Wallace

www.wallaceinstruments.com

Productivity Reliability Repeatability Traceability

Managing the cost of quality → rubber, polymer, plastics

Why Use Wallace Instruments?

Wallace has reliably designed and supplied materials testing equipment to the rubber and polymer industries since the early 1950s. We are proud that our Wallace-designed products, including component parts and test blocks, are produced entirely in the UK; with our instruments manufactured by our sister company, Tenon Engineering, at their site in Dorking, England.

Today, Wallace exports to over 60 countries worldwide, from natural rubber-growing regions to countries with established rubber, plastic and polymer processing and product manufacturing industries. Our products are supported through our network of distributors and agents, as well as directly through Wallace.

Wallace manufacturing and design is carried out in-house providing excellent quality control and significant depth of engineering and manufacturing know-how.

Our instruments are used to verify material quality throughout the supply chain and can be found in testing laboratories worldwide, where they also support the development of new materials and products that meet industry standards..

Wallace products are designed based on the following key principles to ensure you manage the cost of quality:

- Productivity
- Reliability
- Repeatability
- Traceability
- Flexibility

Wallace supplies a wide range of equipment and accessories, and we are the only UKAS ISO/IEC 17025 accredited calibration laboratory for Shore and IRHD rubber hardness testers in the UK.

Please refer to our website for details (www.wallaceinstruments.com).

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Index

Plasticity

Hardness

Compression

Specimen Preparation and Accessories

Plasticity

The Plasticity Retention Index (PRI) is a key measurement in determining the quality of natural rubber. It measures the resistance of natural rubber to thermal oxidation. The procedure consists of a plasticity test (P_0) on a non-aged specimen, followed by a test (P_{30}) of a specimen that has been aged for 30 minutes at a temperature of 140°C ± 0.5°C using the O14 Ageing Chamber.

Plasticity measurements are also used in various industries such as silicone and medical patches.

$$PRI = \left(\frac{P_{30}}{P_0}\right) X\ 100$$

P_{30} is the median value of the aged results
P_0 is the median of the non-aged results

Wallace provides a fully integrated and highly productive solution for determining PRI:

- High Productivity Specimen Cutter
- Ageing Chamber (48 or 96 samples)
- Rapid Plastimeter (fixed and variable temperature)

Please refer to our YouTube channel for information videos.

Our Rapid Plastimeter and P2 Williams Plastimeter provide solutions to the silicone and medical industries.

P14 Rapid Plastimeter Mk V

The Wallace Rapid Plastimeter measures the plasticity of unvulcanised rubbers using a simple, clean and fast testing procedure.

The instrument is used in conjunction with the Wallace Ageing Chamber (O14) to determine the Plasticity Retention Index (PRI) of raw natural rubbers.

Features

- **Accurate and repeatable measurements**
- **Available as 2 models - P14 or P14/VT (Variable Temperature)**
- **Traceability software ensures ease of recording test results**
- **Supplied with additional top platens of 7.3mm and 14mm diameter for use with samples outside the normal plasticity range**
- **The platens are easily interchangeable**

The P14 Rapid Plastimeter provides powered zero calibration, eliminating the need for tedious manual set up. Aluminium castings are used throughout the design for rigidity and stability.

The variable temperature model (P14/VT) characterises the flow behaviour of synthetic rubber compounds, as its platen temperatures can be varied between 50°C and 180°C.

Principle of Operation

A modified parallel plate compression principle is used with automatically timed 'conditioning' and 'load' periods. A sample is compressed between two circular platens which are maintained at a temperature of 100°C. The sample is conditioned for 15 seconds at a thickness of 1mm. A compressive force of 100N is then applied for 15 seconds. The final thickness of the test piece is expressed as a Rapid Plasticity Unit. One Wallace Plasticity Unit represents 0.01mm.

Standards

BS ISO 2007, BS ISO 2930, ASTM D3194

Specifications

Wallace Rapid P14 Plastimeter		
Part Number	WAP14-001	WAP14/VT
Platen Temperature	100ºC ±0.5°C	50ºC to 180ºC ±0.5°C
Dimensions (mm)	420 (h) x 300 (w) x 360 (d)	
Weight	20kg	
Upper Platen Size	10mm diameter standard, 7.3mm & 14mm diameter accessories	
Lower Platen Size	16mm	
Test Time	15 seconds conditioning + 15 seconds load	
Compression Force	100N	
Operating Temperature	5 to 40°C; Altitude 2000m maximum	
Humidity Range	10 to 80% RH non-condensing	

P14 Plastimeter

O14 Ageing Chamber

The Wallace O14 Ageing Chamber reliably ages rubber samples in accordance with international standards, as an integral part of determining the Plasticity Retention Index (PRI) of raw natural rubbers. The PRI is a measure of the resistance of natural rubber to thermal oxidation (P_0) on a non-aged specimen, followed by a test (P_{30}) of a specimen that has been aged for 30 minutes at a temperature of 140° C ± 0.5°C.

The Wallace O14 Ageing Chamber, in conjunction with the Wallace Plastimeter (P14), high efficiency cutter (WAS2) and traceability fixture, ensures maximum productivity when determining the PRI of natural rubber.

Wallace supplies the O14 Ageing Chamber in two models with a capacity to age 48 or 96 samples respectively.

Determining the PRI of rubber requires the accurate matching of the aged and non-aged rubber samples when performing the plasticity test. Wallace has designed a stackable traceability fixture which not only allows for accurate matching of the samples, but also ease of handling of samples between sample preparation, ageing and plasticity testing. Matching is achieved by coloured buttons in the tray handle and fixture tray.

Features

- **Accurate, stable and reliable temperature control**
- **Drawers individually time controlled**
- **Tri-colour LEDs indicate time status individually for each of the four test compartments**
- **Audible alarm alert at 30 minute time lapse**
- **Over-temperature cut out**
- **Easy to use traceability fixture**

WAO14-96

Principle of Operation

Housed in a robust steel case, the O14 features an aluminium block with four chambers that carry the drawer units and sample dishes. This block plus high-quality insulation creates a very stable temperature profile and minimises heat loss. A temperature of 140°C (as specified by the standard) is maintained by a PID Controller, which continuously displays the chamber temperature. A reliable air pump provides the air flow as required by the relevant standards.

Standards

BS ISO 2007, BS ISO 2930, ASTM D3194

Specifications

Wallace Ageing Chamber		
Part Number	WAO14-96	WAO14-48
Dimensions (mm)	230 (h) x 270 (w) x 490 (d)	230 (h) x 270 (w) x 490 (d)
Weight	23kg	23kg
Maximum Power	200W	200W
Chamber Size (mm)	12 (h) x 50 (w) x 280 (d)	12 (h) x 50 (w) x 280 (d)
Chamber Temperature	140ºC ±0.2ºC	140ºC ± 0.2ºC
Number of Heating Chambers	4	4
Number of Dishes per Sample Drawer	8	4
Number of Samples per Sample Drawer	24 max	12 max
Number of Samples per O14	96 max	48 max
Operating Temperature	5 to 40°C; Altitude 2000m maximum	5 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing	10 to 80% RH non-condensing
Temperature Recovery	<3 mins @ 140ºC after sample insertion	< 3 mins @ 140ºC after sample insertion

Included		
Ageing Chamber	1 off	1 off
Sample Drawers	8 off (4 off in oven, 4 off in fixture)	4 off standard capacity
Dishes	120 off	60 off
Traceability Fixture Trays	4 off	Optional
Traceability Fixture Coloured Buttons	80 off	Optional

High Productivity Volumetric Specimen Cutter

The Wallace Specimen Cutter with its compact robust design allows the user to easily cut multiple volumetric samples for use with the P14 Plastimeter and O14 Ageing Oven. The easy to operate circular motion of the handle allows the cutting of consistent volumetric samples quickly and easily.

Features

- **Easy to use**
- **Higher productivity**
- **Compact robust design**

Principle of Operation

This new Specimen Cutter, with it's compact and robust design, allows the user to easily cut multiple volumetric samples for use with the P14 Plastimeter and O14 Ageing Oven. An easy to operate circular motion of the handle allows the cutting of consistent volumetric samples quickly and easily. To achieve this, the cutter has been designed using a CAM system that enables the samples to be compressed to the correct volume, before being cut in one circular movement of the handle.

Specifications

Wallace Volumetric Specimen Cutter	
Part Number	WAS2
Dimensions (mm)	170 (h) x 100 (w) x 115 (d)
Weight	3.8kg
Operating Temperature	5 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

Standards

ISO 2007, ASTM D3194

P2 Williams Parallel Plate Plastimeter

The Williams Plastimeter is widely used for determining the plasticity and recovery of silicones and unvulcanised rubber compounds.

Features

- **Simple error free operation**
- **Consistent results assured**
- **Robust design**
- **Easy to use**
- **Measurements to 0.01mm**
- **Latch allows samples to be safely inserted between plates**

Principle of Operation

The Plastimeter features two parallel platens. A lower platen that forms the base of the instrument, and an upper platen which can be raised and lowered vertically by a handle. The test consists of compressing a cylindrical sample of specified volume between two parallel plates, and measuring the compressed height after a specified period. The sample is prepared from a sheet of unvulcanised rubber about 15mm thick. When the upper platen is lowered, a force of 49 ±0.05N is applied to the sample. A dial gauge reads the thickness of the test sample, which is the Plasticity Number.

