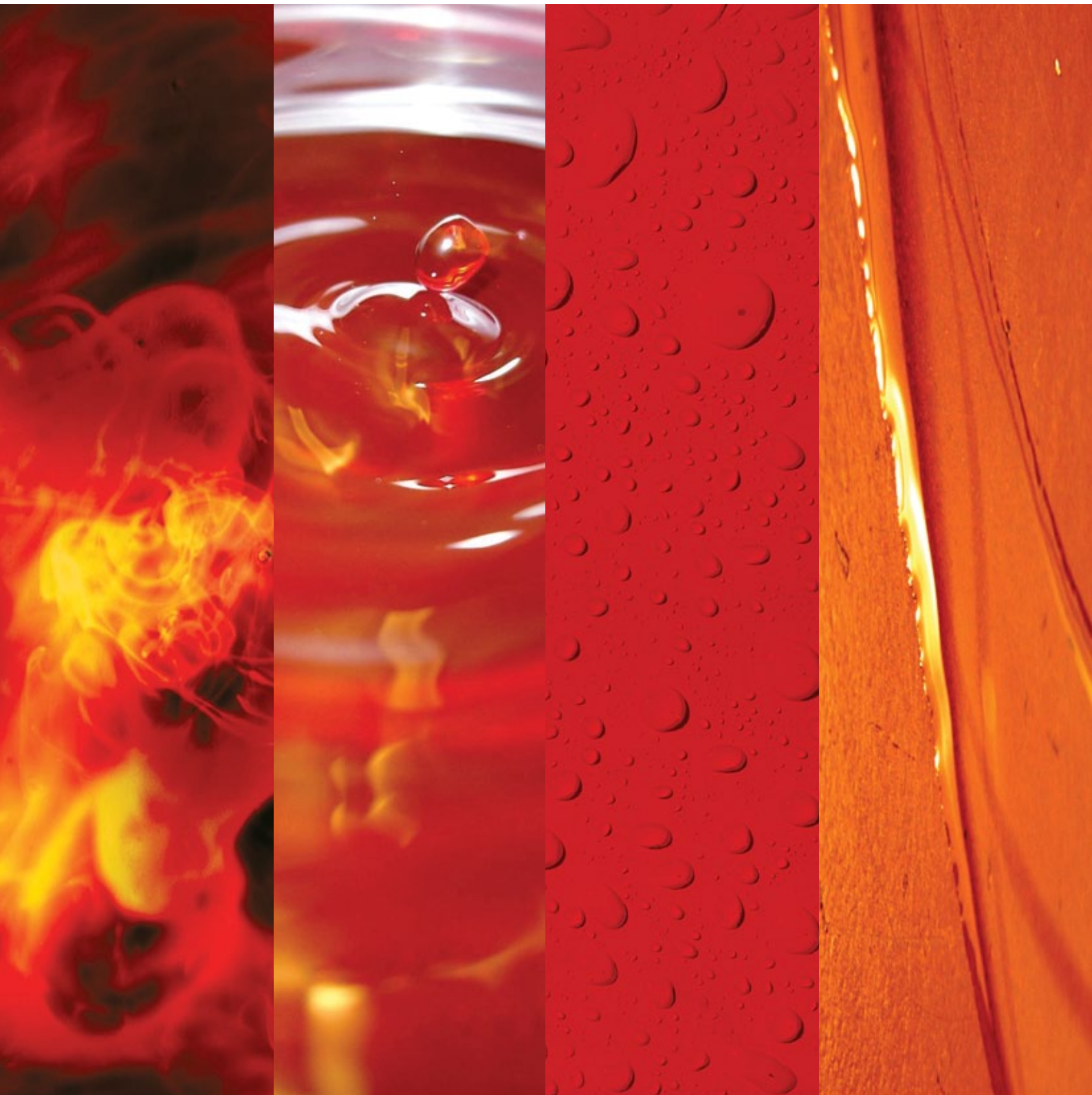
Appearance
Physical Testing
Viscosity

sheen

a brand of Elektron Technology



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Contents

Appearance

The Visible Quality

There are many parameters associated with the appearance of a product which are fundamental in determining its acceptability. These parameters are not only determined by the products design but are also influenced by other factors such as its Colour and Gloss. Additionally for some products (e.g. Automotive Paints) other more specific characteristics can exist such as Haze or Orange Peel which further affect these factors.

From R&D, Production to Incoming or Final QC, the monitoring and measurement of these parameters with modern, accurate test equipment is absolutely critical in order to achieve high quality standards and problem free manufacture. Modern instrumentation techniques also avoid uncertainties caused by subjective visual evaluations and allow precise measurements to be made with consistent repeatability and traceable accuracy.

Sheen Instruments presents a wide range of state-of-the-art instruments serving many industries, by combining leading edge technologies with user friendly features.

1.0
COLOUR

The human eye is capable of differentiating several million colours, despite this subjective visual evaluation, when used for quality control purposes, is no longer preferred as it suffers from a lack of real quantifiable data and inconsistent documentation. Since the early 1930's many scientific measuring techniques have been developed by National Standards Organisations, among them the CIE (International Committee of Light), based on a logical numeric scaling where physical parameters and calculations have been clearly defined, universally accepted and adopted. As a result, many methods are today perfectly proven, and governed by major standards such as ASTM, BS, DIN, or ISO etc.

Colour vision

Colour is described as an interaction of:
light sources – objects – human eyes.

Light source

Depending on their type and physical characteristics, light sources influence the perception of colours.
For industrial purposes, major light sources - or illuminants - are standardised :

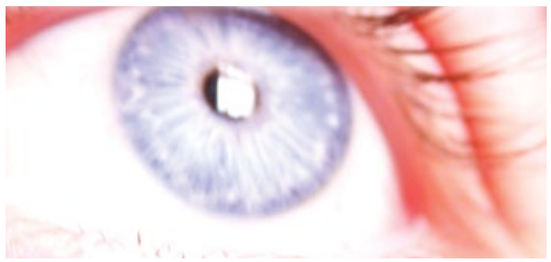
A : Incandescent lamp
C : North-sky daylight
D (65) : Daylight - widely used
F (various) : Fluorescent lamp

Due to metamerism, colours identical under one light source may show differences under others.

Object

Depending on their type, their surface condition, glossy or matt finish, opacity, materials can reflect and absorb light differently, thus influencing the colour perception.
For these reasons, samples and measuring conditions should be defined and carefully prepared by the user.
For paints and inks, the use of an automatic precision film applicator provides perfectly reliable samples.

Observer



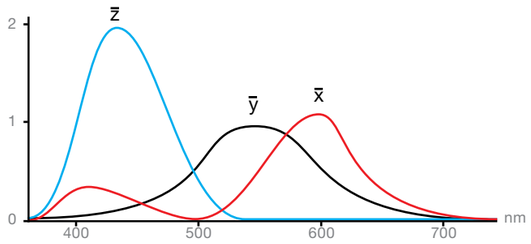
Human eyes can see within a spectrum of approx. 400 and 700 nm. Colour vision is transmitted by the eye via a network of receptors, basically sensitive to 3 colours, standardised as tristimulus values:

X = Red - Y = Green - Z = Blue
based on a 2° or 10° observation spot.

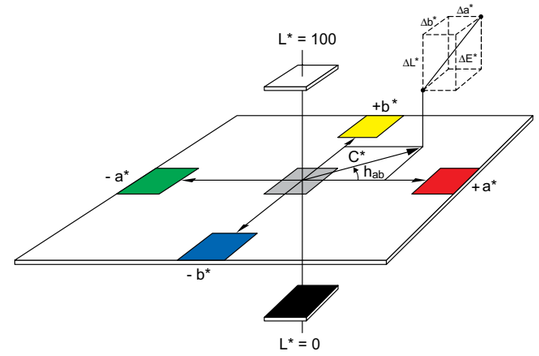
These values constitute the basis for the calculation of many measuring systems, from Chromaticity Coordinates to the most widely used CIELab colour space.

The CIE L*a*b* system

Among many colour measurement methods, the most commonly used and most popular is the CIE L*a*b* (CIELAB) system. In this colour space, almost any colour can be identified according to its position within a three dimensional framework.



Human eye sensitivity



$$\Delta E^*ab = \sqrt{(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2}$$

The L* axis shows its Lightness; the a* axis its redness or greenness, and the b* axis its yellowness or blueness. This uniform system also offers effective calculation of colour differences, between sample and reference : ΔL*, Δa*, Δb*, and total difference ΔE*. Additional related parameters such as ΔC* and ΔH* help to identify the colour variations in saturation and hue.
This accurate and reliable system is easy to use even for inexperienced users, from R&D, Production to Quality Control.

The Instruments

Colorimeters use the mathematically defined light sources and observers described above to measure colours under precisely defined measuring geometries and output the requested data to their display, printer or computer.
Depending on the technology, there are two categories of instruments:

- **Colorimeter:** by using filters to separate the tristimulus colours it provides limited colour data, difference calculations, and some functions. It is also called a colour comparator.
- **Spectrocolorimeter**: by combining advanced electronic hardware and software capable of analysing the colour spectrum, this instrument (also called a spectrophotometer) provides not only high precision colour data or differences, but also spectral graphs and values useful for light source simulation. It also evaluates metamerism and can perform computerised colour matching and many other advanced features.

