. The sample of grain is allowed to fall into the chamber of the chondrometer under the restriction of a falling weight so that a constant packing density is achieved. The grain is weighed on battery powered scales (6 x 1.5 V AA batteries required) which are included in the kit. The weight is then converted on the chart supplied to give the bushel or hectolitre weight. The unit is simple to use, provides accurate results to ±5% and can be used with all grains including wheat, oats, barley and maize. Conforms to British Standard EN ISO 7971-2:2009.

Chondrometer

Product Code: 560-118

This light and accurate laboratory chondrometer is suitable for use with any gramme balance capable of weighing up to 1400 g.

Further Information:

Supplied with calibration chart.

Size Grading

Grain Sieves Set of 6

Product Code: 560-142

A set of 6 laser-cut stacking grain sieves ensuring the utmost accuracy in grading. The set comprises four sieves with slots 20 mm long x 1.0, 2.0, 2.2, and 3.5 mm wide, made from hard-wearing Stainless Steel plate to BS 6219 and ISO 5223. Also included in the set are two Stainless Steel insect sieves 1.7 mm mesh and 710 μm mesh, to aid the control of storage pests such as weevils and mites. A lid and receiver complete the set. Sieves conforming to other standards are available on request.

- Laser cut for accuracy.
- Non-magnetic Stainless Steel mesh.
- Conform to BS 6219 and ISO 5223.

General Laboratory Instrumentation

Binocular Stereo Zoom Microscope

Product Code: 550-025/01

This binocular miroscope has a sound, ergonomic design and is manufactured to a high standard. The excellent optical performance makes the instrument suitable for both laboratory and teaching purposes. The built-in illumination with daylight filter provides an excellent light source for a wide range of applications.

- 4 objective nosepiece.
- High quality optics.
- Mechanical stage.

Further Information:

For 220-240 V AC, 50 Hz, 1 ph.

Spares/Consumables:

Bulb (Bottom Illumination)
12 V / 20 W (550-025/12)

Bulb (Top Illumination)
12 V / 10 W (550-025/10)

Binocular Microscope 45° Inclined, 360° Rotating Head, Eye-Piece 10x Widefield, 4x 10x & 40x

Product Code: 550-035/01

Accessories:

Objective Lense 100x/1.25
Oil for use with 550-035/01
(550-035/10)

Conductivity Meter complete with Conductivity Cell, Swing Arm Electrode Holder & Manual

Product Code: 525-180/01

This laboratory conductivity meter is a versatile unit which utilises the best of modern technology to simplify operation without sacrificing accuracy or reliability. With push button operation and a customised liquid crystal display, determination of conductivity and TDS can readily be achieved with the minimum of operator training. The meter includes a 32 reading memory facility. Remote monitoring and data collection is facilitated by the provision of both analogue and digital outputs and in the event of power removal all user defined parameters are retained.

Further Information:

Supplied complete with Swing Arm Electrode Holder, conductivity cell (K=1) and full operating instructions.

Spares/Consumables:

Conductivity Cell K=1 (525-180/10)

Environmental Laboratory Equipment

Visible Range Spectrophotometer

Product Code: 485-030/01

This instrument combines advanced electronics with a high quality optical system operating over the range 320 to 920 nm. The monochrominator is a modified Czerny Turner design. It incorporates a cam-driven 1200 lines/mm holographic diffraction grating and features automatic second order resonse suppression. The complete optical system is housed in an independently enclosed unit for maximum protection. Careful design has ensured that heat transfer to the sample is minimised. This enables precise measurements to be performed on a temperature dependent basis. A low noise, high stability and solid state detector for accurate reproducible results, combined with a rigid structure, provides a system with fast warm-up, low drift and high reliability.

- Microprocessor-controlled.
- Digital display 320 to 920 nm wavelength.
- Automatic zero and calibration.

Further Information:

Supplied complete with 100 plastic 10 x 10 mm cuvettes, 10 x 10 mm cell holders and mains lead.

UV/Vis Spectrophotometer

Product Code: 485-031/01

Further Information:

Supplied complete with 100 plastic 10 x 10 mm cuvettes, 10 x 10 mm cell holders and mains lead.

Spares/Consumables:

Spare Xenon lamp module (485-031/10)

Digital Colorimeter

Product Code: 525-242/01

This range of colorimeters features a number of advanced measurement functions and is designed for educational laboratory and industrial functions. The instruments are housed in rugged, chemically resistant, structual foam mouldings and have ergonomically-efficient, sloping front panels. Both models feature 8 built-in gelatin filters covering the visible spectrum fitted onto a switched wheel. The dual cuvette holder enables the sample and a reference to be processed. Measurements can be taken in % transmittance, absorbance or concentration.