Accessories

- Bench Thickness Gauge
- Rotary Specimen Cutter (16mm diameter)

Standards

ASTM D926

Specifications

P2 Williams Parallel Plate Plastimeter	
Part Number	WAP2
Dimensions (mm)	410 (h) x 150 (w) x 150 (d)
Weight	11kg
Compression Force	49.00 ± 0.05 N
Sample Volume	2.00 ± 0.02cm^3
Operating Temperature	5 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

P2 Williams Plastimeter

Hardness

Hardness (resistance to indentation) is one of the most widely measured properties used to characterise rubber, as it is a practical way of determining the degree of vulcanization.

Two measurement scales are in general use – International Rubber Hardness Degrees (IRHD) and the Shore scale. The two test methods use totally different indenter geometries, indenter forces, test time and procedures.

IRHD is used specifically to evaluate rubber, whereas Shore has developed into several different scales for testing a wide range of materials – from foam to hard plastics.

Regular calibration of your hardness tester equipment is essential for accurate, trusted results every time. Wallace is the only UKAS ISO/IEC 17025 accredited calibration laboratory for Shore and IRHD rubber hardness testers in the UK.

Consult with our expert technicians to ensure your hardness testers are accurately calibrated. Trust in our expertise for results that meet the highest standards of precision and reliability.

Full Range

Wallace supplies the full range of IRHD and Shore hardness testers, compliant with international testing standards:

- Automatic benchtop hardness testers
- Handheld digital and analogue durometers
- Stand to hold handheld durometers

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Features

- Simple one-off set up
- One touch fully automatic operation
- Minimal operator training required
- Visual LED indication of foot and indenter contact
- Accurate and consistent results
- Range of sample tables available
- Digital display with programmable resolution to 0.1, 0.2, 0.5 or 1 units

Range of Accessories

- Data Input Terminal
- Printer
- O-ring Holder
- Test Blocks
- Matrix Tables
- ‘V’ Groove Tables
- Oversized Tables

Software

This is supported by our traceability software designed to reliably record and analyse results.

Flexibility

Wallace offers competitive packages of a combination of our hardness testers which takes advantage of the one-off set up and stability, whilst providing flexibility to test to different standards.

Our Extended Head Hardness Tester range allows for flexibility to measure larger items. Maximum sample thickness is 75mm. Our easily exchangeable sample tables turns an extended head to normal use in seconds.

Bespoke sample tables can be provided for specialised applications.

Traceability Software - Hardness Testers

Wallace traceability software helps you manage your cost of quality through three key principles:

Productivity – easy and simple to use and adaptable to your known operating practice.

Traceability – a critical success factor for quality control, our software adapts to your own user defined traceability parameters and stores them in a protected database.

Analysis – data can be easily downloaded or analysed to monitor trends and identify and correct quality issues.

Wallace understands that not every testing facility is set up in the same way. Therefore the first step is to customise the software to your lab environment.

This includes device name, instrument model, and serial numbers as well as operator identification. In addition, you need to define your own traceability parameters - for instance part number, batch number, customer number or a combination.

These bespoke defined parameters will be the backbone of the operating practice, and analysis you perform later.

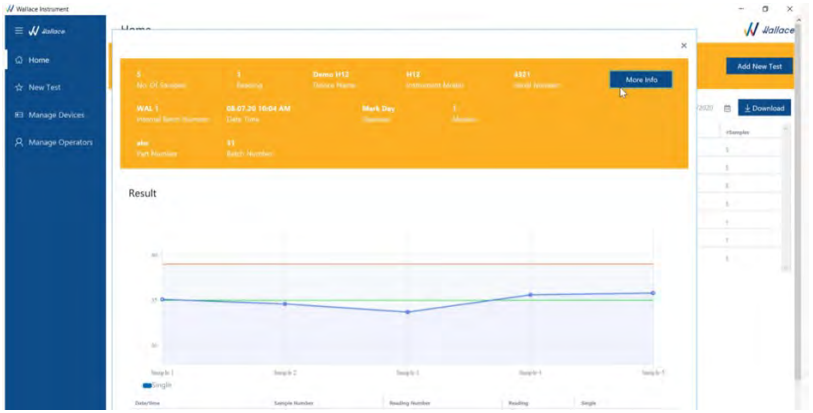
The selections always default to the simplest option (ie. single reading per sample).

Results are displayed clearly both graphically and in table format. After each individual test you can choose whether to accept or reject.

Results are committed to the secure database.

Flexible filters allows you to view the data by device number, operator name or other user defined fields.

Data can be downloaded in a CSV file to integrate with other systems or for further analysis. This data can then be used to design and print bespoke calibration certificates or labels.



Benchtop Hardness Testers - a full range for your needs

IRHD	Standard	Force Method	Foot Force	Contact Force	Indenting Force	Force Duration	Indenter Shape & Diameter	Max. Indention Depth	Sample Thickness	Measurement Range	Application Material
WAH12 Micro	ASTM D1415 ISO 48-2	Weight	235mN ±30	8.3mN ±0.5	145mN ±0.5	5 + 30 seconds	Ball, Ø 0.395mm	0.30mm	2.0mm ±0.5	30 - 100 Micro IRHD	Soft thin vulcanized rubber, O-rings, thermoplastic elastomers.
WAH14 Macro (Normal)	ASTM D1415 ISO 48-2	Weight	8.3N ±1.5	0.3N ±0.02	5.4N ±0.01	5 + 30 seconds	Ball, Ø 2.50mm	1.80mm	8 - 10mm	30 - 85 IRHD	Soft, vulcanized rubber, natural rubber, nitriles, thermoplastic elastomers, flexible polyacrylics and thermosets, wax, felt and leathers.
WAH14 Macro (High)	ASTM D1415 ISO 48-2	Weight	8.3N ±1.5	0.3N ±0.02	5.4N ±0.01	5 + 30 seconds	Ball, Ø 1.00mm	0.44mm	8 - 10mm	85 - 100 IRHD	Hard rubber, thermoplastic elastomers, harder plastics and rigid thermoplastics.
WAH14 Macro (Low)	ASTM D1415 ISO 48-2	Weight	8.3N ±1.5	0.3N ±0.02	5.4N ±0.01	5 + 30 seconds	Ball, Ø 5.00mm	3.18mm	8 - 10mm	10 - 35 IRHD	Soft rubber, thermoplastic elastomers, very soft plastics and thermoplastics, medium-dense textile windings.

SHORE TYPE	Standard	Force Method	Foot Force	Spring Force	Force Duration	Indenter Shape & Diameter	Max. Indention Depth	Sample Thickness	Measurement Range	Application Material
WA17A	ASTM D2240 ISO 48-4	Spring	1kg	8.05N	1 or 3 seconds	35° Truncated Cone (Frustrum)	2.50mm	>6mm	20 - 90 A	Soft vulcanized rubber, natural rubber, nitriles, thermoplastic elastomers, flexible polyacrylics and thermosets, wax, felt and leathers.
WA17B	ASTM D2240 ISO 48-4	Spring	1kg	8.05N	1 or 3 seconds	30° Cone	2.50mm	>6mm	Above 90 A Below 20 D	Moderately hard rubber, thermoplastic elastomers, paper products and fibrous materials.
WA17C	ASTM D2240 ISO 48-4	Spring	5kg	44.45N	1 or 3 seconds	35° Truncated Cone (Frustrum)	2.50mm	>6mm	Above 90 B Below 20 D	Medium hard rubber, thermoplastic elastomers, medium hard plastics and thermoplastics.
WA17D	ASTM D2240 ISO 48-4	Spring	5kg	44.45N	1 or 3 seconds	30° Cone	2.50mm	>6mm	Above 90 A	Hard rubber, thermoplastic elastomers, harder plastics and rigid thermoplastics.
WA17DO	ASTM D2240 ISO 48-4	Spring	5kg	44.45N	1 or 3 seconds	Ø 2.38mm ½ Ball	2.50mm	>6mm	Above 90 C Below 20 D	Moderately hard rubber, thermoplastic elastomers, and very dense windings.
WA17M	ASTM D2240 ISO 48-4	Spring	0.25kg	0.765N	1 or 3 seconds	30° Cone	1.25mm	>1.5mm	20 - 85 A	Thin irregularly shaped rubber, O-rings, thermoplastic elastomers and plastic specimens.
WA17O	ASTM D2240 ISO 48-4	Spring	1kg	8.05N	1 or 3 seconds	Ø 2.38mm ½ Ball	2.50mm	>6mm	Below 20 DO	Soft rubber, thermoplastic elastomers, very soft plastics and thermoplastics, medium-dense textile windings.
WA17OO	ASTM D2240 ISO 48-4	Spring	0.4kg	1.111N	1 or 3 seconds	Ø 2.38mm ½ Ball	2.50mm	>6mm	Below 20 O	Extremely soft rubber, thermoplastic elastomers, sponge, extremely soft plastics and thermoplastics, foams, low density textile windings, human and animal tissue.

H12 Micro IRHD Hardness Tester

The Wallace H12 Micro Hardness Tester allows accurate and repeatable measurements of small thin samples such as O-rings.

Features

- **Traceability software available**
- **Tests small /thin samples and O-rings**
- **One touch fully automatic operation**
- **Accurate and consistent results**
- **Easy access to sample area**
- **Operator dependency reduced**
- **Range of sample tables**
- **Printer and data terminal as options**

Principle of Operation

The Wallace H12 is a digital benchtop hardness tester that measures in IRHD the hardness of rubber samples. In particular it has been designed to accurately test thin sections and small test pieces such as O-rings.

The robust 'C' frame design allows the operator easy access from front and sides to safely load and remove samples. The indenter mounting is essentially frictionless and its position sensed by a linear variable differential transformer, providing the instrument with outstanding sensitivity. Adjustable anti-vibration feet reduce the effect of external vibration.

By simply pressing the start button, the instrument functions automatically, allowing accurate, repeatable results to be recorded in much less time than traditional models.