Depending on the materials to be measured, there are two versions of instruments:

- Reflectance colorimeters - measuring the reflected colour from the surface of the material e.g. for solid surfaces.
- Transmission colorimeters - measuring the transmitted colour through the material, e.g. for transparent liquids.

Measuring geometries – Colour & Gloss

For solid materials, two geometries are most frequently used: 45/0° and d/8°. Due to their specific optical design, they either include (SPIN) or exclude (SPEX) the gloss component of the reflected light. This allows the incident light to be reflected from the measured surface as two components - specular (gloss) and scattered (colour). While performing comparably therefore on medium gloss, the two geometries provide however slightly different measurements on high gloss samples.

45/0°: the sample is circumferentially illuminated at 45°, and measured at 0°. This system is considered to view samples iln a similar way to that of a human observer: the colour aspect varies depending on the samples gloss value.
Thus it could display different results, (E*), when measuring two identical colours each having different gloss levels.

d/8° (diffuse): the sample is illuminated diffusely with a sphere, and measured at 8°. By integrating the specular gloss measurement (SPIN) into the sphere, this system measures colour regardless of gloss variations. Thus the E* value will show no difference for identical colours having different gloss levels. This is useful for the evaluation of colour strength & dispersion, thermochromacity, etc. For some applications, the sphere system is also available in a version excluding this specular gloss measurement (SPEX) with an internal gloss trap. The results however are not identical as those of the 45/0° geometry.

d/8°-+-Gloss or 45/0°-+-Gloss: to simultaneously measure colour and gloss (at 60°)*, a sphere SPIN or 45/0° instrument is equipped with a built-in glossmeter.

1.1
COLOUR OF SURFACES

Spectromatch Gloss

Outstanding Precision Colour Measurement

This new portable Spectrophotometer combines the latest and most advanced technology in micro-electronics and colorimetry.
While providing high precision measurement based on 10 nm spectral resolution in agreement with many other high-end Spectrophotometers, it offers excellent performance in many applications, from laboratory analysis to on-site quality control.

Colour + Gloss measurement in one unit

For many products, the colour effect can be influenced by the variation of gloss. Spectromatch Gloss measures both attributes using the built-in 60° glossmeter, and displays colour and gloss data simultaneously. This unique feature helps to efficiently identify the potential causes of mismatch.

Truly portable

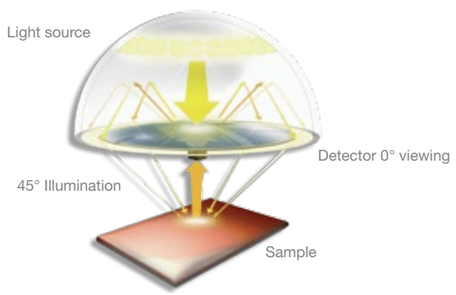
Powerful internal data processing, ease of use and compact design bring maximum reliability and flexibility to your daily operations.

Long term stability

Spectromatch Gloss is available either in sphere d/8° or 45/0° geometries, equipped with an exclusive illumination system. This advanced technology provides highly reliable temperature independent measurement and long term stability, with 3-month calibration interval.

Excellent repeatability on textured surfaces

The 45/0° version specially offers a patented technique to eliminate influences caused by measuring direction: an exclusive built-in white hemisphere enhances light distribution and ensures optimum circumferential illumination, thus providing an excellent repeatability, particularly for measurements of textured surfaces.



Features

- ☐ Exclusive illumination system:
  - Excellent short & long term stability
  - Long calibration intervals (every 3 months)
  - Temperature stable measurement 10° to 40°C
  - Simple maintenance
- ☐ Available geometries: 45/0° or d/8° SPIN, Ø11 mm aperture
- ☐ Buit-in 60° gloss meter, 5 x 10 mm aperture for both versions
- ☐ Output to PC (Easy-link software included)
- ☐ Guarantee: 10 years on light source, 2 years on the instrument

Professional & easy documentation

- ☐ Easy-link software included for:
  - download of colour data, differences, spectral data to Windows Excel, upload standard values from PC
  - QC report with trends graphs showing customised tolerancing
  - instant and efficient documentation with prepared templates (Lab plot, data, trends graphs etc.)

Performance

Colour

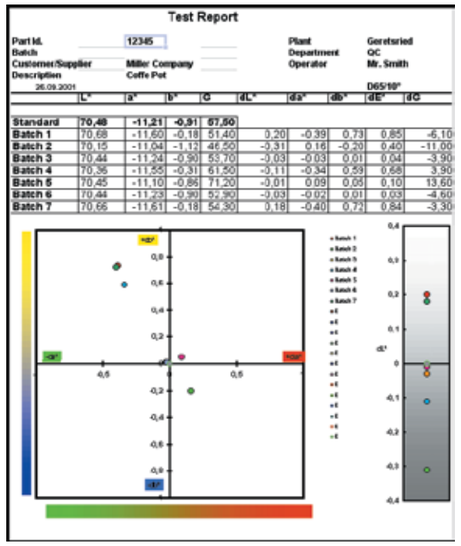
- ☐ Spectral range: 400-700 nm, 10 nm interval
- ☐ Precision/Repeatability: 0.01 ΔE*, 1σ (10 measurements on white tile)
- ☐ Inter-instruments agreement: 0.2 ΔE*, 1σ (on 12 BCRA tiles)
- ☐ Colorimetric systems: CIELab/Ch, Lab(h), XYZ, Yxy
- ☐ Differences: ΔE*, ΔE(h), ΔE_{CMC}, EF_{MC2}, E_{94}, E_{99}, E_{2000}, and ΔL*a*b*, ΔL*C*h* and Δ of other components
- ☐ Indices: - YIE313, YID1925, WIE313, CIE, Berger
  - Opacity, Metamerism
  - Colour strength
- ☐ 13 illuminants: A, C, D50, D55, D65, D75, F2, F6, F7, F8, F10, F11, UL30
- ☐ Observer: 2° or 10°

Gloss 60°

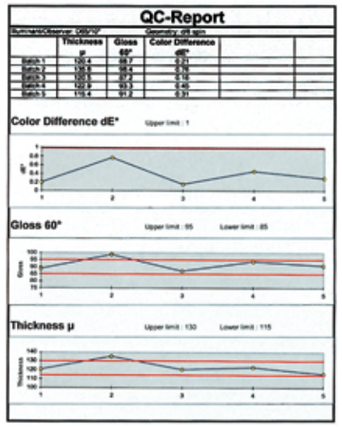
- ☐ Range: 0-180 GU (Gloss Unit)
- ☐ Repeatability/reproducibility: 0.2/1.0 GU
- ☐ Measuring area: 5 x 10 mm

General

- ☐ Memory: 200 standards, 999 samples
- ☐ Automatic functions: colour search, store, average
- ☐ Pass/Fail function, with adjustable tolerances
- ☐ Programmable user configuration: limited functions for routine check, or full capability
- ☐ Light weight: 500 gr.
- ☐ Large display 60 x 30 mm: colour & gloss data, spectral curves, auto switch-off
- ☐ Languages: English, French, German, Italian, Spanish, Japanese
- ☐ Energy efficiency: ± 8,000 measurements / battery set
- ☐ Operating temperature: 10°C - 42°C (50°F – 110°F)
  Standard delivery
- ☐ Calibration standards:
  - Colour: White (certified), Black, and Green reference tiles
  - High Gloss standard
- ☐ Measurement spot locator, Instructions manual, Easy-link software, Interface cable, 4 x AA batteries, wrist strap, colour theory reminder, carrying case.
- ☐ Humidity: < 85% rH, non condensing/35°C (95°F)



Professional documentation



Ordering references

Spectromatch Gloss

	Geometry	Measuring area, Ø (mm)
281	45/0°	11
282	d/8° - SPIN	11
181/3	Micromatch plus 45/0°, aperture 4 mm	
185	Micromatch plus 45/0°, glass-sealed aperture 20 mm Ø	

Optional accessories

BG4401	USB adapter
BG6825	Small Sample Adaptor
190	MatchMaster Colour Matching Software

Standards

	Colour	Gloss
ASTM	D1925, D2244,	D523, D2457
		E308, E313, E1164
DIN	5033, 5036, 6174	67530
ISO	7724	
EN ISO		7668
EN ISO	2831	

Special specifications for Automotive Industry

In order to ensure consistency in the appearance of interior car components from various suppliers, very tight tolerances are specified. Typical range for colour ΔL*a*b* = ± 0.5, and for gloss <5 GU = ± 0.3 to 0.5. Sheen Instruments can supply upon request special versions of Spectromatch (d/8° & 45/0°) and Glossmaster (see page 11) to meet these stringent requirements. They offer 60° gloss measurement with outstanding specifications.