- 8 built-in filters.
- Dual cuvette holder.
- Large LCD display.

Further Information:

A general purpose laboratory or portable unit which operates from mains supply or an external 12 V supply. It is supplied complete with 9 built-in filters, 100 disposable cuvettes, recorder output, mains lead and manual.

Accessories:

Microsample Cuvettes 10 ml (Pack of 100) (525-246)

Microsample Cuvettes 10 ml

Product Code: 525-246

Pack of 100.

Bench Dissolved Oxygen Meter

Product Code: 525-235/01

This unit has been designed for use in the laboratory for the measurement of dissolved oxygen accurately and with ease. Measurements can be obtained as % or mg/l and are automatically temperature compensated. All adjustments are made using multi-turn rotary controls and the results are displayed on an LED display.

- Measures DO_2 over ranges 0 to 200%, 0 to 25% and 0 to 19.9 mg/l (ppm).
- Measures temperature over the range -50°C to +199.9°C.
- Barometric pressure compensator.

Kjeldahl Apparatus

Digestion Unit 8 Place, Semi-Auto, complete with Block, Rack, Heat Shield & Exhaust System

Product Code: 525-355/01

Supplied with digestion block, carrying rack with heat shield, exhaust system, two-tier console, instruction manual and 8 digestion tubes, 250 ml, 300 x 42 mm.

Further Information:

For 220-240 V AC, 50-60 Hz, 1 ph.

Spares/Consumables:

Digestion Tube, macro 250 ml (525-355/10)

Digestion Unit 20 Place, Semi-Auto, complete with Block, Rack, Heat Shield & Exhaust System

Product Code: 525-356/01

Supplied with digestion block, carrying rack with heat shield, exhaust system, two-tier console, instruction manual and 20 digestion tubes, 250 ml, 300 x 42 mm.

Further Information:

For 220-240 V AC, 50-60 Hz, 1 ph.

Spares/Consumables:

Digestion Tube, macro 250 ml (525-355/10)

Environmental Laboratory Equipment

Turbosog Fume Scrubber

Product Code: 525-370/01

The Turbosog is specially designed for the complete removal of fumes from both Kjeldahl and other inorganic acid digestions. It allows Kjeldahl digestions to be performed outside the fume cupboard on the open bench. The fume scrubber consists of two separate parts, the pre-separator and the Turbosog. The pre-separator consists of two glass bottles in line between the exhaust manifold and the Turbosog. The first bottle acts as a condensate trap collecting moisture from the digestion of both water and H_2SO_4. The second bottle contains a neutralizing solution which removes over 90% of the acid fumes.

The Turbosog is a centrifugal suction pump which pulls the reduced fumes and air flow through an inlet pipe into a water reservoir. A magnetic valve restricts water flow to a maximum of 50 litres per hour. The water level is kept constant as the unit empties by displacement. Any residual fumes are diluted and expelled with the waste water.

- Compact and space saving.
- Corrosion proof and maintenance free.
- Efficient, with low operating costs.

Further Information:

For 220-240 V AC, 50-60 Hz, 1 ph.

Supplied with Turbosog pre-separator, 2 glass bottles, 1 glass insert for washing bottle, 1 glass insert for condensation bottle, isoversinic tubing and instruction manual. Power supply 220-240 V, 50-60 Hz, 1 ph.

Automatic Distillation Unit

Product Code: 525-375/01

This distillation unit is fully automatic with full microprocessor control. The operator has only to insert the digestion tube and the distillate receiver vessel. The control display is a back-lit LCD with 2 x 16 character lines. Information is entered via the touch sensitive keypad which has numerical characters for entering distillation program parameters, and manual function keys to activate the chemical addition pumps and for programming.

There are 10 programmes with 0-8 for Kjeldahl and associated distillations and 9 for alternative distillation work. Each of the programmes has the following variables entered in sequence. All the programme steps are controlled by time with chemical addition pumps having a known flow rate of 13 ml/second. The unit is divided into 4 chambers, distillation, instrumentation, steam generation and chemical pumps, for maximum protection of the various components. All the functions of the unit are monitored and errors are displayed on the character display. This unit has a manual end point titration.