As minimal training is required, new operators soon become confident with the H12, achieving consistent readings from the outset.

Accessories

A range of optional sample tables are available, designed to locate samples of varying shapes and special sample holding fixtures. It includes the O-ring adaptor (H19/ORA) that ensures the centre of the ring is directly beneath the centre line of the indenter.

Standards

ISO 48-2, ASTM D1414, ASTM D1415

Specifications

H12 Micro IRHD Hardness Tester	
Part Number	WAH12/1
Dimensions (mm)	300 (h) x 215 (w) x 255 (d)
Weight	6.5kg
Resolution	Selectable rounding to 0.1, 0.2, 0.5 or 1
Indenter Shape	Ball
Indenter Diameter	0.395mm ±0.005
Maximum Indention Depth	0.3mm
Measurement Range	30 - 100 Micro IRHD
Force Method	Weight
Foot Force	235mN ±30
Contact Force	8.3mN ±0.5
Indenting Force	145mN ±0.5
Force Duration	5 + 30 seconds
Sample Thickness (as per standard)	2.0mm ±0.5
Operating Temperature	5 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing
Output of Test Results to PC/ Printer/Datalogger	USB connection (RS232 protocol)

H14 Macro IRHD Hardness Tester

The Wallace H14 Macro Hardness Tester allows accurate and repeatable measurements of larger samples.

Features

- **Traceability software available**
- **One touch fully automatic operation**
- **Accurate and consistent results**
- **Easy access to sample area**
- **Operator dependency reduced**
- **Range of sample tables**
- **Printer and data terminal as options**

Principle of Operation

The Wallace H14 is a digital benchtop hardness tester designed for measuring in IRHD the hardness of standard rubber samples.

The robust ‘C’ frame design allows the operator easy access from front and sides to safely load and remove samples. The indenter mounting is essentially frictionless and its position sensed by a linear variable differential transformer, providing the instrument with outstanding sensitivity. The adjustable anti-vibration feet reduce the effect of external vibration.

By simply pressing the start button, the instrument functions automatically, allowing accurate, repeatable results to be recorded in much less time than traditional models.

As minimal training is required, new operators soon become confident with the H14, achieving consistent readings from the outset.

Accessories

A range of optional sample tables are available, designed to locate samples of varying shapes and special holding fixtures.

Standards

ISO 48-2, ASTM D1414, ASTM D1415

Specifications

H14 Macro IRHD Hardness Tester			
	WAH14 (Normal)	WAH14 (High)	WAH14 (Low)
Part Number	WAH14/1	WAH14H	WAH14L
Dimensions (mm)	300 (h) x 215 (w) x 255 (d)	300 (h) x 215 (w) x 255 (d)	300 (h) x 215 (w) x 255 (d)
Weight	8kg	8kg	8kg
Indenter Diameter	2.50mm ±0.01	1.00mm ±0.01	5.00mm ±0.01
Maximum Indention Depth	1.80mm	0.44mm	3.18mm
Measurement Range	30 - 85 IRHD	85 - 100 IRHD	10 - 35 IRHD
Resolution	Selectable rounding to 0.1, 0.2, 0.5 or 1		
Indenter Shape	Ball		
Force Method	Weight		
Foot Force	8.3N ±1.5		
Contact Force	0.3N ±0.02		
Indenting Force	5.4N ±0.01		
Force Duration	5 + 30 seconds		
Sample Thickness (as per standard)	8 to 10mm		
Operating Temperature	5 to 40°C; Altitude 2000m maximum		
Humidity Range	10 to 80% RH non-condensing		
Output of Test Results to PC/ Printer/Datalogger	USB connection (RS232 protocol)		

H17 Shore Scale Hardness Testers

The Wallace H17 series of hardness testers allows accurate measurement of both soft and hard materials using multiple Shore Scales.

Features

- **Traceability software available**
- **Tests soft and hard materials using different scales**
- **One touch fully automatic operation**
- **Accurate and consistent results**
- **Easy access to sample area**
- **Operator dependency reduced**
- **Range of sample tables**
- **Printer and data terminal as options**

Principle of Operation

The Wallace range of H17 digital benchtop hardness testers are designed for measuring in Shore scale the hardness of various materials. A range of models are offered including the H17A for testing standard rubber, H17O for soft rubber and medium density textiles, H17D for hard rubbers and plastics, and H17M for thin/ small rubber samples.

The robust ‘C’ frame design allows the operator easy access from front and sides to safely load and remove samples. The adjustable anti-vibration feet reduce the effect of external vibration.

By simply pressing the start button, the instrument functions automatically, allowing accurate, repeatable results to be recorded in much less time than traditional models.

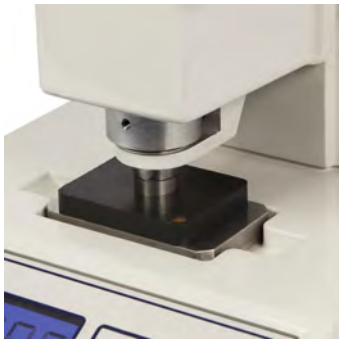
As minimal training is required, new operators soon become confident with the H17, achieving consistent readings from the outset.

Accessories

A range of optional sample tables are available, designed to locate samples of varying shapes, sizes and special holding fixtures.

Standards

ISO 48-4, ASTM D2240



H17A Model

H17 Shore Scale Hardness Testers

Full Range

	Model H17A	Model H17B	Model H17C	Model H17D	Model H17DO	Model H17M	Model H17O	Model H17OO
Dimensions (mm)	300(h) x 215(w) x 255(d)	300(h) x 215(w) x 255(d)	350(h) x 215(w) x 255(d)	350(h) x 215(w) x 255(d)	350(h) x 215(w) x 255(d)	300(h) x 215(w) x 255(d)	300(h) x 215(w) x 255(d)	300(h) x 215(w) x 255(d)
Weight	7.5kg	7.5kg	12kg	12kg	12kg	6.5kg	7.5 kg	6.5kg
Resolution	0.1 units	0.1 units	0.1 units	0.1 units	0.1 units	0.1 units	0.1 units	0.1 units
Indenter Diameter & Shape	35º; Truncated Cone (Frustum)	30°; Cone	35°; Truncated Cone (Frustum)	30º; Cone	Ø 2.38mm; ½ Ball	30º; Cone	Ø 2.38mm; ½ Ball	Ø 2.38mm; ½ Ball
Indenter Radius	Flat	0.1mm	Flat	0.1mm	1.19mm	0.1mm	1.19mm	1.19mm
Max. Indention Depth	2.50mm	2.50mm	2.50mm	2.50mm	2.50mm	1.25mm	2.50mm	2.50mm
Measurement Range	20 - 90 A	Above 90 A Below 20 D	Above 90 B Below 20 D	Above 90 A	Above 90 C Below 20 D	20 - 85 A	Below 20 DO	Below 20 O
Force Method	Spring	Spring	Spring	Spring	Spring	Spring	Spring	Spring
Foot Force	1kg	1kg	5kg	5kg	5kg	0.25kg	1kg	0.4kg
Spring Force	8.05N	8.05N	44.45N	44.45N	44.45N	0.765N	8.05N	1.111N
Force Duration	1 or 3 seconds	1 or 3 seconds	1 or 3 seconds	1 or 3 seconds	1 or 3 seconds	1 or 3 seconds	1 or 3 seconds	1 or 3 seconds
Sample Thickness	>6mm	>6mm	>6mm	>6mm	>6mm	>1.5mm	>6mm	>6mm
Operating Temperature	5 to 40°C; Altitude 2000m maximum							
Humidity Range	10 to 80% RH non-condensing							
Output of Test Results to PC/Printer/Datalogger	USB Connection (RS232 protocol)							

Flexibility - Extended Head Hardness Tester
Bespoke applications

Flexible and Stable

Wallace provides the Extended Head Hardness Tester range for measuring larger items. Maximum sample thickness has increased from 35mm to 75mm.

You can now have:

- Our proven C-frame design which provides rigidity for unrivalled stability and repeatability of results; and
- Flexibility in use. Our easily exchangeable sample tables converts an extended head to normal use in seconds.

Specialised bespoke sample tables can be provided or designed to suit your specific needs.

Maximum Clearance

Bespoke Application

Easy conversion to standard operation

Handheld Durometers

Wallace offers both analogue and digital Handheld Durometers (including Shore A, Shore D and Shore OO). These durometers enable accurate and repeatable results in accordance with the relevant standards. All models are designed for handheld applications or in conjunction with the Wallace Handheld Durometer Stand.

Features

- **Accurate and repeatable results**
- **Non-reflective, full 360° dial face**
- **Excellent 1/2 point accuracy**
- **Digital model connects directly to your PC for data transfer**
- **Digital model has resolution 0.1 and auto-off function**
- **Conforms to various ISO, ASTM standards**

Principle of Operation

The Wallace Handheld Durometers are designed for measuring the hardness of various materials. Simply pressing the unit vertically onto the sample will cause the indenter to penetrate the sample under a specific spring force. The indention is converted to a hardness value.

To increase repeatability and accuracy, use the handheld unit in conjunction with the stand. This will ensure that repeatable force and perpendicularity are maintained, thus increasing the repeatability and accuracy of each test.