Instrument	Repeatability	Reproducibility
Spectromatch /gloss 60° (0-10 GU)	± 0.1 GU	± 0.5 GU
Tri-Glossmaster 20-60-85°	± 0.1 GU	± 0.2 GU
Glossmaster 60°	± 0.1 GU	± 0.2 GU

All these special units can be ordered with additional 0-10 GU gloss standard. Please consult with Sheen Instruments.

Micromatch Plus 45/0°

For particular applications, special versions of Micromatch Plus 45/0° spectrophotometer (without gloss meter and hemispherical light diffuser) are available.

Features

- ☐ Same as Spectromatch
- ☐ Spectral resolution : 20 nm
- ☐ Original illumination system for stable colour measurement & long term calibration.

Color View

This bench-top 45/0° spectrophotometer is a reference laboratory instrument, suitable for rough or directional materials, powders or pellets etc. Its robust design allows for trouble free intensive operation.
Optional built-in 60° gloss meter, additional aperture size adapters and measurement with a glass cup enhance its versatility.

Features

- Excellent repeatability due to patented self calibration
- Cooled measurement port allows rapid measurement with no thermochromic effects
- Built-in retro-viewer, aperture Ø32 mm
- White (certified) and black calibration standards + green control tile
- Auto-QC software included (see Color-sphere)
- Optional built-in 60° glossmeter, including calibration standard

Performance

- Geometry: 45/0° circumferential,
- Halogen lamp, user replaceable
- Spectral range 380-720 nm, 10 nm interval
- Repeatability: 0.01 ΔE*, 1σ, 300 measurements on white tile
- Operating environment: 10°C-40°C, <-85% rH, non condensing.

Ordering references

Color-View

BG6501	Color View 230V (115V on request)
BG6502	Color View with 60° gloss 230V (115V on request)

Optional accessories

BG6521	Ø11 mm aperture kit (plate +optical adapter)
BG6520	Ø4 mm aperture
BG6135	Calibration glass plate (when using glass cup)
BG6136	Glass cup Ø60 mm
BG6245	Cover for glass cup
BG6524	Tungsten halogen lamp

Standards

Same as for Micromatch Plus

Light Booth

When visual evaluation is acceptable, light booths reduce uncertainties by providing neutral viewing and standardised light sources. 4 models are available, each with different viewing room dimensions, one of these being a portable unit. Custom lamp layout, diffuser, sample holders available upon request.

The Standard Cabinets are offered with Illuminants

A : Tungsten Filament lighting used by BS950 – metamerism test, 2856K
D65 : 'Artificial daylight' conforming to BS950: Part 1, 6500K
840P15 : Narrow band Triphosphor Fluroecent"Point of Sale" 4000K (Formerly TL84)
UV : Ultraviolet backlight, for assessing white and fluorescing dyes & brighteners.

Other combinations are available, F or H can be supplied in place of A, D50, 75, CWF, U30, or U35 in place of D65, 840P15. Diffusers are recommended for accessing highly specular material, glass and polished surfaces.

Ordering references

	Voltage*	Viewing room dimensions W x H x D (mm)
CAC/60	240V	680 x 360 x 380
CAC/120	240V	1260 x 570 x 590
CAC/150	240V	1520 x 570 x 590
CAC/330	240V	(Portable) 630 x 275 x 280

* 110-V on request.

Colour Chart

Reference colours are useful for industrial identification and classification. Available as compact colour fan of 210 shades.

Separated sheets with (or without) colorimetric data, or other types of colour charts also available upon request.

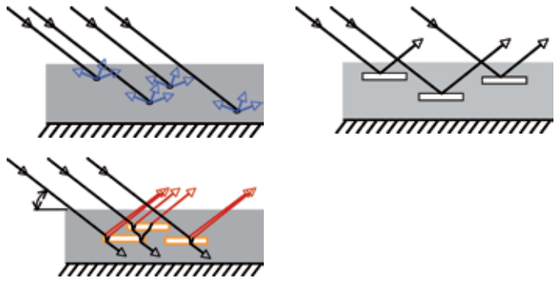
Ordering references

RAL/K5 RAL Colour Fandeck

Metallic Colour

Metallic Coatings

Effect finishes now play a more dominant role in applications, and colour changes become dependant on viewing angle and lighting conditions.Interference finishes show not only a lightness change with changing viewing angles but also a change in chroma and hue. Special effect pigments which create sparkling effects when lighting conditions change from sunlight to cloudy sky, are also commonly used.



Visual Evaluation of Effect Coatings

Changing viewing angles display a lightness change , a sample needs to be tilted to create the same effect for a visual impression. This effect is referred to "light-dark flop". The bigger the lightness changes between angles of view are, the more the contours of an object will be accentuated. In order to observe colour travel of interference finishes the panel should be moved to allow increasing or decreasing the angle of the light source.

Instrumental Colour Measurement of Effect Coatings

ASTM , DIN and ISO standards define multi angle colour measurement to objectively define the colour of metallic finishes . Research studies show a minimum of three and optimally five viewing angles. The aspecular angle is the viewing angle measured from the specular direction in the illuminator plane. The angle is positive when measured from the specular direction towards the normal direction.

For colour QC colourmetric data L*, a*,b* (or L*, C*, h) and delta E* can be used. Tolerances are generally higher for the near specular (15', 25') and the flop angle (75' , 110') that the 45deg tolerance. Thus to have a unique tolerance parameter which is colour independent, weighted factors have to be used. Automotive companies set specifications on delta E CMC or delta E using DIN 6175-2 using 3 or 5 angle instrumentation. Flop index is often a useful characteristic measuring the change in lightness of a metallic colour as it is tilted through the entire range of viewing angles.

A new generation of special effect pigments with colour travel over a wide range has driven the requirement for additional viewing and illumination angles. The new –15deg angle provides a behind the gloss impression angle.

Flake Characterization

In addition to colour changes our total perception is also influenced by metallic flakes or pigments, these effects are altered by lighting conditions.

Sparkle

Observed under direct sunlight often described as sparkle or, micro brilliance or glint and generated by reflectivity of individual effect pigments, amount of flakes and size and distribution of the flakes.

Sparkle impression also changes depending on angle of illumination.

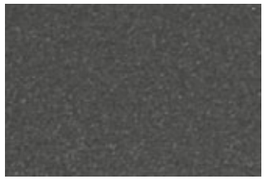
Low sparkle (glint)

High sparkle (glint)

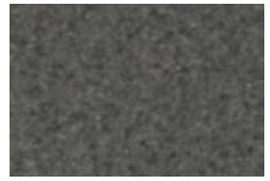
Graininess

Another effect seem under cloudy conditions is graininess. Based on the optical texture and coarseness or "salt and pepper" appearance.

Influenced by flake diameter or orientation displayed in a non-uniform and irregular pattern. Observation angle is of low influence when evaluating graininess.



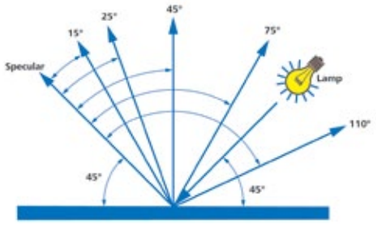
Low graininess (coarseness)



High graininess (coarseness)

Multi- angle colour and effect measurement with the Byk-mac

Traditional 5-angle colour measurement calculates colour values by averaging the spectral reflection over the entire illuminated spot and therefore does not differentiate between the colour of the basecoat and the reflection of the aluminium flakes. Thus two effect finishes can have the same colour values using a 5-angle spectrophotometer, but visually appear very different. The visual difference is the result of flake effects which can be observed using the Sparkle and Graininess features on the Byk-mac.



Byk-mac

Total colour impression of effect finishes

The appearance of effect finishes are influenced by different viewing angles and conditions. Apart from the light-dark flop and colour shift special sparking effects can be created.

Byk-mac is unique as it measures both multi-angle colour and flake characterization in one portable device.

Traditional 5-angle colour measurement : 15deg / 25deg / 45deg / 75deg / 110deg

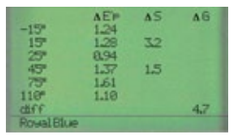
Additional colour measurement behind the gloss for colour travel of interference pigments : -15°deg

Sparkle and graininess measurement for flake characterization.

Ergonomic design and easy operation

The shape of the instrument ensures easy handling and true portability.

With intuitive menu control evaluation of metallic finishes has never been easier. The instrument is equipped with trigger pins if all pins do not contact the surface an error message will be displayed thus guaranteeing reproducible results on



- ☐ Menu guided operation
- ☐ Designated buttons for standard and sample reading.
- ☐ Menu scroll wheel
- ☐ Large display – statistics and alphanumeric name input
- ☐ 1000 reading storage capability.
- ☐ Auto-chart software for documentation and data management.

LED light – reproduce & repeat

The Byk-mac uses a patented and highly stable LED light source providing superior accuracy time and time again.

Reduced calibration frequencies allows the Byk-mac to offer consistent results site to site globally.