- Fully automatic steam generator.
- Electronic control of steam pressure and water level.
- Programmable, utilising miroprocessor control.

Further Information:

For 220-240 V AC, 50-60 Hz, 1 ph.

Accessories:

Storage tanks for automatic distillation units, Set of 3 (525-376)

Soxhlet Apparatus

Basic 6-Place Soxhlet Extraction System (Glassware & Connections supplied separately)

Product Code: 525-402/01

The soxhlet apparatus is used for the continuous extraction of fats and oils from solid material using an organic solvent such as petroleum ether. In a practical agricultural context the method is usually applied to the determination of "oil content" in agricultural produce such as sunflower and other oil seeds. The material to be extracted is usually placed in a porous paper thimble and continuously condensing solvent allowed to perculate through it before returning to the boiling vessel either continuously or intermittently. The solvent can then be evaporated off to leave the fat. Each heating unit has individual hotplates of 85 mm diameter with stepless heating control so that the temperature of each hotplate can be operated individually. The heating unit has a lacquered sheet steel casing with an enamelled top plate. The basic extraction system is supplied complete with top moulds, air bath inserts support rods, 600 x 12 mm, and a connection cable.

Further Information:

For 220-240 V AC, 50-60 Hz, 1 ph.

Accessories:

Cooling Water Feed Pipe for 525-402 series with 6 Fastening Clamps (525-406)

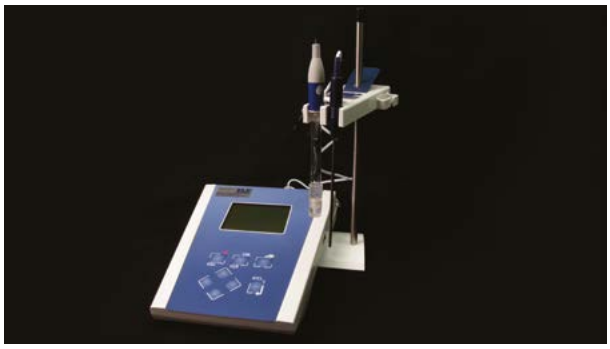
Holder with Clamp for Soxhlet Glass Parts (525-404)

Extraction Thimble 33 x 80 mm Box of 25 (525-424)

Set of Soxhlet Glass Parts Including 1 Flask 500 ml, 1 Extractor 150 ml, and Condenser (525-403)

Laboratory pH Meter with pH Electrode, Swing Arm, Temperature Probe, Manual & Buffer Capsules

Product Code: 525-210/01



This is a versatile, simple to use pH, mV and temperature meter that is ideal for routine analysis. With up to three decimal place resolution and a choice of up to three calibration points, the 525-210/01 provides the user with added flexibility where future demands for enhanced performance may be required. The pH measurement meter also has the ability to store up to 32 results.

- Ideal for routine laboratory applications.
- 3 decimal place resolution.
- 1, 2, or 3 point pH calibration.
- Back lit custom LCD.
- Simultaneous readout of pH and temperature.
- Automatic or manual buffer selection.

Specifications	
pH Range	-2.000 to +19.999
pH Resolution	0.001, 0.01, 0.1
pH Accuracy	± 0.003
Calibration	User selectable 1, 2, or 3 point
Automatic Buffer Recognition	DIN, NIST, JIS
mV Range	± 1999.9 mV
mV Accuracy	± 0.2 mV
Temperature Range	-10°C to 105°C
Temperature Resolution	0.1°C
Temperature Accuracy	± 0.5°C
ATC Range	0 to 100°C
Connector	BNC
Display	LCD
Power Supply	9 V AC ± 10 @ 50-60 Hz
Dimensions L x W x D (mm)	210 x 250 x 55
Weight (g)	850

Environmental Laboratory Equipment

Orbital Shaker

Product Codes: 583-132/01, 583-134/01

- Available with orbital or reciprocating action.
- Variable speed with soft start.
- Any size or mix of vessels.
- Fully adjustable cradle system.

The cradle type platforms have four rubber cushioned horizontal securing bars which can be easily adjusted both vertically and horizontally to hold most sizes and types of vessel, including flasks, bottles and beakers.

Speed is variable between 0 to 300 rpm/strokes per minute and an electronic feedback system accurately maintains the set speed.

Model 583-132/01 provides a smooth orbital shaking action with an orbit of 16 mm, ideal for most culturing/mixing applications.

Model 583-134/01 has a reciprocating shaking action with an amplitude of 20 mm.