Standards

ISO 48-4, ISO 868, ASTM D2240

Digital Durometer


Analogue Durometer A

Specifications

SHORE TYPE	Standard	Foot Force	Spring Force	Indenter Shape & Diameter	Max. Indention Depth	Sample Thickness	Measurement Range	Application Material
A	ASTM D2240 ISO 48-4 ISO 868	1kg	8.05N	35° Truncated Cone (Frustrum)	2.50mm	>6mm	10 - 90 A Below 20 D	Soft vulcanized rubber, natural rubber, nitriles, thermoplastic elastomers, flexible polyacrylics and thermosets, wax, felt and leathers.
B	ASTM D2240 ISO 48-4	1kg	8.05N	30° Cone	2.50mm	>6mm	Above 90 A Below 20 D	Moderately hard rubber, thermoplastic elastomers, paper products and fibrous materials.
C	ASTM D2240 ISO 48-4	5kg	44.45N	35° Truncated Cone (Frustrum)	2.50mm	>6mm	Above 90 B Below 20 D	Medium hard rubber, thermoplastic elastomers, medium hard plastics and thermoplastics.
D	ASTM D2240 ISO 48-4 ISO 868	5kg	44.50N	30° Cone	2.50mm	>6mm	Above 90 A	Hard rubber, thermoplastic elastomers, harder plastics and rigid thermoplastics.
DO	ASTM D2240 ISO 48-4	5kg	44.45N	Ø 2.38mm ½ Ball	2.50mm	>6mm	Above 90 C Below 20 D	Moderately hard rubber, thermoplastic elastomers, and very dense windings.
O	ASTM D2240 ISO 48-4	1kg	8.05N	Ø 2.38mm ½ Ball	2.50mm	>6mm	Below 20 DO	Soft rubber, thermoplastic elastomers, very soft plastics and thermoplastics, medium-dense textile windings.
OO	ASTM D2240 ISO 48-4	0.4kg	1.111N	Ø 2.38mm ½ Ball	2.50mm	>6mm	Below 20 O	Extremely soft rubber, thermoplastic elastomers, sponge, extremely soft plastics and thermoplastics, foams, low density textile windings, human and animal tissue.

Handheld Durometer Stand

The Wallace Handheld Durometer Stand provides a lower cost alternative for accurate and repeatable results in accordance with the relevant standards.

The easy height and weight adjustment make it simple to measure non-standard products.

The stand easily adapts to support a range of durometers, both analogue and digital (including Shore A, Shore D and Shore OO).

Features

- **Accurate and repeatable results**
- **Constant and perpendicular foot pressure**
- **Adjustable feet and level gauge**
- **Easy height adjustment using quick release lever**
- **Adapts easily to various ISO standards**
- **Durometer easily fitted to stand**

Principle of Operation

Adjust the height of the durometer to allow the samples to be placed easily under the indenter. There is a safety stop on the shaft that should be set to avoid the instrument being able to drop accidently into the sample or table.

Place the sample on the stand and operate the lever slowly to deploy the durometer. Allow the durometer to move gently onto the sample and display the reading.

Accessories

A range of digital and analogue handheld durometers as well as Shore A and D weights.

Weights		
Standard	**Weight: WAH18-120**	**Weight: WAH18-53**
Shore OO	x	x
Shore A	✓	x
Shore D	✓	✓

Standards

ISO 48-4, ISO 868, ASTM D2240

Specifications

Handheld Durometer Stand	
Part Number	WAH18
Dimensions (mm)	450 (h) x 200 (w) x 200 (d)
Stand Weight	11kg
Indicator Travel	25mm
Adjustment Range	250mm
Operating Temperature	10 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

Digital Durometer on Stand

Accessories - Hardness Test Blocks and Sample Tables

HARDNESS TEST BLOCKS

Wallace offers Rubber Hardness Test Blocks in six scales – IRHD (Micro), IRHD (Macro), Shore A, D, O and M. Test blocks are used for routine verification of hardness testers. Test blocks are manufactured from high-quality rubber which limits the ageing effects of temperature and time on hardness.

IRHD MICRO AND SHORE M TEST BLOCKS

Features

- **Metal holder ensures consistent measurements**
- **Sets come in compact case for ease of storage**
- **Each test block is serialised for traceability**

Specifications

Test Blocks	Scale	Hardness Range (type)	Quantity in Set	Instrument Model
WAH11/1	IRHD Micro	40-90	4	H12
WAH11/1M	Shore M	40-90	4	H17M

IRHD MACRO AND SHORE A, D, O AND OO TEST BLOCKS

Specifications

Test Blocks	Scale	Hardness Range (type)	Quantity in Set	Instrument Model
WAH10	IRHD Macro	40-90	6	H1, H2, H14, H15
WAH10A	Shore A	20-90	6	H16A, H17A
WAH10D	Shore D	20-90	6	H16D, H17D
WAH10O	Shore O	20-90	3	H17O
WAH10OO	Shore OO	20-90	3	H17OO

SAMPLE TABLES FOR WALLACE HARDNESS TESTERS

Sample tables will suit any of the benchtop Wallace Hardness Testers, including the H12, H14 and H17 models. The tables accurately locate onto precision dowels, so no extra fixings are required.

H19/ORA O-ring Holder

The sample stable locates the centre of an O-ring directly beneath the indenter.

Upon turning the knurled wheel, two gear driven pins rise from the surface to locate the O-ring. The holder accommodates cross section diameters of between 1 and 5.5mm.

Dimensions: 23mm (h) x 130mm (w) x 80mm (d)

H19/5 Matrix Table

For precise location of sample holding fixture. The matrix consists of 126 holes located on 10mm centres. Alternate holes are tapped to accept M3 threaded screws or drilled to 3mm to accept a dowel.

Dimensions: 180mm (w) x 76mm (d)

H19 'V' Groove Tables

For location of solid section extrusions and mouldings.

H19/2 1mm wide 'V' groove

H19/3 4mm wide 'V' groove

H19/4 8mm wide 'V' groove

Dimensions: 180mm (w) x 76mm (d)

H19/7 Oversized Table

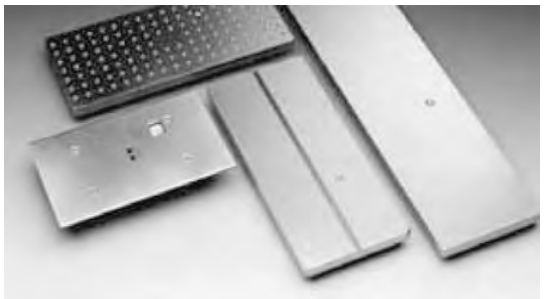
A flat surface for easy positioning of large samples.

Dimensions: 300mm (w) x 76mm (d)

Custom Tables

Wallace can offer custom design tables for specialist applications.

H19 ORA O-ring Table



H19/7 Oversized Table, H19/5 Matrix Table, H19 V Groove Tables

Compression

Compression tests are used to measure the effects of compression and relaxation of rubber and polymers. An important use is to determine the ability of an elastine to seal efficiently when held in compression between two rigid faces.

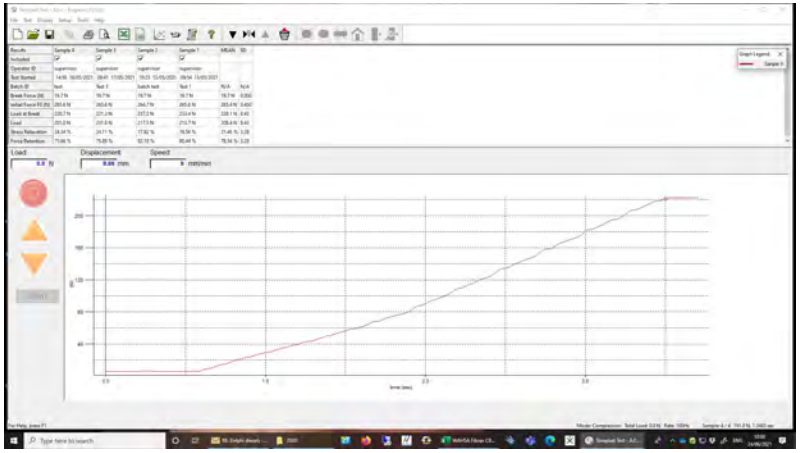
Wallace supplies:

- Compression Stress Relaxometer (CSR)
- CSR Jigs
- Compression Set Apparatus

Software for CSR

The software allows the brakeforce data from a number of individual jigs to be collected and stored.

- **Windows based, easy-to-use software with almost limitless freedom to design and customise compression tests to suit your needs.**



C11 Compression Stress Relaxometer

The Wallace Compression Stress Relaxometer (WAC11) allows the operator to easily measure the Compression Stress Relaxation (CSR) characteristics of elastomers and rubber products (e.g. seals, O-rings) as required by the relevant standards.

CSR is a measure of the ability of an elastomer to seal efficiently when held in compression over time and in varying environmental conditions between two rigid faces. The stress at the interface between the elastomer and the rigid faces is important for efficient sealing and is a function of the modulus of the elastomer and the strain applied.

CSR is used by industries including aerospace, automotive and construction to understand the characteristics of elastomeric seals. Seals are used in numerous applications e.g. O-rings in pipe joints or seals in aero and automotive engines. For safety, warranty and product liability reasons, it is essential that these components, whilst under compression, operate without failure for many years.

Features

- **Accurate, repeatable and reproducible measurement**
- **Software allows the brakeforce data from a number of individual jigs to be collected and stored**
- **Discontinuous method, only one instrument for any number of jigs**
- **This WAC11 is backwards compatible with jigs used on previous models**
- **Compression force from 0N to a capacity of 2.2kN (500 lbf)**
- **Units of measurements mN, daN, N, kN, gf, kgf, ozf, lbf**
- **Alternative Load Cell range available**

Principle of Operation

The principle of the WAC11 is based on the electrical contact being made between the load cell and the head of the jig. The contact is only broken when the force applied to the Relaxometer marginally exceeds the counterforce exerted by the test sample. The Relaxometer features a ballscrew-driven motorised test frame and load cell designed to apply and measure the required force. At the start of the test cycle the measuring head moves quickly to the jig. At a pre-set position, the measuring head reduces the speed to allow the load cell to more accurately read the force. When the applied force just exceeds the counterforce, the results are displayed graphically and can be saved to a designated folder.