Technical Specifications

Measuring Geometry	45 Illumination
	-15°, 15°, 25°, 45°,75°,110°, aspecular viewing.
Measuring Area	23mm diameter
Spectral Range	400 – 700nm, 10nm resolution
Measurement Range	0 – 400% reflectance
Measuring Time	< 6 seconds
Repeatability	0.02 ΔE*σ, 1 σ (10 consecutive measurements on white)
Reproducibility	0.20 ΔE*, 1 σ (average on 12 BCRA II tiles)
Colour Scales	E, E CMC, E DIN6175
Effect Parameters	Sparkle , Graininess
Illuminants	A , C , D50 , D65, F2,F7 , F11 , F12
Observer	2°, 10°
Memory	1000 standards / samples
Language	English, German, French, Italian, Spanish
Power Supply	4 AA NiMH batteries.
Operating Temperature	10° – 42° C (50 – 110° F)
Relative Humidity	up to 85% , 35° C (95° F 0 ; non condensing
Dimensions	218 x 8.1 x 14.7cm (8.6 x 3.2 x 5.8 in)
Weight	approx 1.3kg (approx 2.86lbs)

Standards

ASTM	D2244 , E308 , E1164, E2194
DIN	5033 , 5036 , 6174 , 6175-2 ,
ISO	7724
SAE	J1545

Ordering Information

BG6340	Byk-mac

Comes complete with:
Black, White, Cyan calibration standards
Protective cap
USB Interface cable
8 x AA rechargeable batteries
External battery charger
BYKWARE auto-chart software
Carrying case
Operating manual
Training

Accessories

BG 6332	Black Calibration Standard
BG 6333	Protective Stand
BG 6336	Protective Cap
BG 6337	USB Interface Cable
BG 6338	External Power Supply
BG 6339	External Battery Charger
BG 4809	BYKWARE auto-chart

Hardware requirements

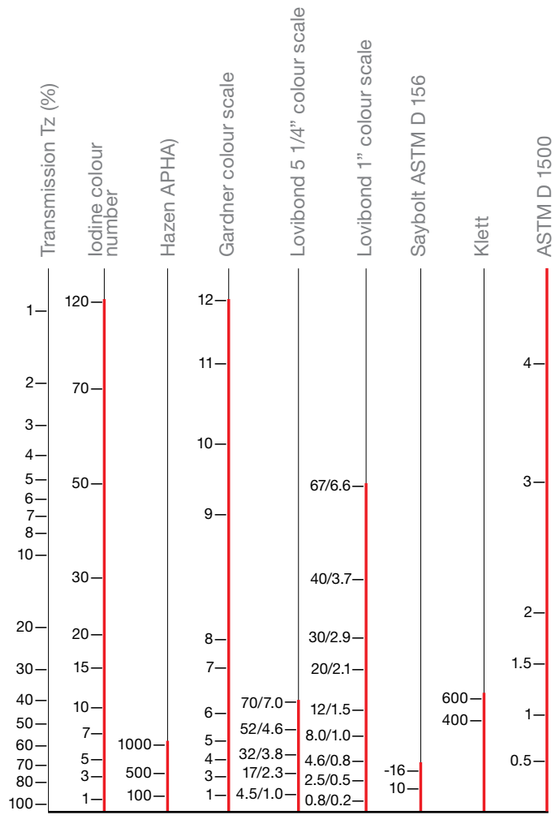
PC with Windows 2000 or later operating system.

The Byk-mac is supplied complete with the innovative auto-chart excel based software, allowing excellent process control and product characterisation.

1.2 COLOUR OF TRANSPARENT LIQUIDS

General

Colour variations of transparent liquids such as varnishes, solvents, resins, tensides, oils etc., may be caused by contamination or impurities, process inconsistencies, or excessive weathering.
Reliable and accurate measurements are therefore essential to ensure consistent production standards.
Many colour scales e.g. Iodine, Gardner, Hazen, Lovibond etc. have been used for visual comparison for decades and still serve as references in various industrial procedures.
Today modern equipment from Sheen Instruments offers proven quality control and analytical solutions.
Visual colour checks can be performed with high quality comparators.
Colorimeteric or spectrophotometric instruments provide objective measurements directly converted to colour scales or CIELab colour space, and traceable documentation.
Furthermore they are capable of identifying any coloured products even when falling outside the scope of conventional scales.



Comparison of visual colour systems with Z-transmittance (approximate scale).

Colour Comparators - 2000 Series

A flexible and cost effective comparator for visual colour grading. The sample is matched in a daylight illuminating unit against calibrated stable glass standards built in test discs. 2 models are available, covering different colour scales, sensitivity, path lengths & accessories :

Gardner Comparator 2000+

Features

- ☐ For Gardner scale evaluation, range: 1-18 units
- ☐ Standard package:
  - Comparator 2000+ series, with Daylight Lighting Unit
  - 10 mm path length fused cell, for relatively dark colours
  - Gardner disc A/30 AS, scale: 1 to 9
  - Gardner disc A/30 BS, scale: 10 to 18

Hazen Comparator 2250

Features

- ☐ For Pt-Co/Hazen/APHA scale evaluation, low range: 0-70 Pt/l
- ☐ Standard package:
  - Nessleriser 2250 comparator, with Daylight Lighting Unit
  - 250 mm path length cylinder, for unsaturated products
  - CAA disc, scale: 0-2.5-5.0-7.5-10-15-20-25-30 mg Pt/l.
  - CAB disc, scale: 30-35-40-45-50-55-60-65-70 mg Pt/l.

Ordering references

Colour Comparator 2000-series

VCC2000	Gardner comparator 2000+
VCC2250	Pt-Co/Hazen/APHA 2250 comparator

Colour Comparator 3000

This comparator, employing a 3-section field of view observation system, allows for easier colour matching due to the advantage of being able to simultaneously view both the sample and two consecutive glasses on the colour scale. For rapid colour grading, the sample can be checked within predetermined limits by setting the glass standards to show the 2 limiting colours.The viewing conditions are colour corrected to CIE standard illuminant C guaranteeing constant lighting conditions for colour grading. Samples are measured in 10.65 mm diameter clear glass tubes.

Features

- For Gardner scale evaluation, 1-18 units
- 10 mm path length
- Tungsten halogen light source, corrected to CIE illuminant C
- Standard package: Comparator, 2 glass coloured standards, 1 test tube Ø-10.65-mm

Ordering references

Colour Comparator 3000-series

VCC3000	Gardner comparator 3000

Optional accessories

VCC3000/1	Test tube Ø10.65 mm
VCC3000/2	Fused cell 10 mm
VCC3000/3,4,5	Individual certified standard 500 ml, Gardner n. 2, 5 or 8
VCC3000/6	Set of 2 conformance filters, Gardner n. 3 & 17

Automatic Colorimeter PFX195

The PFX195 spectrophotometric colorimeter provides objective, unbiased colour data according to a comprehensive range of established industry colour scales, spectral data and CIE values.
A Windows software programme is included to allow data to be transferred to a PC and also provides for remote control. Simple operation, comprehensive facilities and easy maintenance make this colorimeter the perfect instrument for both laboratory and production environments.

Features

- Path length: 0.1 to 50 mm
- Can be used with Ø10.65 mm tube or 12.5 mm cell, with optional adaptor
- Data storage: up to 32 data sets
- RS232 port, parallel printer port
- Test with 1 certified glass filter (included), or optional filters set and colour standards
- Data collecting software for Windows included

Performance

- 9 interference filters
- Spectral ranges: 420-710 nm
- Repeatability: - chromaticity x/y: ± 0.0004
  - transmittance: ± 0.5%
- Light source: filament lamp, easy to replace by user
- 4 scales

	Path length (mm)	Range
Pt.-Co.-/-APHA (Hazen)	50	0-500 mg/l
Iodine	10	1-500 units
Gardner	10	0-18 units
Yellow index	10, 25, 50	

- Colour systems: XYZ, xyY, CIE L*a*b*, ΔE*, L*C*h
- Spectral data: 0-100 %, optical density: 0-2.5

Ordering references

PFX 195

PFX195	Automatic colorimeter PFX195

Optional accessories

PFX195/1	Optical fused cell 10 mm path length
PFX195/2	Optical fused cell 50 mm path length
PFX195/3	Test tube Ø10.65 mm
PFX195/4	Adaptor for 10.65 mm test tube
VCC3000/3,4,5	Individual certified standard 500ml, Gardner n. 2, 5 or 8
PFX195/5...9	Individual certified standard 500ml Pt.-Co. n° 5, 10, 15, 30 or 50
PFX195/10	Set of 4 conformance filters, Gardner n° 2, 8, 12 & 17
PFX195/11	Set of 5 conformance filters, Pt.-Co.-/-APHA (Hazen) n° 5, 20, 50, 100, 300

LICO 150

High performance, microprocessor controlled photometer with ease of use operating combined with high accuracy and battery power option for portable usage. The Lico 150 can carry out exact colorimetric evaluations in conformity with several ISO/ASTM standards with just a single measurement. It displays the result in traditional colour numbers such as Iodine, Hazen/Alpha, Gardner, Saybolt, and ASTM colour. All 5 colour scales are included, so that the Lico 150 can also be used universally in the laboratory or production control.