Specifications

Product Code	583-132/01	583-134/01
Platform Size	335 x 35 mm	335 x 35 mm
Speed Range	30 to 300 rpm	25 to 250 rpm
Orbit/Amplitude	16 mm	16 mm
Dimensions W x D x H (mm)	360 x 420 x 270	360 x 420 x 270
Max Load (kg)	10	10
Net Weight (kg)	11	11

Laboratory Incubator

Product Code: 548-573/01

- Heated incubator.
- Stainless Steel work chamber.
- Inner glass door.
- Safety thermostat with indicator.

The exterior is constructed from sheet steel finished in an easy clean powder coated paint. The interior chamber is made from Stainless Steel.

The incubator has a solid steel door as standard, or, as an alternative, a door with an integral viewing window can be fitted. As an option a double door, comprising steel outer with an inner glass door is also available.

Heated by Incoloy sheathed elements; positioned below the chamber floor for natural convection units and fitted around the fan on the back wall of the chamber for mechanical convection units.

The control system consists of a direct reading thermostat and overheat thermostat, both with calibrated scales and tamper-proof locks. They also include a mains switch with indicator and heat and overheat indicators.

Specifications

Temperature Range	Ambient +5° to 70°C
Fluctuation	±0.25°C at 37°C
No. of Shelves	2
No. of Shelf Positions	3
Internal Dimensions (mm)	330 x 490 x 450
External Dimensions (mm)	590 x 610 x 600
Capacity (ltrs)	75
Weight (kg)	34

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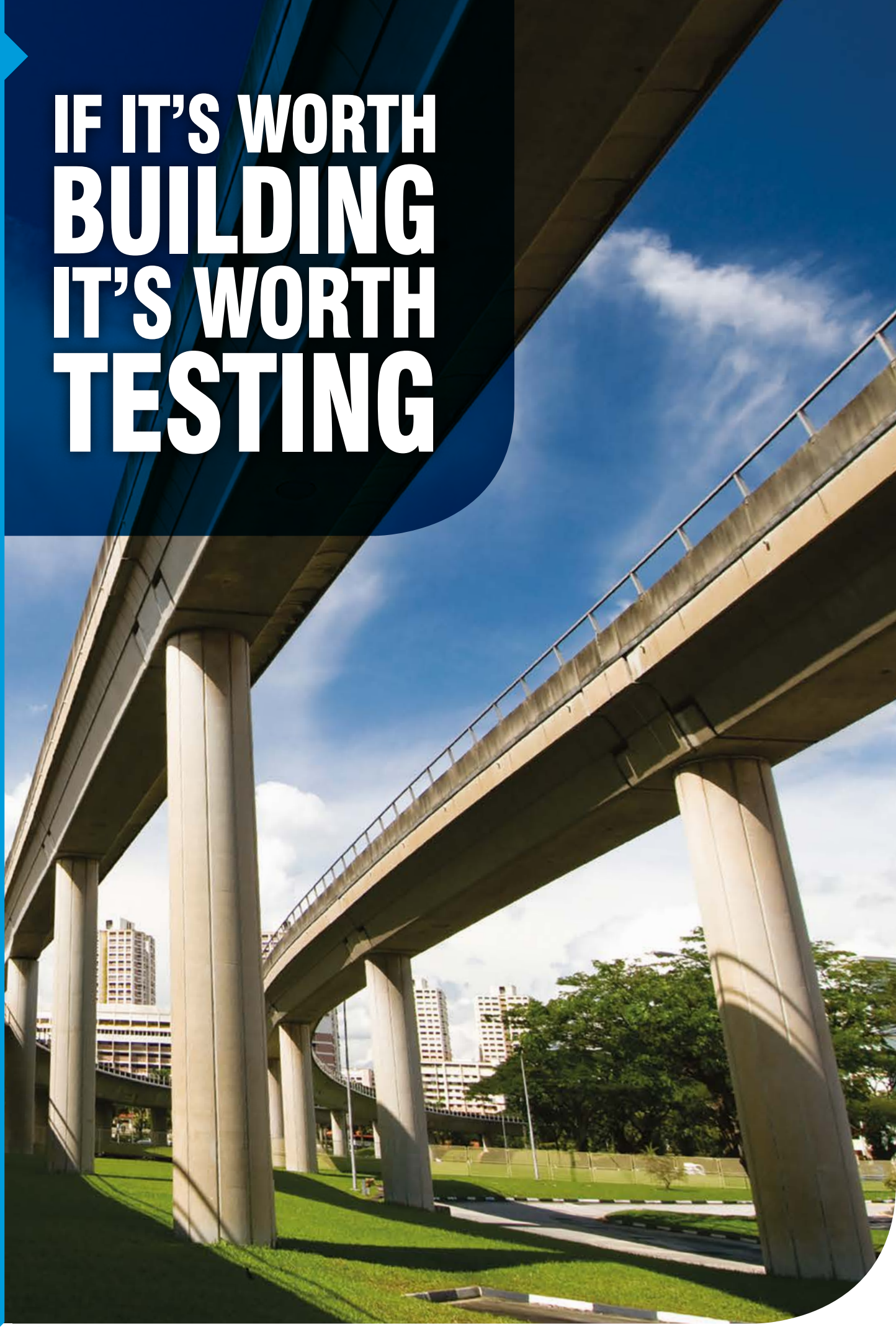