C11 Relaxometer

Specifications

Compression Stress Relaxometer	
Part Number	WAC11
Dimensions	941mm (h) x 290mm (w) x 414mm (d)
Weight	22kg
Max. Power Requirements	250W
Voltage	230VAC 50Hz or 110VAC 60Hz
Available Load Cell Ranges	2 to 50,000 N 0.2 to 55,000 kgf 0.45 to 11,000 lbf
Load Cell Accuracy	±0.1% of full scale 2 to 2.5kN ±0.2% of full scale 5kN to 50kN
Load Cell Resolution	1:6,500
Speed Range	1-1000mm/min
Digital Display of Load/ Position/Speed	Yes
Operating Temperature	10°C to 35°C
Humidity Range	10 to 80% RH non-condensing
Output of Test Results to PC/Printer/ Datalogger	Via USB/networks ports RS232 via USB converter in ASCII format

Accessories

- Wallace supplies a range of both Shawbury-Wallace test jigs (with fixed or adjustable heights/ compression percentages) as well as Wykeham Farrance test jigs.

Standards

BS ISO 3384-1 Method B, BS ISO 3384-2 Method B, ASTM D6147 Method B

Compression Stress Relaxation – Jigs

Wallace offers a range of jigs to accompany the WAC11 Compression Stress Relaxometer. The main models we offer in line with the applicable standards are:

- **Shawbury-Wallace Stress Relaxation Jig**
  This fixture is used for the discontinuous method and is based on the electrical contact being made between the load cell and the head of the jig. The contact is only broken when the force applied to the Relaxometer marginally exceeds the counterforce exerted by the test sample.

- **Wykeham Farrance Stress Relaxation Jig**
  This fixture is used for the discontinuous method and works by applying a slight increase in the compression of the test specimen.

Shawbury-Wallace Stress Relaxation Jig

This jig comes both as fixed height jigs and adjustable jigs. Fixed height jigs are generally used when the same test is often repeated (e.g. same sample thickness and compression ratio), whilst the adjustable jigs are used where the applicable size or compression ratio varies.

The fixed height jig (C11/1) is supplied with one fixed spacer, it's height being determined by the sample size and the required percentage compression. There are a number of standard fixed height spacers available to suit different sample heights and percentage compressions.

The adjustable height jig (C11/6) is supplied with one adjustable spacer. This allows the required compression ratio to be achieved on samples of varying heights. The distance between the upper and lower platen faces can be adjusted in the range of 0.0mm to 12.0mm.

An O-ring adaptor is available and can accommodate O-rings of up to 41mm diameter. It simply locates over the bottom plate of the jig and a small hole drilled through the adaptor allows air to vent to the atmosphere, preventing a pressure differential across the seal.

Features

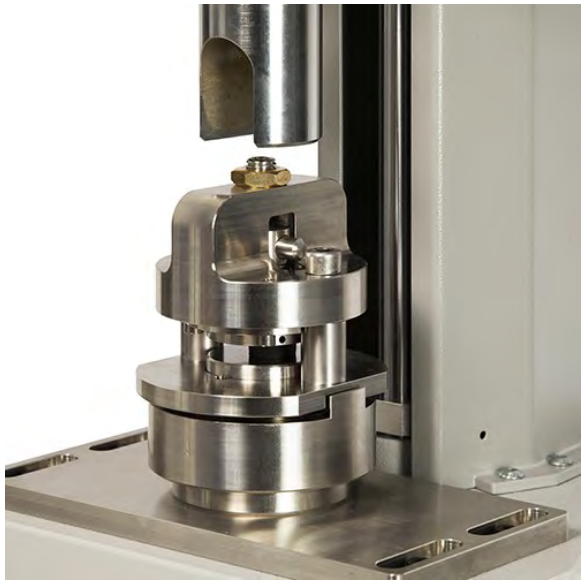
- **Full range of jigs for standard and bespoke applications**
- **Bespoke jigs on request**
- **Seamlessly integrates with existing and previous models of WAC11**
- **Suitable for testing O-rings**

Accessories

- O-ring Adaptor
- Standard Rotary Cutters
- Spacer

Standards

BS ISO 3384-1 Method B, BS ISO 3384-2 Method B, ASTM D6147 Method B



NOTE: Bespoke spacers are available upon request.

Specifications

Shawbury-Wallace Stress Relaxation Jigs	
Part Number	WAC11/1 and WAC11/6
Dimensions	120mm (h) x 100mm (Ø)
Weight	1.8kg
Operating Temperature	-40°C to +250°C

Range of Spacers for Fixed Height Jigs (WAC11/1)			
Part Number	**Sample**	**% Compression**	**Spacer**
WAC11/1-1-1A	12.50	20%	26.00 ± 0.05
WAC11/1-1-1B	6.30	20%	30.96 ± 0.05
WAC11/1-1-1C	12.70	20%	25.84 ± 0.05
WAC11/1-1-1D	6.35	20%	30.92 ± 0.05
WAC11/1-1-1E	12.50	25%	26.63 ± 0.05
WAC11/1-1-1F	6.30	25%	31.28 ± 0.05
WAC11/1-1-1G	12.50	15%	25.38 ± 0.05
WAC11/1-1-1H	6.30	15%	30.65 ± 0.05
WAC11/1-1-1J	13.00	25%	26.25 ± 0.05
WAC11/1-1-1K	13.00	35%	27.55 ± 0.05
WAC11/1-1-1L	1.00	10%	35.10 ± 0.05
WAC11/1-1-1M	3.50	25%	33.38 ± 0.05
WAC11/1-1-1N	6.30	40%	32.22 ± 0.05
WAC11/1-1-1P	2.00	25%	34.50 ± 0.05
WAC11/1-1-1Q	7.00	10%	29.70 ± 0.05
WAC11/1-1-1R	12.70	25%	26.47 ± 0.05
WAC11/1-1-1S	6.00	25%	31.50 ± 0.05
WAC11/1-1-1AA	6.30	30%	31.59 ± 0.05
WAC11/1-1-1AB	6.30	50%	32.85 ± 0.05
WAC11/1-1-1AC	6.25	40%	32.25 ± 0.05
WAC11/1-1-1AE	10.00	15%	27.50 ± 0.01
WAC11/1-1-1AF	10.00	20%	28.00 ± 0.01
WAC11/1-1-1AG	10.00	25%	28.50 ± 0.01
WAC11/1-1-1AH	12.50	15%	25.38 ± 0.01
WAC11/1-1-1AJ	12.50	20%	26.00 ± 0.01
WAC11/1-1-1AK	12.50	25%	26.63 ± 0.01
WAC11/1-1-1AL	2.65	25%	34.01 ± 0.05
WAC11/1-1-1AN	10.00	30%	29.00 ± 0.01

Compression Stress Relaxation – Jigs

Wykeham Farrance Stress Relaxation Jig

Wallace offers a range of jigs to accompany the WAC11 Compression Stress Relaxometer. This jig is the Wykeham Farrance style jig. It is a fixed height jig and will provide a known compression percentage using precision ground spacers.

The fixed height jig (WAC11-190) is supplied with a pair of fixed spacers. The spacers are sized to give 25% compression to a standard 6.3mm thick sample. Spacers are available to give 15% compression to a standard 6.3mm thick sample. Bespoke spacers can be made for specific applications.

Features

- **Full range of jigs for standard and bespoke applications**
- **Bespoke jigs on request**
- **Seamlessly integrates with existing and previous models of WAC11 Compression Stress Relaxometer**
- **Temperature sensor hole in base for 1.6mm probe**

Accessories

- Custom spacer thickness
- WAC11 location adaptor
- Sample positioning gauge
- Standard rotary cutters

Principle of Operation

The jigs compress the sample by a known percentage and maintain the compression throughout the entire test process. With the jig fitted to the WAC11, the counterforce can be measured at the prescribed time intervals easily. The jigs can then be stored in the required condition, until the next test time, without compromising the known compression percentage.

Standards

BS ISO 3384-1 Method B, BS ISO 3384-2 Method B, ASTM D6147 Method B

NOTE: Bespoke spacers are available upon request.

Specifications

Wykeham Farrance Stress Relaxation Jig	
Part Number	WAC11-190
Dimensions (mm)	35 (h) x 44.5 (Ø)
Weight	1.2 kg
Operating Temperature	-40°C to +250°C

Range of Spacers (2 off required)			
Part Number	**Sample**	**% Compression**	**Spacer**
WAC11-199-001	6.30	25%	3.9875 ± 0.025
WAC11-199-002	6.30	15%	3.6725 ± 0.025
WAC11-199-003	6.25	25%	4.0063 ± 0.025
WAC11-199-004	6.35	25%	3.9688 ± 0.025
WAC11-199-005	6.40	25%	3.9500 ± 0.025
WAC11-199-006	6.45	25%	3.9313 ± 0.025

Parts and Accessories of Jig	
Part Number	**Description**
WAC11-193	Push Rod to fit WAC11 instrument
WAC11-194	WAC11-190 fixture locator for WAC11 instrument
WAC11-195S	Sample locating tool - set of three
WAC11-199-001	Compression Spacer 25% compression for 6.3mm sample
WAC11-199-002	Compression Spacer 15% compression for 6.3mm sample

The Wallace jig assemblies are made from stainless steel as standard, but can be manufactured in other materials for specific applications.