Features

- Touch-screen TFT Display
- 16 Language for user interface
- Battery option
- Automatic cuvette recognition
- Data log for 200 colour values
- Automatic zero calibration programme
- Reference Beam Technology
- Password protection, GLP documentation
- 1 USB-Port for keyboard, memory stick, printer
- 1 USB-Port for PC

Colour measurement methods

Hazen/Alpha/PtCo-color
Gardner color
Iodine – color
Saybolt – color
ASTM D 1500

Included Accessories

- Universal Power supply 100 – 240V , 50-60Hz , incl
- Dust cover
- User Manual

Ordering References

L150	Lico 150 colorimeter
L150/1	Starter Kit (L282 , L341, L293)
L150/2	Test filter set for stray light, absorbance and wavelength check.
L150/3	Certified testing solution set “Addista-color”
L150/4	Round cuvette 11mm, glass, disposable , pk/500
L150/5	Rectangular cuvette 50x10mm disposable pk/50
L150/6	Rectangular cuvette 50x10mm with caps, plastic, disposable, pk/10.
L150/7	Rectangular cuvette 50x10mm , glass pk/1
L150/8	Rectangular cuvette 10x10mm , glass pk/3
L150/9	USB-Keyboard (US layout)
L150/10	USB-Barcode Scanner (hand held scanner)
L150/11	USB-Memory Stick
L150/12	Lithium-Ion Battery , 11v , 4400mAh , 300g
L150/13	PC-Software Data Trans , incl USB cable
L150/14	Replacement bulb 6V , 10W

Dimensions 22.0 x 13.5 x 33.0 cm
Weight 4KG

LICO 500

High performance, microprocessor based spectrophotometer with a wavelength range from 380 to 720nm for colour measurement or 320 to 1100nm for routine analysis.

Lico 500 can carry out exact colorimetric evaluation in conformity with several ISO/ASTM standards with a single measurement and display the result in systems such as Iodine, Hazen/Alpha or Gardner colour numbers as well as CIE-L*a*b* colour values. In addition there are over 20 indexes, transmittance and absorbance can be measured at individual wavelengths, so that the Lico 500 can also be used universally for analytical purposes in the laboratory.

Features

- Touch-screen TFT-Colour-Display
- Automatic cuvette recognition
- Data log for 500 colour values, 50 colour references, 500 photometric readings, 20 wavelength scans , 20 time scans.
- Automatic zero calibration program
- Reference Beam Technology
- Password protection
- USB-Ports

Colour systems

Iodine, Hazen/APHA, Gardner-color, Saybolt, Mineral Oil, Klett-color, Hess-Ives, ADMI, Yellowness-index, AOCS-Red/Yellow, Chlorophyll A, CIE-Lab, Hunter-lab, XYZ, European and US Pharmacopoeia

Photometric methods

- Wavelength scan 320 – 1100nm incl.
- Difference mode.
- Time course mode
- Single & Multi Wavelength mode.

Ordering reference

Lico 500	Spectrophotometer 100-240V , 50-60 HZ

Optional accessories

L500/1	Starter Kit
L500/2	Test Filter Set for stray light, absorbance & wave lenght check
L500/3	Adista-color test solution
L500/4	Round Cuvettes , 11mm glass , pk500
L500/5	Rectangular cuvette , 50x10mm, plastic , pk50
L500/6	Rectangular cuvette , 50x10mm, plastic with caps pk10
L500/7	Rectangular cuvette , 50x10mm,glass pk1
L500/8	Rectangular cuvette , 10x10mm, glass , pk3
L500/9	USB-Keyboard (US layout)
L500/10	USB-Barcode Scanner (hand held sensor)

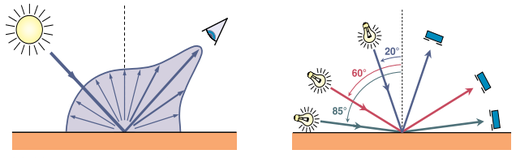
2.0
GLOSS

General

Gloss is an important attribute of surface appearance, it changes our perception of colours and shapes and influences our overall visual experience.
Gloss affects objects by the interaction of incident light with the surface and observer and depends on variables such as illumination angle, surface profile, physical characteristics and observation conditions.
For many products, gloss can play an important part in their visual acceptability and for quality purposes should be monitored with precision instrumentation particularly when it varies through the process.

Gloss measurement

Unified methods for the measurement of gloss are described in ASTM, DIN and ISO standards.
When a defined light source illuminates a surface, it is partly scattered and partly reflected in the equal but opposite angle. This specular reflection determines the surfaces gloss level. The intensity of the specular reflection, which depends on the material and the illumination angle, is measured under specified conditions. Results are expressed in Gloss Units (GU), which is a calibrated scaling based on the refractive index of a black glass having a specular reflectance of 100 Gloss Units (GU) at the specified angle. All non-metallic materials e.g. paints or plastics can have a value related to this level, while for highly reflective metallic surfaces e.g. plated components and some raw materials can reach 2000 GU (mirror gloss).

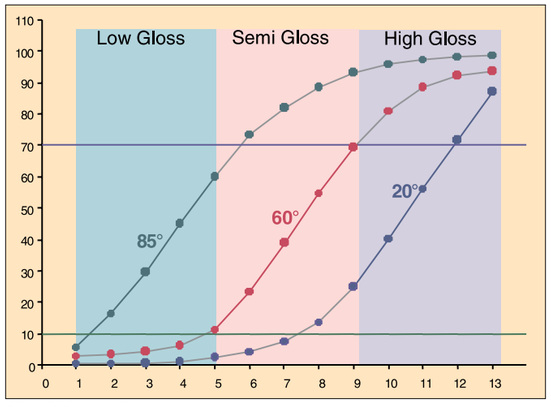


Multi purpose geometries

Glossmeters

Our range of instruments offer a variety of measurement geometries each applicable to different gloss measurement applications or materials.
Generally three geometries cover the majority of industrial applications:
- 20° for high gloss surfaces
- 60° for medium gloss surfaces
- 85° for low gloss or matt surfaces

The 60° geometry is widely used due to its medium gloss coverage. However, it has been experimentally shown that when readings taken at 60° exceed 70 GU, then a change to 20° is recommended for better differentiation. Equally when readings drop below 10 GU the geometry should be changed to 85° for the same reason.
For some specific industrial applications such as the measurement of ceramics, plastics and paper, special 45° or 75° geometries are also available.
All Sheen glossmeters include certified calibration standards, traceable to BAM, the German National Standards authority for gloss measurement.



Gloss differentiation

Table A

Gloss instruments selection chart

Geometry	20° High gloss	60° Medium gloss	85° Low gloss	45° Medium gloss	75° Low gloss
Application		General purposes		Ceramic Foil	Paper Vinyl
ASTM C346	☐	☐	☐	■	☐
ASTM C584	☐	■	☐	☐	☐
ASTM D523	■	■	■	☐	☐
ASTM D2457	■	■	■	■	☐
AS 1580 (602.2)	■	■	■	☐	☐
BS 3900 D5	■	■	■	☐	☐
DIN 67530	■	■	■	☐	☐
DIN EN ISO 2813	■	■	■	☐	☐
JIS Z 8741	■	■	■	■	■
MFT 30064	■	■	■	☐	☐
TAPPI T480	☐	☐	☐	☐	■
EN ISO 7668 (mirror)*	■	■	■	■	☐

* Suitable also for mirror gloss, please check instrument & version specific working ranges

Glossmaster

This brand new generation of truly portable glossmeters have been designed mainly with the user in mind. They not only offer top performance, greater versatility and ease of use but also include enhanced features.
With the most powerful built-in data processing capability, including difference calculations and pass-fail functions, they make Quality Control easier than ever before with true compliance to all International Standards.
The menu-guided operation is simply controlled and activated by a jog-dial button. Data can be stored in the large capacity memory and output to Excel™ for professional detailed reports using the included Easy-link software.
The instruments high precision measurements and reliable automatic calibration contribute to strengthen your quality standards.
All these performances are contained in a compact, sturdy and light weight unit.

4 models are available:
- Tri-Glossmaster 20-60-85°: 3 angles in one instrument
- Glossmaster single-angle: 20, 60, or 85°.

Tri-Glossmaster 20-60-85°

This versatile glossmeter covers a wide range of applications from matt to high gloss measurements conforming to International Standards. Samples can be measured separately at each angle or at 2 or 3 angles simultaneously and effectively processed using the powerful built-in software.