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1. General

(a) "The Company" shall mean ELE International, a division of Hach Lange Limited.

(b) "The goods" shall mean the equipment, plant or services which are the subject of this Contract.

(c) "The Customer" shall mean the person, firm or Company who contracts to purchase in full or in part the goods from the Company.

(d) Any contract entered into by the Company for the supply of goods is subject to these conditions. Any writing on or attached to any purchase order form, document or correspondence shall not be included or implied unless previously agreed upon in writing and signed by an authorised officer of the Company.

(e) No order for supply arising from a quotation or otherwise shall be deemed to be accepted or constitute a legally enforceable contract with the Company until accepted in writing by the Company or until delivery of the goods, whichever shall be the earlier.

(f) No responsibility is accepted by the Company for any inaccuracy or error in orders given by telephone.

2. Descriptions and Specifications

The descriptions, specifications and illustrations contained in catalogues, price lists and other leaflets or descriptive matter produced by the Company shall not form part of the contract and no report, representation or statement made by any servant or agent of the Company shall be binding on the Company. Names, addresses and trademarks on illustrations indicate ownership of the artwork and must not be taken as necessarily indicating the manufacturers. Any description or sample given of the goods is by way of identification only and does not constitute a sale by description or sample.

3. Time

Any date or period quoted by the Company for despatch is given in good faith by way of estimate only. While the Company will endeavour to deliver within the period stated, such date or period is not to be of the essence of the contract and the Customer shall be bound to accept the goods when they become available. The Company shall not be liable for any loss or damage or delays in transit or consequential losses or losses including loss of profit resulting in any way in respect of late delivery howsoever caused even in such cases as the Company has expressly agreed in writing a delivery date, nor shall such failure to deliver on the date or within the period named by the Company be deemed to be a breach of contract.

4. Price

(a) All prices and terms quoted by the Company or shown in any of the Company's price lists, catalogues, etc may be altered without notice.

(b) Prices of goods, both quoted and printed, are ex-warehouse and exclusive of VAT, packing, freight, postage, insurance, port rates, off loading and installation and other costs unless expressly specified to the contrary.

(c) The Company reserves the right at any time prior to delivery of the goods to adjust the price to take account of any increase in the cost of raw materials, labour or services or any currency fluctuations, increases of taxes or duties or any other matters affecting the cost to the Company in complying with the contract.

(d) The Company reserves the right to impose a handling charge of not less than 15% on returned goods save in circumstances where the goods are returned by reason of defects or shortages which it is the Company's duty under the terms of the Agreement to rectify.

(e) The Company reserves the right to impose a minimum order charge.

(f) Installation and commissioning will be quoted only against the specific request of the Customer. In all cases containers, bottles, packages and packing materials are chargeable and not returnable.

(g) The Company reserves the right to amend any accidental errors and omissions in quotations and invoices.

5. Payment

(a) Time for payment shall be of the essence.

(b) The Customer shall have no right of set off, Statutory or otherwise.

(c) The Company reserves the right at any time at its discretion to demand security for payment before continuing with or delivering any order.

(d) All accounts are payable in full on receipt of the goods unless expressly agreed in writing by the Company.

(e) For all credit accounts approved by the Company in writing for:

(i) Customers in the UK invoices are to be paid in full by the last day of the month following date of invoice.

(ii) For all customers outside the UK payment must be made by confirmed irrevocable letter of credit, payable at sight unless other terms have been agreed in writing by the Company.

(f) Where the goods are delivered in instalments or in the course of two or more separate deliveries any failure to make such payments due on or before the due date will entitle the Company at its option to treat the contract of sale as voided by the Customer and in such event the Company reserves all rights thereon which may be accrued to the Company prior to such termination.