C3/C4 Compression Set Apparatus

The ‘set’ is the residual strain in a rubber test piece after it has been subjected to stress for a given time and then allowed to recover for a given time, the temperature being substantially constant during the test. 'Compression Set' is the residual compression strain after compression (a) to a given compression strain, or (b) a given compression stress.

Wallace provide 2 models using the constant strain method of testing - the WAC3 model (ISO Standard) and the WAC4 model (ASTM Standard). Each model has 3 versions covering single, double and triple daylight.

Features

- **Measures set at constant strain**
- **Machined to high quality**
- **One, two or three samples per fixture**
- **Circular cutters to prepare samples**

Principle of Operation

Two or more circular steel plates, 12.5mm thick and 126mm diameter, are clamped together with three bolts. Spacers of the appropriate thickness, in the form of rings around each bolt, are placed between the plates to control the thickness of the test pieces whilst compressed. Loose stainless steel discs are interleaved between the main plates to provide a highly polished surface in contact with the test pieces. These discs may easily be replaced should they become scratched, pitted or damaged.

The apparatus is available with single (2 plates), double (3 plates) and triple daylight (4 plates). It can also be supplied with spacers of the required thickness to meet the ISO (Model C3) or the ASTM (Model C4) specifications. When ordering please state whether ISO or ASTM model is required, and also the number of daylights (or the number of plates).

Models

ISO Standard Model - WAC3

Single daylight	(2 plate)	WAC3/1
Double daylight	(3 plate)	WAC3/2
Triple daylight	(4 plate)	WAC3/3

ASTM Standard Model - WAC4

Single daylight	(2 plate)	WAC4/1
Double daylight	(3 plate)	WAC4/2
Triple daylight	(4 plate)	WAC4/3

Standards

ISO 815, ASTM D395

Specifications

Compression Set Apparatus - C3			
	C3/1 Single Daylight	**C3/2 Double Daylight**	**C3/3 Triple Daylight**
Part Number	WAC3/1	WAC3/2	WAC3/3
Dimensions (mm)	60 (h) x 126 (Ø)	80 (h) x 126 (Ø)	100 (h) x 126 (Ø)
Weight	3.2kg	4.5kg	6.3kg
Operating Temperature	10 to 500°C; Altitude 2000m maximum		
Humidity Range	10 to 80% RH non-condensing		

Compression Set Apparatus - C4			
	C4/1 Single Daylight	**C4/2 Double Daylight**	**C4/3 Triple Daylight**
Part Number	WAC4/1	WAC4/2	WAC4/3
Dimensions (mm)	60 (h) x 126 (Ø)	80 (h) x 126 (Ø)	100 (h) x 126 (Ø)
Weight	3.2kg	4.5kg	6.3kg
Operating Temperature	10 to 500°C; Altitude 2000m maximum		
Humidity Range	10 to 80% RH non-condensing		

Mooney Viscometer Mk III

The Mooney Viscometer Mk III measures and records the viscosity of natural, synthetic or compounded rubber.

Features

- **Simple and robust mechanical system producing reliable results**
- **Precise digital temperature control**
- **Easy to use traceability software**

Principle of Operation

Conforming to international standards, the Mk III is a shearing-disc viscometer in which the rubber sample is compressed pneumatically in a cylindrical chamber formed by cavities in 2 opposing dies.

The viscosity is determined by measuring the torque required to turn the rotor inside the chamber, which is heated to a set temperature. As the rotor shears the sample, a torque reaction is transmitted through a worm shaft, which deflects a torsion beam. A digital dial gauge measures the beam's displacement. With its simple mechanical drive system and well-proven design, the Mk III has been in use for many years and has become the workhorse for many laboratories.

Accessories

Standard

- Large rotor
- Tool set

Optional

- V3/Cal calibration kit
- S6/15 Mooney sample cutter
- Small Rotor
- Software
- Printer

Our Software

- Allows you to follow test results live on screen
- Save all results for future reference
- Compare results on screen
- Print results with one click

V3/2 Mooney Viscometer

Specifications

Mooney Viscometer Mk III	
Part Number	WAV3/2
Dimensions (mm)	810 (h) x 510 (w) x 460 (d)
Weight	127kg
Max. Power Requirements	1700 VA
LED Screen	2 line, 20 character back-lit display housed in control panel
Controls	3 sealed switches with integral LED indicators
Die Heating Temperature Range	By elements to upper & lower platens. 700W per element 80 - 150°C (±0.1°C)
Maximum Torque	Cut out at 200 Mooney points
Die Closure	Using Pneumatic cylinder
Air Line Pressure	80 psi or 5 bar maximum
Gauge (excl. V3/1)	0.0 - 0.5˝range. 0.0005˝resolution.
Pressure Controls	Twin controls for platen closure and test routine
Operating Temperature	10 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

Standards

ISO 289-1, ASTM D1646

F16 De Mattia Flexing Machine

The Wallace range of Flexing Machines is used to test specially moulded samples for resistance to cracking or cut growth by repeated flexing. Flex testing is recommended when the flexing encountered in service is liable to simulate the action of the test (i.e. tyre sidewalls or soles of shoes).

The De Mattia Flex Testing Machine F16 includes a range of 3 machines capable of handling 12, 24 or 36 samples in an oven with digital temperature control having a range of ambient to 150°C.

Features

- **Easy access cabinet or oven versions**
- **Cycle counter fitted with 9 - 999,999 cycles allowed/test**
- **Internal illumination fitted**
- **Balanced main shaft ensures smooth operation**
- **Ambient to 150°C temperature range on oven versions**
- **Motor cut-outs fitted to both doors**

Accessories

In accordance with the testing standards, Wallace offer the following special moulds and piercing tool for producing a groove in the edge of the test specimen. This groove helps to induce the onset of cracking during flexing.

- Three cavity specimen mould F1/1
- Six cavity specimen mould F1/1/1
- Piercing Tool with needle F1/3 (BS, ASTM & SATRA versions available)

Principle of Operation

Cracking and cut growth increase with increasing cycles. Samples are loaded so that they are flat when the grips are tightened and flexed but not elongated during tester operation.

The tester is stopped at intervals specified and the cracks evaluated. Two sets of grips on either side of the frame are reciprocated at constant frequency for a pre-set number of cycles controlled by a cycle counter.

Easy access to the interior of all machines is provided through hinged front and rear doors. Four recessed lamps provide interior illumination and a knurled flywheel is used to rotate the mechanism, and a brake to hold the position for easy sample loading. The main shaft is fitted with a balance weight to ensure smooth running.

Specifications

De Mattia Flex Testing Machine (F16)			
Version	**F16/12**	**F16/24**	**F16/36**
Part Number	WAF16/12	WAF16/24	WAF16/36
Number of Samples	12	24	36
Dimensions (mm)	1210 (h) x 710 (w) x 570 (d)		
Weight	275kg		
Maximum Power	2900 VA		
Oven Temperature	Ambient to 150°C		
Temperature Stability	± 1°C		
Operating Temperature	10 to 40°C; Altitude 2000m maximum		
Humidity Range	10 to 80% RH non-condensing		

Standards

ISO 132, ASTM D430-06, ASTM D813

O7E Multi-Cell Ageing Oven

Accelerated ageing and heat resistance tests are designed to estimate the relative resistance of rubber to deterioration with the passage of time. The Wallace O7E Multi-Cell Ageing Oven, allows samples to be aged in separate cells, preventing any contamination from adjacent samples through the migration of volatile substances.

Features

- **Stable temperature range 60 - 250°C**
- **Seven separate test cells**
- **No volatile migration between cells**
- **Auto-tuning temperature control**
- **Adjustable air flow**
- **Accurate temperature and airflow**
- **Safety temperature cut-out**
- **Sturdy construction on stand and castor wheels**

Principle of Operation

The rubber is subjected to controlled deteriorating influences for definite periods, after which appropriate properties are measured and compared with the corresponding properties of the unaged rubber.

This air oven method of ageing exposes a test sample to elevated air temperatures, allowing its physical properties, such as tensile strength, to be measured and compared with those of an unaged sample.

Avoiding the need for valuable bench space, the O7E is designed as a complete unit with its own stand and castor wheels.

The oven is a solid aluminium block with seven vertical cells machined from it. Preheated air at a controlled temperature is pumped from a manifold through a calibrated opening into the bottom of each cell, ensuring even air and temperature distribution.

To avoid contamination from re-circulation, the air is discharged to the atmosphere through the two covers at the top of each cell. The test samples are suspended from the inside of the top cover.

The oven includes a PID temperature controller with digital display. The controller is auto-tuning, achieving a high level of accuracy and stability at the working temperature. Alarms on the controller abort the tests if the temperature goes outside its operating band.

A valve positioned on the top of the control module regulates the airflow, which is measured accurately by a calibrated flow-meter.

A USB communication option is offered, allowing connection to a PC.

Specifications

Wallace Multi-Cell Ageing Chamber (O7E)	
Part Number	WAO7E
Dimensions (mm)	960 (h) x 620 (w) x 500 (d)
Weight	113kg
Maximum Power	2.1kW
Chamber Size (mm)	75 (diameter) x 305 (depth)
Number of Heating Chambers	7
Temperature Range	60 - 250 ºC ± 0.2ºC
Air Flow	1 - 10ft 3/hr
Operating Temperature	10 to 40°C; Altitude 2000m max.
Humidity Range	10 to 80% RH non-condensing

Safety Features

- After a power failure, the oven will not auto-reset for safety reasons.
- The oven is fitted with thermostats, which will switch off the power supply if the cell temperature exceeds 280°C.