Features

- ☐ Menu guided operation, activated by the jog-dial button
- ☐ Reading: 20°-60°-85° separately, or simultaneously 20+60°, 60+85°, 20+60+85°
- ☐ Difference & Pass-Fail reading (memory for 50 references)
- ☐ Continuous reading with actual value, average, min., max.
- ☐ Statistics:
  - adjustable number of readings/sample, from 2 to 99
  - selectable display with actual value, average, std. deviation, min., max., range, difference, pass/fail
- ☐ Memory: 999 readings, saved with individual name, date & time and recall function
- ☐ Automatic calibration check
- ☐ Protective holder with integrated calibration standard (including traceable certificate)
- ☐ RS 232 output to PC, including Easy-link software
- ☐ Standard package: Instrument & calibration holder (certified), Easy-link software & PC cable, Manual, Battery, Case

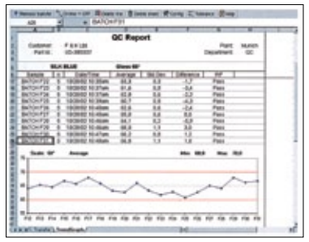
Performance

- ☐ Auto-range: 0-2000 GU (20°)
  0-1000 GU (60°)
  0-160 GU (85°)
- ☐ Suitable for non-metal and metal surfaces
- ☐ Repeatability: 0.2 GU (0-99.9 GU) – 0.2% (100-2000 GU)
- ☐ Reproducibility: 0.5 GU (0-99.9 GU) – 0.5% (100-2000 GU)
- ☐ Measuring time: 0.5 sec./each geometry
- ☐ Measuring area, mm: 10 x 10 (20°), 9 x 15 (60°), 5 x 38 (85°)
- ☐ Language: English, Spanish, German, French, Italian, Japanese
- ☐ Auto shut-off: adjustable 10 to 99 sec.
- ☐ Power: 1 x 1.5V Mignon Alkaline battery for 10,000 readings, or external power supply.

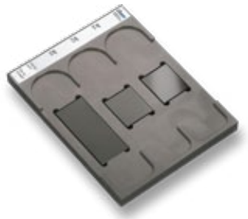
Ordering references overleaf>>

Software (included)

- Easy-link, for data downloads to Excel, with standard templates for professional QC reports.



Integrated calibration standard (certified)



Tri-angle linearity check standard (certified)

Ordering reference

Tri-Glossmaster

260	Tri-Glossmaster 20-60-85°

Optional accessories

BG4401	USB Adapter, including driver software
BG4403	External power supply, 90-264V, self adapting, European plug
BG4404	External power supply, 90-264V, self adapting, UK plug
BG4432	Linearity check standard Tri-angle (certified)
BG4433	Linearity check standard Tri-angle mirror (certified)

Glossmaster Single Angle: 20,-60,-or 85°

Identical features as for Tri-GLOSSMASTER, but measuring only at one angle.

Ordering references

Glossmaster (single-angle)

261	Glossmaster 20°
262	Glossmaster 60°
263	Glossmaster 85°

Optional accessories

BG4401	USB Adapter, including driver software
BG4403	External power supply, 90-264V, self adapting, European plug
BG4404	External power supply, 90-264V, self adapting, UK plug
BG4422	Linearity check standard 20°, high & semi-gloss tile (certified)
BG4462	Linearity check standard 60°, high & semi-gloss tile (certified)
BG4487	Linearity check standard 85°, high & semi-gloss tile (certified)

Tri-Glossmaster µ

This three angle 20-60-85° gloss meter is identical to the Tri-Glossmaster, but equipped with a built-in thickness gauge enabling gloss measurements to made as a function of the coatings thickness on the same sample spot, measuring in seconds.

Features

- Suitable for high (metallic) to low gloss surfaces
- Simultaneous display of 20/60/85° readings
- Automatic diagnosis & long term stable calibration
- Built-in coatings thickness gauge for ferrous (F) and non-ferrous (FN) substrates
- Statistics, difference & pass-fail
- Memory for 999 readings with name input
- RS232 output to PC, Easy-link software included
- Standard package:

Instrument & calibration holder (certified), zero standards F & NF, Easy-link software, PC cable, battery, operating manual, carrying case.

Performance

- Gloss range, GU: 0-2000 (20°), 0-1000 (60°), 0-160 (85°)
- Measuring area, mm: 10 x 10 (20°), 9 x 15 (60°), 5 x 38 (85°)
- Coatings thickness range: 0-500 µm (0-20 mils)
- Repeatability for Gloss 0-99.9 GU, (100-2000 GU): respectively 0.5 GU, (0.5%)
- Reproducibility: Gloss, respectively: 1 GU, (1%) - Thickness: 2%

Ordering reference

Tri-Glossmaster µ

260T	Tri-Glossmaster µ

Optional accessories

See Tri-Glossmaster above

Standards

Gloss	see table A
Thickness	
ASTM	B499, D1400
DIN EN ISO	2360
EN ISO	2178

Minigloss 60°

This economy, pocket sized, 60° gloss meter offers high quality measurement and is very easy to use.
The steel case protects the optical system and the electronics either in the lab, in the workshop, or in the field.

Features

- Easy to use - one button operation
- Automatic digital push button calibration
- Range: 0.1-100 GU, repeatability: ± 0.5 GU, precision: ± 1 GU
- Large backlit LCD display, visible even in low light area
- Automatic power off & low battery warning
- Powered by mains/rechargeable batteries (900 readings/charge)
- Standard package: Instrument, certified standard, charger, carrying case.

Ordering reference

Minigloss 60

101N	Minigloss 60°

Standards

See table A

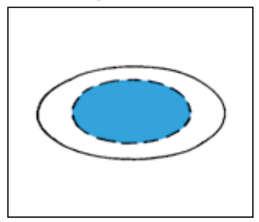
Microgloss 60° SO (small orifice)

This 60° gloss meter is specially designed for measurement of small areas. This feature is of particular interest to packaging, metal finishing, automotive, plastics, or other products with particular shape or size, which are difficult to measure with gloss meters equipped with a standard size orifice.

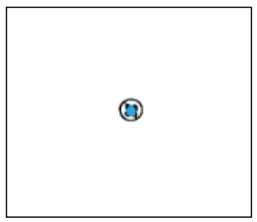
Features

- 2 versions available: for normal surfaces, or for mirror gloss surfaces
- Measurement area: 2x2 mm
- Automatic calibration on standard supplied
- Statistics: latest reading, number of readings, max., min., average, standard deviation
- Batch facility
- Memory: 4000 readings
- RS232 output (3-pin DIN socket) to printer or PC
- Powered by mains/built-in rechargeable battery
- Internal lithium battery, storage of calibration data & readings up to 10 years
- Standard package: Instrument, calibration standard, charger, carrying case.

Measuring Area



Standard 60°



Microgloss 155/SO

Ordering reference

Microgloss 60°-SO

155/SO	Microgloss 60° small orifice
155/SO/M	Microgloss 60° small orifice, “mirror” (0-999 GU)

Standards

See table A

Bench Glossmeter

This bench top unit is designed for the gloss measurement of curved or specially shaped surfaces difficult to measure with pocket instruments. The flat top allows large samples to be conveniently and accurately placed onto the glossmeter for measurement.
Optional alignment guides allow small pieces to be precisely positioned onto the small measurement orifice (SO model) for optimal reproducibility.

Different versions available:

- 60°: measurement area: 9 x 15mm, range 0-1000 GU autoranging (normal and mirror gloss)
- 60°/SO: small orifice: 2 x 2mm, range 0-1000 GU autoranging (normal and mirror gloss)
- 20° & 60°: for general purpose, medium and high gloss surfaces
- 75°: for the paper industry.

Features

- Automatic calibration
- Statistics
- Easy to use, clear LCD display
- Memory: 4000 readings
- Powered by mains/built-in rechargeable battery
- RS232 output to printer or PC (ASCII format)
- Optional remote footswitch for hands free operation
- Standard package: Instrument, certified calibration standard, rechargeable batteries & charger.

Ordering references

Bench-Glossmaster

157/60	Bench Glossmaster 60°
157/60/SO	Bench Glossmaster 60° - Small Orifice
157/20/60	Bench Glossmaster 20 & 60°
157/75	Bench Glossmaster 75°

Optional accessories

157/022/S	Footswitch for all models
157/034/A	Alignment guide - factory fitted (only for 157/60/SO) to be placed at the time of ordering

Standards

See table A

Microgloss 45° or 75°

Certain applications demand the use of glossmeters with specific geometries.
These pocket size instrument with dedicated geometries have been designed to meet these requirements.

- 45°: for ceramics, plastics, plastic films – measuring area: 9 x 13mm, range 0-180 GU
- 75°: for paper, paperboard, structured plastics – measuring area: 9 x 21 mm, range 0-140 GU

Features

- Automatic calibration, menu-guided operation
- Statistics: number of readings, mean, standard deviation
- Memory: 999 readings
- RS232 output to printer or PC, Easy-link Software included
- Standard package: Instrument & calibration holder (certified), Easy-link & PC cable, 2 x AA/1.5V batteries, leather pouch, operating manual and carrying case.