(g) In the event of non-payment, late payment or other default by the Customer the Company shall be entitled to recover all legal costs thereby incurred together also with interest on the monies outstanding, calculated at 2% per calendar month or part month compounded monthly.

(h) Payment via major credit and debit cards: by means of a secure payment system (the SSL protocol): for security reasons, credit and debit cards will be charged on the day of order placement.

6. Risk and the Passing of Property

(a) Risk in the goods shall pass to the Customer when the goods are delivered to or collected by the Customer or its agents, in accordance with Incoterms 2010. Where the terms of sale are Ex Works, risk in the goods shall pass to the customer when the goods leave the Company's premises.

(b) Title in the goods remains vested in the Company and shall only pass from the Company to the Customer upon full payment being made by the Customer of all sums (due on whatsoever account or grounds) to the Company, and after risk has passed. In the event of the goods being sold by the Customer in such manner as to pass to a third party a valid title to the goods, whilst any such sums are due as aforesaid, the Company's right under this condition shall attach to the proceeds of such sale or to the claim for such proceeds and the Customer shall place such proceeds in a separate account. Nothing herein shall constitute that the Customer is the Agent of the Company for the purposes of any subsale.

(c) The customer agrees that whilst any such sums are due as aforesaid the Company may at any time enter upon the Customers premises and remove the Goods therefrom and that prior to such payment the Customer shall keep such Goods separate and identifiable for this purpose.

7. Inspection

(a) The Customer is under a duty to inspect the goods on delivery or on collection as the case may be.

(b) Claims for damage in transit or shortage in delivery of the goods will only be considered if the carriers and the Company receive written notification of such damage within three working days of delivery or in the event of loss of goods in transit within fourteen working days of the date of consignment. When goods are accepted from carriers without being checked the delivery book must be signed "Not Examined". If access is not available to the location stated in the contract the Company or their carriers reserve the right to deliver to the nearest convenient location and to notify the Customer of their action.

(c) In all cases where defects or shortages are complained of, the Company shall be under no liability in respect thereof unless an opportunity to inspect the goods is afforded to the Company before any use is made thereof or any alteration or modification is made thereto by the Customer.

8. Warranty

(a) The Company warrants that it has title to and the unencumbered right to sell the goods. Such warranty specifically includes the Company's ownership of the necessary patent rights and copyright sufficient to enable the Customer to use the Goods for the purpose stated. However nothing in this Contract or otherwise shall be deemed to grant to the Customer the right to manufacture or in any way reproduce the goods or reproduce or use any intellectual property rights of the Company or its agents.

(b) No representation or warranty is given as to the suitability of the goods for any particular purpose and the Customer shall satisfy himself in this respect and shall be totally responsible therefor.

(c) Unless otherwise notified by the Company all goods supplied shall have a twelve month warranty commencing from the date of invoice. In circumstances where the Company notifies the Customer of an alternative warranty period, such alternative shall prevail over any other warranty period. The Company undertakes to replace or repair free of charge any components in the equipment supplied against the purchaser's order which, in the opinion of the Company, become defective due to faulty material or bad workmanship within the Warranty period. The Company's Warranty does not apply to the remedying of defects caused by ordinary wear and tear, accident, misuse or neglect, internal adjustments or modifications or where warranty seals have been broken other than by employees of the Company or the Company's trained and accredited agents, nor does this Warranty imply any liability for loss or damage arising directly or indirectly from any defect in the equipment or from delay in remedying any defect.

(d) In the case of any goods not manufactured by the Company but supplied by them or incorporated within the Company's goods the Company is unable to provide any warranty but will where possible assign to or pass on to the Customer the benefit of any such warranty that the Company shall itself have received from its own supplier.

(e) All other guarantees, warranties, conditions and representations, either express or implied, whether arising under any statute, law, commercial usage or otherwise, including implied warranties of merchantability and fitness for a particular purpose, are hereby excluded.

(f) The sole remedy for Products not meeting this Limited Warranty is replacement, credit or refund of the purchase price. This remedy will not be deemed to have failed of its essential purpose so long as ELE International is willing to provide such replacement, credit or refund.