Standards

BS ISO 188, ASTM D573

High Precision Densimeters

The Wallace High Precision Densimeter is a cost efficient inspection instrument, calculating an accurate measurement of specific gravity. It is ideal for measuring the density or volume of rubber, plastics, sintered metals, ceramics, foods and other materials. Using the optional liquid measuring kit, the specific gravity of a liquid can also be determined.

Wallace offers two models of the Densimeter. The 22B with a resolution to 3 decimal places and the 21C with a resolution to 4 decimal places.

Features

- **Lightweight, portable design**
- **Stabilizes and displays results in seconds**
- **Specific gravity resolution to the third decimal point**
- **Can also measure material with an SG of less than 1.00**
- **Sample volume can be displayed**

Principle of Operation

The innovative design makes specific gravity measurement simple and results are displayed after an elapsed time, which varies according to the mode selected. Zero and tare are set through touch button operation on the front panel. The angle accessory (supplied as standard) enables samples with an SG of less than 1 to be tested. Compensation for temperature and for fluids other than water can be set by the operator. A built-in accuracy check is a standard feature so that if the sample weight is insufficient, the final digit will flash. A wind shield is provided to protect the instrument from draughts and dust during operation.

Standard Accessories

- Wind and dust shield
- 200g calibration weight
- Stainless steel angle for measuring objects with an SG less than 1.00
- Thermometer
- Tweezers
- RS232C interface, AC adaptor

Optional Accessories

- A kit to measure the density of liquids
- WAX23 Excel Addin software allows for collection and display of data to a PC
- High speed printer

X22B Densimeter

Specifications

High Precision Densimeter		
	Model X22B	**Model X21C**
Part Number	WAX22B	WAX21C
Dimensions (mm)	170 (h) x 190 (w) x 218 (d)	332 (h) x 259 (w) x 358 (d)
Weight	1.5kg	7.5kg
Scale Capacity	300g	220g
Resolution	0.001 (Density/Volume)	0.0001 (Density/Volume)
Electrical Requirements	110/120 VAC 50/60 Hz	110/120 VAC 50/60 Hz
Operating Temperature	10 to 40°C; Altitude 2000m maximum	
Humidity Range	10 to 80% RH non-condensing	

Digital Bench Thickness Gauge

The Wallace Digital Bench Thickness Gauge accurately measures the thickness of rubber and similar soft materials using a constant pressure foot. The gauge conforms to international test standards and is widely used when testing rubber for tensile strength and compression.

The product is available with a 10 micron resolution gauge or a 1 micron resolution gauge.

Features

- **Constant foot pressure**
- **Easy height adjustment**
- **Digital-resolution of 0.01mm (S4/14) or 0.001mm (S4/15)**
- **Adapts easily to various ISO standards (a range of different feet and weights is available)**
- **Gauge capable of PC interface**

Accessories

- Various diameter feet complying to a wide range of specifications can easily be attached to the dial gauge spindle.
- A range of additive weights can be placed in the carrier at the upper end of the spindle, which creates the specified foot pressure on the test piece.

Other Offers

Many other material standards available. Contact Wallace to discuss your requirements.

Principle of Operation

The 150mm diameter base provides a smooth flat surface upon which the test piece is placed. It is easy to exchange different feet and weights to comply with different standards.

Throughout the dial gauge travel (25mm), a constant force on the spindle ensures the foot pressure on the test piece is constant.

A lifting lever attached to the indicator raises the spindle and foot, allowing easy location of the test piece.

S4/14 Bench Thickness Gauge

Specifications

Digital Bench Thickness Gauge		
	Model S4/14	**Model S4/15**
Part Number	WAS4/14	WAS4/15
Dimension (mm)	200 (h) x 150 (w) x 150 (d)	200 (h) x 150 (w) x 150 (d)
Weight	3kg	3kg
Indicator Travel	25mm	25mm
Resolution	0.01mm	0.001mm
Feet Diameter	3.7mm and 5.5mm Standard ** Special feet available on request	
Weight	30g Standard * Various weights available on request	
Operating Temperature	10 to 40°C; Altitude 2000m maximum	
Humidity Range	10 to 80% RH non-condensing	

Standards

Sample Prep: ISO 23529, ASTM D3767

S1 Specimen Cutting Press

This robust, manually operated press cuts test samples from sheets of rubber and other soft materials with an exceptionally high force (4.1kN). Once prepared, the samples are typically subjected to physical tests such as tensile, tear, dynamic, and cure.

Features

- **Hand operated exerting 4.1kN cutting force**
- **Safety catch and warning labels fitted**
- **Automatic ejection of samples**
- **Can accept Schopper rings or 8mm square test pieces**
- **Throat depth allows cutting area for samples up to 180mm long**
- **Alternative base widths available (150mm standard)**

Accessories

- Large range of cutting dies available
- Replacement cutting table

NOTE: The cutting table is 150mm wide by 200mm deep and cutters must not exceed these dimensions.

Principle of Operation

The press is operated with two hands. While one hand is used to lift the safety catch, the other pulls the handle, which through a lever system, drives the ram down.

If the safety catch is not lifted, the ram cannot be moved ensuring operator safety.

The ram stroke is easily adjustable, ensuring that the die cuts through the sample but is not itself compressed thereby preventing damage to the cutting edge. As a further precaution, the operator is advised to place a suitable backing material on the cutting table to protect the very sharp edges of the cutter.

Articulated stainless steel fingers, mounted off the press frame, are adjusted to pass through the holes in the cutter back-plate so that the sample is automatically ejected on the return stroke of the arm.

Specifications

Specimen Cutting Press - S1	
Part Number	WAS1
Dimensions (mm)	840 (h) x 150 (w) x 360 (d)
Weight	31kg
Cutting Table Dimensions (mm)	150 (w) x 200 (d)
Maximum Ram Force	4.1 KN
Temperature Range	60 - 250 ºC ± 0.2ºC
Operating Temperature	10 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

S1 Cutting Press

Specimen Preparation Equipment

Specimen Cutting Dies

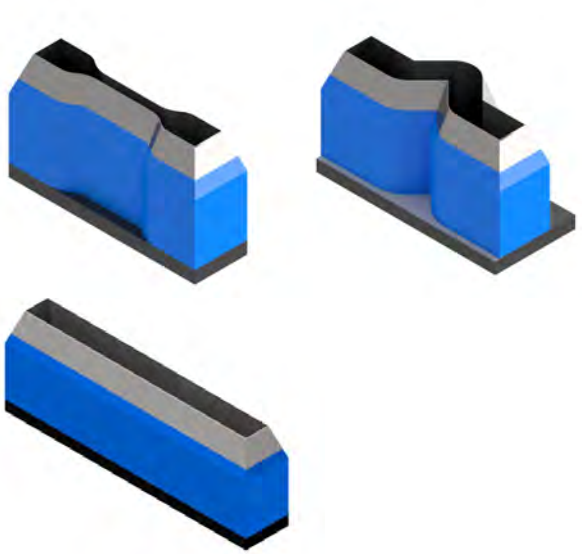
A large range of cutting dies, conforming to international standards, is available for use with the S1 Specimen Cutting Press. Each die is fitted with a safety back plate. A shank can be fitted to each cutting die, acting as the interface for locking the die into the ram of the press.

Dumbbell, circular and parallel blade cutters are available as well as angle, crescent and trouser tear cutters.

We also supply cutters to our customer's own design and offer a cutter reconditioning and sharpening service.

All cutters are fully inspected before dispatch and, upon request, are supplied with a certificate of conformity.

Please refer to the Wallace website for details.



Specimen Moulds

Specimen moulds are available for producing rubber test pieces for use in accordance with relevant standards.

The range utilises ground flat top and bottom plates with offset handles and slotted hinges which allow for sample thickness from 0-14mm. The inner frame forms the cavities. For smaller samples, a lift off plate located on dowels facilitates easy removal of the samples. The flat sheet versions have a bolted perimeter frame.

Please contact Wallace for further information.

Specifications

Range of Specimen Moulds (WAS7)			
Part Number	**Mould Type/Use**	**Sample Size (mm)**	**Mould Dimensions (mm)**
WAS7/1	2mm Flat Sheet	200 x 200	44 (h) x 287 (w) x 322 (d)
WAS7/2	1.5mm Flat Sheet	200 x 200	44 (h) x 287 (w) x 322 (d)
WAS7/3	Dumbbell Shape	ISO 37 Type 2	44 (h) x 287 (w) x 322 (d)
WAS7/4	Hardness Testing "Pucks"	Ø29 x 12.5	44 (h) x 292 (w) x 322 (d)
WAS7/5	Sample for Flex Testing	150 x 25 x 6.3	44 (h) x 287 (w) x 322 (d)
WAS7/6	"Puck" for Compression Test	Variable	44 (h) x 287 (w) x 322 (d)

Mould for 1.5 and 2mm Flat Sheet - samples cut from sheet

Mould for Samples for Flex Testing

Mould for Hardness Testing "Pucks"

X17/25 Thin Film Grips

The innovative design of Wallace's Thin Film Grips prevent slippage or breakage of thin samples when tested for tensile strength. The X17 grips are suitable for compliant elastomeric material, paper, fabric and threads less than 0.2mm in thickness.

The measurement of tensile properties, especially ultimate Tensile Strength and Elongation at Break, is one of the most widely used physical tests on rubber and elastomeric materials, being used for quality control testing to International Standards. Other tests requiring extension of test pieces include Tear Resistance, Creep, Stress Relaxation and Tensile Set, Fatigue and Crack Growth Resistance under cyclic deformation, and Adhesion Strength of rubber laminates.