Ordering references

Microgloss 45 or 75

164	Microgloss 45°
165	Microgloss 75°

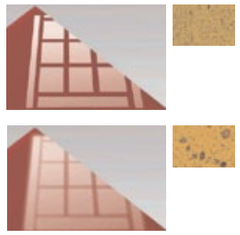
Optional accessories

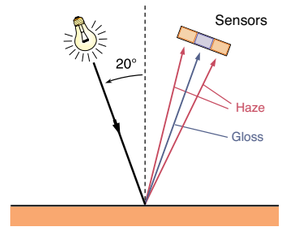
BG4537	Linearity check standard 45°
BG4555	Linearity check standard 75°
BG6650	Portable serial printer 230V, 40 column with charger
BG6649	Portable serial printer 115V, 40 column with charger
BG4401	USB Adapter, driver included

Standards

See table A

3.0
GLOSS & HAZE





General

A high gloss surface is expected to have a clear and brilliant appearance, however due to certain structural defects it may exhibit a milky appearance, which reduces its reflecting quality.

This milkiness or haze effect may be caused by various physical parameters:

- degree of dispersion (particle size), or additives
- type of application (flocculation from electrostatic or pneumatic spraying)
- weathering, polishing or abrasion

To measure haze in conjunction with gloss, a special gloss meter equipped with two additional sensors next to the 20° gloss sensor captures the scattered light, allows simultaneous evaluation of both parameters for better process control.

Haze-Gloss

This versatile laboratory instrument is designed for measurements of gloss, mirror gloss and Haze.
The special optical system and robust design provide excellent long term stability, accuracy and repeatablity.
A foot switch, motorized sample holder and spot target illumination automate routine operations.

Features

- Measurement at 20-60-85° of Gloss & Mirror Gloss, and Haze at 20°
- Reference beam, closed optics, self diagnosis for accurate measurements
- Statistics: average, min., max., standard deviation
- Memory: 9 x 600 values
- Serial RS232, data output to Excel via Easy-link software (included)
- Standard package: Instrument with certified Gloss & Haze standards, Easy-link software, PC cable, foot switch

Performance

- Gloss range: 0 to 2000 GU, repeatability: 0.2 GU, reproducibility: 0.5 GU
- Haze range: 10 to 2500 HU (Haze Unit), repeatability: ± 1HU, reproducibility: ± 7HU.

Ordering references

Haze-Gloss

BG4601	Haze - Gloss

Optional accessories

BG4616	Certified medium gloss standard 20°
BG4617	Certified medium gloss standard 60°
BG4618	Certified medium gloss standard 85°
BG4056	Mirror gloss standard

Standards

Gloss: See table A

Haze

ASTM	E430
ISO	DIS13803

Micro-Haze Plus

This small, portable instrument simultaneously measures Gloss and Haze at 20° and is ideal for Quality Control of finished products in the production process, or at the customers site.

Features

- Haze & Gloss at 20°
- Automatic calibration on certified standards
- Statistics: average, std. deviation
- Serial RS232 data output to PC via included Easy-link software, or to portable printer
- Memory: 999 values
- Standard package: Instrument, holder with integrated certified Gloss & Haze standards, Easy-link software, PC cable, Leather pouch, manual & transport case, 2 x AA1.5V Mignon batteries.

Performance

- Gloss range: 0-180 GU, repeatability: 0.5-GU, reproducibility: 1 GU
- Haze range: 10-500 HU (Haze Unit), repeatability: ± 1 HU, Reproducibility: ± 7 HU.

Ordering references

Micro-Haze

BG4632	Micro - Haze Plus

Optional accessories

BG4514	HIgh & medium gloss check standard, certified
BG6650	Portable printer 230V (115V upon request)
BG4401	USB Adaptor, driver included

4.0
ORANGE PEEL & DOI

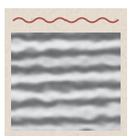
Orange peel is a phenomenon perceived as a wavy pattern disturbing highly glossed painted surfaces e.g. automotive body finishes. It affects the smoothness and the mirror-like appearance of such finishes.

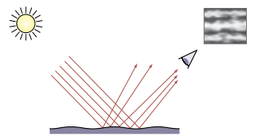
The causes could be due to a number of factors: the flow and levelling characteristics of the paint system, processing parameters, coating thickness, substrate roughness, or paint formulation.

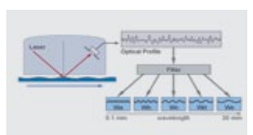
This effect can be seen from varying distances, from approx. 0.4 to 3 m, as small and large waviness patterns. In addition to the visible conditions, invisible patterns less than 0.1 mm reduce the gloss, and as a result affect the Distinctness of Image (DOI).

In the past, these appearance attributes were measured in various different terms or scales, depending on the manufacturers and their evaluation practices. Today the Wave-Scan DOI offers standard methods to objectively define these attributes and ensure better process control, of particular use in the automotive industry.

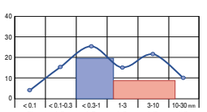

Small waves


Large waves

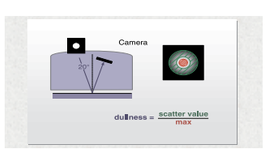




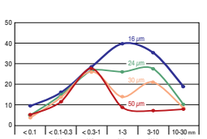
Measurement of Orange Peel



Structure spectrum



Measurement of dullness



Influence of film thickness

Wavescan Dual

This portable instrument allows objective QC evaluation of surface quality after each point of the painting process.
As with the Wave-scan DOI, the integrated laser system scans the specimen at 60< degrees symbol> over a defined distance collecting the optical profile.
In order to reproduce human eye response the orange peel structures are divided into different levels within a spectrum ranging from 0.1 to 30 mm wavelengths.
Additionally an infra-red high energy LED also performs dullness measurement over the same distance using a newly integrated CCD camera, providing greater information on the image forming qualities, related to the DOI, of the surface caused by structures < 0.1mm.
Data can be transferred from the instrument to a powerful data capture/analysis package, Autochart, which is provided with the instrument.

Features

- ☐ Optimal correlation to the visual perception of Orange peel & DOI
- ☐ Output of Long Waves & Short Waves, and DOI
- ☐ Independent of paint system and refractive index
- ☐ Reliable measurements on test panels or curved parts
- ☐ Suitable for solid and metallic coatings
- ☐ One-hand operation, self calibration
- ☐ User–defined sampling procedure
- ☐ Memory 599 values with zone identification
- ☐ Data analysis & management with Auto-chart software
- ☐ Standard package: Instrument, Certified reference tile, Protective cover, Auto-chart software on CD, Docking station and interface cable, 2 rechargeable Li-Ion battery packs, Battery holder for AA alkaline or rechargeable batteries, 3 Batteries, Operating Manual and Carrying case.

Auto-chart software

- ☐ Instrument programming:
  - object identification: car model, colour, paint line
  - definition of measurement sequence and zones identification
- ☐ Analysis with Excel™ and Access™:
  - trend graph, products comparison, history, structure “spectrum”

Performance

Application

☐ High to Semi Gloss:	du<65, linear range		
High Gloss Surface:	du<40, linear range		
☐ Structure Spectrum			
- du	<0.1 mm	- Wc	1 to 3 mm
- Wa	0.1 to 0.3 mm	- Wd	3 to 10 mm
- Wb	0.3 to 1 mm	- We	10 to 130 mm
☐ Repeatability:	du<40: 4% or >0.4		
	du<40: 4% or >0.4		
☐ Reproducibility:	du<40: 4% or >0.4		
	du<40: 4% or >0.4		
☐ Object curvature	radius >500 mm		
☐ Min. sample size	35 mm x 150 mm		
☐ Scan length	5 / 10 / 20 cm		
☐ Resolution	375 points/cm		
☐ Memory	1500 readings		
☐ Interface	USB 1.1		
☐ Light source	Laser diode, LED and IR-SLED		
☐ Laser energy	<1mw (Laser class 2)		
☐ Dimensions	150 x 110 x 55 mm (5.9 x 4.3 x 2.2in.)		
☐ Weight	650g (1.5lbs)		

Ordering references

Wavescan Dual

BG4840	Wave-scan dual
BG4846	Wave-scan II

Optional accessories

BG4843	Reference tile for Wave-scan dual
BG4847	Reference tile for Wave-scan II
BG4841	Docking station for Wave-scan dual
BG4825	Clear tape for low gloss surfaces

Micro-wave-scan

This small compact portable instrument allows Orange Peel and DOI measurements to be made easily on small and curved surfaces. Exterior automotive components including mirror housings, door handles and decorative trim can be effectively measured to ensure consistency in surface finish. DOI measurements are also possible without the need to scan the surface.
With good correlation to the Wavescan DOI, this instrument can measure samples of minimum size 25mm x 40mm and has user selectable scan lengths of 20, 10 or even 5cm. The instrument is powered by a rechargeable battery pack (Li-Ion) using the docking station supplied that automatically charges the battery pack when it is not being used. The station can be connected to a pc to allow the data transfer of stored values. Optionally the instrument can be powered by 2 standard mignon alkaline or rechargeable batteries which will allow 1000 readings to be made before requiring replacement / recharging.
2000 readings can be stored in the instrument in selectable memories.