9. Insurance

Where goods are insured by the Company at its discretion or at the request of the Customer charges will be made on the invoice. The Company's liability under the insurance shall be limited to the amount received by them or the value of the goods, whichever is the less, and the Company shall be under no liability to take proceedings for the recovery of loss or damage but where goods are insured under the Company's Open Cover Cargo Policy the rights in such policy shall be assigned where possible to the consignee/Customer and any claims shall be administered by them in accordance wit ICC (A) 1.1.82.

10. Packing

Unless otherwise expressly stated in writing the contract packing is not included in the contract price and will be the subject of an additional charge by the Company. The Company does not give warranty as to the fitness of any packing for storage purposes or any other purpose other than the transport of the goods to the named contract destination.

11. Liability

(a) Nothing herein shall be deemed to exclude or restrict the Company's liability for death or personal injury resulting wholly from the negligence of the Company.

(b) The Company shall not be liable for any consequential or indirect loss suffered by the Customer whether this loss arises from a breach of duty in contract or tort or in any other way, including loss arising from the Company's negligence. Non-exhaustive illustrations of consequential or indirect loss would be:

(i) Loss of profits.

(ii) Loss of contracts.

(iii) Damage to property of the Customer or anybody else.

(iv) Personal injury to the Customer or anybody else (except so far as such injury is wholly attributable to the Company's negligence).

(c) The Customer hereby agrees to indemnify the Company against all claims made against the Company by any of the Customer's employees, Customers or any other person for which liability would have been excluded by this clause if the claim had been made against the Company by the Customer.

(d) The Company shall not be liable in any way for any damages direct or consequential as a result of use of the equipment for any purpose other than that agreed nor for any use not stated and agreed in the Company's specifications nor for any fault or defect arising from the Customers failure to disclose relevant and pertinent information to the Company. Where the purpose of the goods is misrepresented or omitted the Company shall be under no obligation in any manner and responsibility and liability shall pass to the Customer.

(e) The Company shall not be liable in any way for any damage direct or consequential arising as a result of the failure by the Customer to comply with the terms of the operating manual supplied with the goods or by reason of a failure by the Customer to comply with the specified requirements for maintenance and calibration of the goods.

(f) The Customer acknowledges that the proper use of the goods can only be made by appropriately trained operatives. Training in the use of the equipment provided by ELE is available on a chargeable basis. Accordingly, the Company shall not be liable in any way for any damage direct or consequential, arising as a result of the use of the goods by inadequately experienced or inadequately trained operatives.

(g) The total liability of the Company Indemnified Parties arising out of the performance or nonperformance hereunder or Company's obligations in connection with the design, manufacture, sale, delivery, and/or use of Products will in no circumstance exceed in the aggregate a sum equal to twice the amount actually paid to ELE International for Products delivered hereunder.

12. Patent Protection

Subject to all limitations of liability provided herein, Company will, with respect to any Products of Company's design or manufacture, indemnify Customer from any and all damages and costs as finally determined by a court of competent jurisdiction in any suit for infringement of any European patent (or U.S. patent for Products that ELE International sells to Buyer for end use in the U.S.) that has issued as of the delivery date, solely by reason of the sale or normal use of any Products sold to Customer hereunder and from reasonable expenses incurred by Customer in defense of such suit if Company does not undertake the defense thereof, provided that Customer promptly notifies Company of such suit and offers Company either (i) full and exclusive control of the defense of such suit when Products of Company only are involved, or (ii) the right to participate in the defense of such suit when products other than those of Company are also involved. Company's warranty as to use patents only applies to infringement arising solely out of the inherent operation of the Products according to their applications as envisioned by Company's specifications. In case the Products are in such suit held to constitute infringement and the use of the Products is enjoined, Company will, at its own expense and at its option, either procure for Customer the right to continue using such Products or replace them with non-infringing products, or modify them so they become non-infringing, or remove the Products and refund the purchase price (prorated for depreciation) and the transportation costs thereof. The foregoing states the entire liability of Company for patent infringement by the Products. Further, to the same extent as set forth in Company's above obligation to Customer, Customer agrees to defend, indemnify and hold harmless Company for patent infringement related to (x) any goods manufactured to the Customers design, (y) services provided in accordance with the Customer's instructions, or (z) Company's Products when used in combination with any other devices, parts or software not provided by Company hereunder.

13. Repairs

The Company are not responsible for damage to goods sent to them for repair or examination nor for incidental damage to glass, apparatus and delicate instruments in the course of repair. Time involved in the preliminary examination of an article may be charged in the event of no repair being ordered. Goods returned for repair should be sent carriage paid and be clearly labelled with the senders name and address. At or before the goods are sent advice shall be sent by fax or telex to ELE Shipping Department clearly indicating method of despatch, description of goods and value for customs. At the same time a letter should be sent detailing the work required.