Difficulties are commonly encountered when testing samples cut from thin sheets, films and finished products made of latex rubber and other highly extensible materials. Products made by dipping N R latex can extend up to ten times their original length, and are often coated with a lubricant. Tests may be invalidated by slippage or breakage at the grips.

Features

- **Eliminates slippage and breakage at the grip**
- **Reduces number of invalid tests**
- **Easily fits into conventional grips**
- **Self aligning**
- **Quick and easy loading**

Principle of Operation

A combination of clamping and capstan effects prevents both slip and tearing, whilst still conforming to the requirements of standard test methods.

Until now the most common type of grips used were pneumatic and simple wrap-around utilising the capstan effect. Pneumatic grips using parallel or shaped faces can be made to grip satisfactorily but due to the large local pressure set up, especially with very thin samples, failure at the grips is very common. Wrap-around grips do not usually suffer from this defect but due to the difficulty of obtaining sufficient surface contact slippage occurs.

The X17 overcomes these problems by achieving 360° wrap-around which, due to the exponential relationship of the capstan effect, squares the effective gripping friction.

The grips are closed and opened by simple thumb and forefinger actions and are provided with a tab end which can be secured in conventional grips simply and quickly without modification.

Specifications

Thin Film Grips - X17	
Part Number	WAX17
Dimensions (mm)	75 (h) x 40 (w) x 27 (d)
Weight	200g each
Maximum Width of Sample	25mm
Maximum Thickness of Sample	0.2mm
Operating Temperature	10 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

X17/25 Thin Film Grips

P14 Temperature & Linearity Calibration Kit

The Wallace Rapid Plastimeter (P14) provides a stable platform for plasticity testing. It is good laboratory practice to undertake Temperature and Linearity verification regularly. A weekly check is recommended. More frequent checks can be made. Our Temperature & Linearity Calibration Kit provides easy and accurate verification readings.

Features

- **Easy fit of temperature probe - probe pre-fixed in place on platen adaptors**
- **Verify both platens in one go - easy to use platen adaptors, dual input and clear readout on meter**
- **Highly accurate temperature readings - PT100A probe accurate to within ±0.35°C**
- **Slip gauges for linearity verification**

Principle of Operation

The temperature verification is done by placing the temperature probes on upper and lower platens and measuring the temperature.

Linearity is verified by using various sized slips placed between the upper and lower platens.

Standards

ISO 2007, ISO 2930, ASTM D3194

Specifications

Calibration Kit - Temperature & Linearity	
Part Number	WAP14-CAL-01
Kit Box Dimensions (mm)	70 (h) x 225 (w) x 200 (d)
Kit Weight	350g
Operating Temperature	10 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

Included		
Item	**Application**	**Quantity**
Handheld Meter	Temperature	1 off
Custom Temperature Probes	Temperature	2 off
Piece of Cork	Temperature	1 off
Heat Sink Compound	Temperature	1 off
AAA Batteries	Meter	6 off
Slip Gauges	Linearity	1 off each (1mm, 0.75mm, 0.5mm, 0.25mm)

Temperature & Linearity Calibration Kit

P14 Force Calibration Kit

Wallace offer calibration kits to regularly verify the operation of the Wallace Rapid Plastimeter (P14) as part of good laboratory practice. This requires the verification of both Clamping Force and Measuring Force.

The Clamping Force must be verified to be greater than 300N and the Measuring Force at 100N±1N.

The Force Calibration Kit consists of:

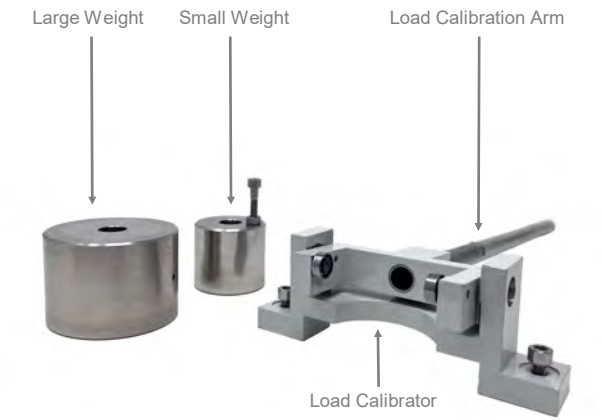
- Large weight
- Small weight
- Load Calibrator
- Load Calibration Arm

Principle of Operation

The Force Calibration Kit has been designed utilising the principles of a force on a lever. The length of the load calibrating arm and the mass of the weights are calculated so that the correct force is simulated accurately. Using this principle the operator can easily establish that the correct forces are being exerted in the clamping and measuring state.

Standards

ISO 2007, ISO 2930, ASTM D3194



Specifications

Force Calibration Kit	
Part Number	WAP14-CAL-02
Kit Box Dimensions (mm)	164 (h) x 452 (w) x 383 (d)
Kit Weight	2.9kg
Clamping Force	>300N
Measuring Force	100N±1N
Operating Temperature	5 to 40°C; Altitude 2000m maximum
Humidity Range	10 to 80% RH non-condensing

Mooney Viscometer - Calibration Kits

Wallace offer calibration kits to regularly verify the operation of the Mooney Viscometer as part of good laboratory practice. This requires the verification of both torque and temperature.

The Torque Calibration Kit consists of:

- Weights to simulate torque
- Frame to suspend weights
- Drum rotor to attach weights

The Temperature Calibration Kit consists of:

- Custom temperature sensor to measure both platens
- Dual channel digital thermometer

Principle of Operation

Torque

In normal operation the rotor is rotated within a sample, the sample has resistance and so the rotation of the rotor generates torque. This torque is measured and the result is expressed in Mooney units. To calibrate the instrument the sample resistance is simulated using weights. These are suspended on a frame using wire cables attached to a spool. The spool is located in place of the rotor. When the motor is started, the spool winds in the weights and they simulate 100 Mooney units.

Temperature

The temperature block is placed between the platens and the platens are closed. The temperature of the platens is displayed on the digital thermometer.

Torque Calibration Kit

Temperature Calibration Kit

Specifications

Torque Calibration Kit	
Part Number	WAV3/CAL KIT
Kit Box Dimensions (mm)	180 (h) x 600 (w) x 500 (d)
Kit Weight	38kg

Included	
Calibration Weight	2 off
Pulley Assembly	1 off
Rotor Height Gauge	1 off
Calibration Frame	1 off

Temperature Calibration Kit	
Part Number	W9-320
Kit Box Dimensions (mm)	55 (h) x 235 (w) x 200 (d)
Kit Weight	740g

Included	
Temperature Sensor Unit	1 off
Dual Input Thermometer	1 off

Standards

ISO 289-1, ASTM D1646

Accessories

X19 Data Input Terminal

Includes: Data input terminal cable

The data input terminal contains a 16 character, two line LCD display and QWERTY keypad. It supplies additional information on the operation of the hardness tester and offers the user several new options. Test parameters are more easily set. Data for operator and sample identification can be entered. The timing of the primary and secondary indenter loads (H12 and H14) can also be pre set.

Other features include:

- Date and time recording and traceability

Specifications

WAX19 Data Input Terminal	
Dimensions (mm)	40 (h) x 225 (w) x 165 (d)
Weight	800g

X20 Printer

Includes : Power supply, mains lead, printer , 2 printer paper rolls and printer cable

The compact, high-speed, 24 character width printer provides a permanent record of results and instrument settings. Various parameters can be set including:

- Sample identification with auto-increasing suffix
- Date and time of test
- Traceability of aborted tests

Specifications

WAX20 Printer	
Dimensions (mm)	70 (h) x 125 (w) x 110 (d)
Weight	300g + PSU 450g

Service & Calibration

Regularly servicing and calibrating your testing instruments provides the peace of mind that your equipment will continue to deliver reliable, accurate and repeatable results, every time. Preventive maintenance is critical for minimising downtime and maximising productivity.

At Wallace Instruments our well trained technicians provide comprehensive servicing, calibration and upgrade services worldwide, including on-site visits for even greater convenience.

Calibration Expertise

Wallace has many decades of experience in reliably calibrating production and customer instruments.

All Wallace technicians follow methods which allow for full traceability of calibrations.

As the only UKAS ISO/IEC 17025 accredited calibration laboratory for rubber hardness testers in the UK, we give you full confidence that you're getting the most accurate results from your equipment.

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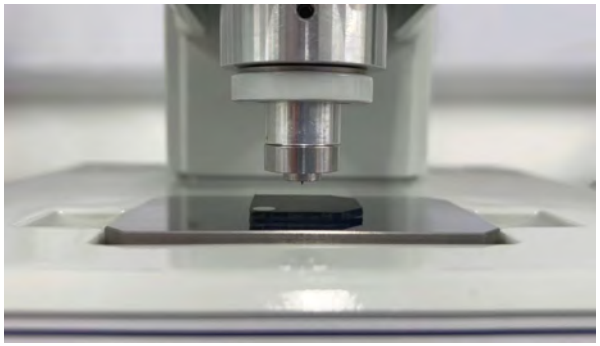

Servicing and Repair Expertise

Our aim with our service and repair offer is to ensure you have maximum availability of your instruments. All of our technicians are fully trained not only to calibrate instruments, but also to service and maintain the instruments.

We are able to service multiple brands alongside our highly rated Wallace instruments, making your life even easier; reducing disruption and removing the need for multiple visitors to your site.

On completion of the service you will be supplied with a full service report and certificates of service which includes any additional notes relating to your instruments.

We can help you troubleshoot any issues you may have and provide solutions for the problem. We also have the ability to support you remotely if needed.

Servicing Contracts

Our 3 or 5 year service contracts take away the stress of ensuring your instruments are always operating at optimum condition. We will automatically remind you when your next service appointment is due and arrange a time that's convenient for you.

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