14. Drawings and Sketches

The Company reserves the right to charge for the preparation of drawings or sketches prepared either for the submission or any execution of orders. All such drawings remain the property of the Company.

15. Force Majeure

(a) The company shall not be liable for any failure to deliver the goods arising from circumstances outside the Company's control.

(b) Non-exhaustive illustrations of such circumstances would be Acts of God, war, riot, explosion, abnormal weather conditions, fire, flood, strikes, lockouts, Government action or regulations, delay by suppliers, accidents, shortage of materials, labour or manufacturing facilities.

(c) Should the Company be prevented from delivering in the above circumstances it shall give the Customer written notice of this fact as soon as reasonably practicable after discovering it.

(d) If the circumstances preventing delivery are still continuing six months after the Customer receives the Company's notice then either party may give written notice to the other cancelling the contract.

(e) If the contract is cancelled in this way, the Company will refund any payment which the Customer has already made on account of the price (subject to deduction of any amount the Company is entitled to claim from the Customer) but the Company will not be liable to compensate the Customer for any further loss or damage caused by the failure to deliver.

16. Export

(a) The Customer shall be solely responsible for ensuring that any import or other regulations of any country or district to which the goods are to be exported are complied with and the Company shall be under no liability whatsoever should the goods subsequently fail to fulfil the requirements of such regulations.

(b) The Customer shall inform the Company of any intended further transshipment of the goods to third parties and their proposed use so that the Company may ensure that the contract is in compliance with any export restrictions or embargoes laid down from time to time by the government of the United Kingdom. In the event that such restrictions prevent the Company from complying with its contractual obligations the contract will be treated as being subject to Force Majeure and dealt with in accordance with clause 14. If a Customer knowingly or not provides misleading information to the Company the Customer shall indemnify the Company against any penalties, fines or other expenses incurred as a result.

17. Cancellation

(a) If the Customer shall fail to pay the contract price to the Company on the due date or, if an actual person, die or be the subject of an order under the Mental Health Act 1959, or if any distress or execution is levied upon the Customer's property or assets or if the Customer shall offer to make any scheme or arrangement with creditors or commit any act of bankruptcy or, being a Company, has a receiver appointed for any part of its undertaking or assets or if a resolution for winding up shall be passed, then the Company may treat all sums due or to become due on any delivery as immediately payable or suspend or cancel further deliveries or require payment in advance therefore or recover any goods which are unsold wheresoever they are stored or treat the contract as repudiated by the Customer but without prejudice to any other rights of the Company.

(b) Cancellation of the order by the Customer for whatever reason shall entitle the Company to payment of all costs, expenses and losses of the Company arising therefrom. Such notification of cancellation by the Purchaser shall not be deemed to have been accepted by the Company in the absence of specific agreement by the Company in writing to that affect. In all cases the Company reserves to itself any rights that it may have in law.

18. Notices

Any notice to be given hereunder shall be in writing and shall be deemed to have been duly given if sent or delivered to the party concerned at its address specified overleaf or such other address as that party may from time to time notify in writing and shall be deemed to have been served, if sent by post, forty-eight hours after posting.

19. Assignment

Neither the Company nor the Customer shall assign or transfer or purport to assign or transfer the contract or the benefits thereof to any other person without the prior consent of each other.

20. Proper Law and Jurisdiction

The contract shall be governed by and construed in accordance with English Law and all disputes arising in connection with the contract shall be submitted to the jurisdiction of the English Courts.

21. Compliance with Laws

Company represents that all Products delivered hereunder will be produced and supplied in compliance with all applicable laws and regulations. Buyer shall comply with all local laws and regulations applicable to the re-sale, installation, use, or import of all Products delivered hereunder. Buyer shall comply with all applicable export control laws and regulations of the United States, the UK, the European Union and any other country having proper jurisdiction and shall obtain all necessary export licenses in connection with any subsequent export, re-export, transfer and use of all Products and technology delivered hereunder. Buyer shall not sell, offer to sell, transfer, export or re-export any Company Products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor use Company Products or technology in any facility which engages in activities relating to such weapons. Buyer shall also comply with the United States Foreign Corrupt Practices Act of 1977, as amended, the UK Bribery Act 2010, and any other applicable anti-bribery laws.

IF IT'S WORTH BUILDING, IT'S WORTH TESTING

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