Features

☐ High Gloss Surfaces:	du<40, linear range		
☐ Structure Spectrum			
- du:	<0.1 mm		
- Wa:	0.1 to 0.3 mm		
- Wb:	0.3 to 1 mm		
- Wc:	1 to 3 mm		
- Wd:	3 to 10 mm		
☐ Scan Length			
- 20cm:	du, Wa….Wd, L,S, DOI		
- 10cm:	du, Wa….Wd, L,S, DOI		
- 5cm:	du, Wa….Wd, L,S, DOI		
- 0cm:	du, Wa, Wb, DOI		
☐ Repeatability:	8% or >0.8		
☐ Reproducibility:	12% or >1.2		
☐ Object curvature:	radius >300 mm		
☐ Min. sample size:	25mm x 40 mm		
☐ Scan length:	5 / 10 / 20 cm		
☐ Resolution:	375 points/cm		
☐ Memory:	2000 readings		
☐ Interface:	Serial RS232		
☐ Light source:	Laser diode, LED		
☐ Laser energy:	<1 mw (Laser class 2)		
☐ Dimensions:	70 x 120 x 40 mm (2.7 x 4.7 x 1.6 in.)		
☐ Weight:	250 g (0.6 lbs)		

Ordering references

Micro-wave-scan

BG4824	Micro-wave-scan

Optional accessories

BG4828	Docking station
BG4829	Reference tile for micro-wave-scan
BG4401	USB Adaptor

5.0
OPACITY

Sheen-Opac

An easy to use instrument for measurement of the opacity, or luminuous reflectance, of a grey scale. Suitable for the evaluation of a coatings hiding power, or simple shade sorting tasks of metallised films, anodized aluminium or ceramics.

Features

- Automatic calibration on 2 included calibration standards
- Large backlit LCD display of individual readings
- Rechargeable batteries, with dual voltage mains battery recharger supplied.

Performance

- Geometry 45/0°, CIE Illuminant C
- Measuring area: 9 x 13 mm
- Range: 0 – 100 units
- Accuracy: ± 1 unit or 1% (full scale).

Ordering references

Sheen - Opac

310	Sheen - Opac

Standards

BS	3900 D6/D7
DIN	55984
ISO	3906, 6504

Pfund Black & White Cryptometer

A simple and rapid test method to determine opacity in terms of hiding and spreading powers. This precision instrument is suitable for production and quality control purposes, particularly when product specifications are based on the evaluation of wet films instead of dry coatings.
The measurement is made simply by searching the position on the engraved scale where the wet coating, trapped between the wedged top plate and the scale, perfectly hides the background.

Features

- Supplied with 2 top plates & case
- 2 top plates combinations:
  K=0.04 + K=0.08, or K=0.02 + K=0.07, with optional K=0.035A simple and rapid test method to determine opacity in terms of hiding and spreading powers. This precision instrument is suitable for production and quality control purposes, particularly when product specifications are based on the evaluation of wet films instead of dry coatings.

Ordering references

Pfund Cryptometer

302/1	Pfund B/W Cryptometer with plates K=0.04 + K=0.08
302/2	Pfund B/W Cryptometer with plates K=0.02 + K=0.07

Optional accessories

302/K0035	Optional extra top plate K=0.035

Get the best results from your measurements!

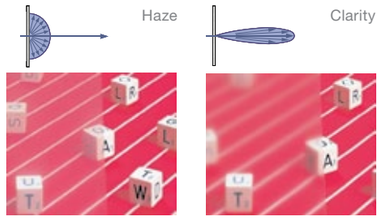
To achieve repeatable and reliable appearance measurements experts recommend the use of accurate automatic application equipment.

Sheen Instruments offer a range of film applicators, including automatic draw down and centrifugal applicators, which provide outstanding precision to eliminate inconsistencies and variations during sample preparation.

Visit our web site **www.sheeninstruments.com** or contact us for more information.

6.0
TRANSPARENCY, HAZE & CLARITY

The optical properties of many materials such as plastic films, sheets, panels and glass are essential for their suitability in a particular application. The light absorption or scattering behaviour of these materials determines their transparent or hazy effects and how objects can be seen through them.
These characteristics are a result of the total transmittance capability, which consists of directly transmitted light and diffuse components. Wide angle scattering causes Haze or loss of contrast, narrow scattering affects the see-through quality or clarity. All these parameters can be measured effectively with the Haze-Gard Plus.



Haze-Gard Plus

This instrument, equipped with an integrating sphere offers reliable and accurate measurement of Total Transmittance, Haze, and Clarity. A large variety of samples can be easily positioned onto the sample port, and measurements made independent from the ambient lighting conditions.

2 models available:
- Haze-Gard Plus illuminant C for general purposes
- Haze-Gard Plus illuminant A for automotive windshields

Features

- Reference beam, self-diagnosis, enclosed optics for long term accuracy
- Statistics: average, std. deviation, variance coefficient, min/max.
- Memory : 7 x 999 values
- Serial RS232, data output to printer or PC, via Easy-link software included
- Foot switch & automatic measurements for hand-free operation
- Standard package: Instrument, zero standard, Clarity standard, foot switch, Easy-link software, PC cable, operation manual.

Performance

- Geometry: 0°/diffuse, sample port: Ø25.4 mm, measurement area : Ø18 mm
- Illuminant CIE/C or A, spectral response: CIE f(Y)
- Range: 0-100%, repeatability: ± 0.1, reproducibility: ± 0.4 unit.

Ordering references

Haze-Gard Plus

BG4725	Haze-gard Plus Illuminant C
BG4726	Haze-gard Plus Illuminant A

Optional accessories

BG4734	Clarity check standard, certified
BG4745	Haze certified standards, set of 4 approx. 1-5-10-20-30%*
BG4754	Transmittance certified standards, set of 4 approx. 1-5-10-20-30%*
BG4738	Film holder (size 17 x 10 cm, thickness <0.5 mm)
BG4735	Taber Abrasion holder
BG4739	Cuvette holder
BG6180-83	Cuvette for liquid, path length 2.5/4.0/5.0/10.0 mm
BG6650	Portable printer 230V (115V upon request)

* Individual standards also available upon request

Haze-Gard Dual

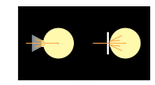
Based on the same instrument as the Haze-gard Plus and offering comparable features, this version is designed to perform Transmittance and Transmission Haze measurements according to either ASTM 1003 / non-compensated, or ISO 13468 / compensated methods. In the former method results are affected by the sample reflection meanwhile in the latter they are independent from the samples reflective properties.

Features (difference to Haze-gard Plus)

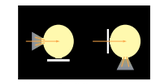
- Memory : 3 x 999 values
- Standard package: Instrument, zero standard, foot switch, Easy-link software, PC cable, operation manual.

Performance

- Geometry: 0°/diffuse, sample port: Ø21 mm, measurement area-: Ø16.5 mm
- Illuminant CIE/ D65, spectral response: CIE f(Y)
- Range: 0-100%, repeatability: ± 0.1, reproducibility: ± 0.4 unit.



ASTM 1003



ISO 13468

Ordering references

Haze-gard Dual

BG4727	Haze-gard Dual

Optional accessories

BG4765	Haze certified standards, set of 5 approx. 1-5-10-20-30%*

Transmittance standards, Film holder, Taber Abraser holder, Cuvette holder, Cuvettes, Portable printer (see Haze - gard Plus)

Standards

ASTM	D 1003, 1044
ISO	13468, 14782

* Individual standards also available upon request

Physical testing

The primary requirement of a surface coating system is to withstand external environmental or physical conditions. Ultimately the coating formulation will depend on its suitability for use in specific applications and in itself be dependant on the quality of the raw materials used and the methods in which it is applied.

In order to simulate real world conditions in a QC or Production environment it is essential that precision test equipment is used to ensure that quality standards are met consistently between each production batch.

Sheen Instruments offer a complete range of products for specific physical testing requirement whether it be for automotive, decorative or industrial applications.

7.0
ABRASION, SCRUB & WASHABILITY

Wet Abrasion Scrub Tester

This machine is widely used to test the resistance of many materials to scrub, abrasion, washing. Paints, varnishes, other coatings and finishing can be applied on various supporting media e.g. plastic, glass, wood, paper, leather etc., and submitted to the accelerated test, by reciprocating brushes, sponges or abrasives on the samples with (or without) reagent depending on methods. When applicable, the machine is fitted with a dosing peristaltic pump. Wearing, loss of gloss, damages or soil removal capability of detergents can be observed with high repeatability and reproducibility.

Features

- ☐ Heavy duty motor, scrub rate 37 ±1 cycles/min.
- ☐ Adjustable stroke length 100 to 300 mm, per 50 mm increments
- ☐ 5-digit preset counter, to max. 99,999 cycles
- ☐ 2-holder carriage to hold brushes, sponges, or abrasives
- ☐ quick release clamping frame to hold samples from 10 x 135 mm to 320 x 470 mm, up to 30 mm thickness
- ☐ Built-in fan cooling to prevent sample heating
- ☐ Peristaltic pump (when applicable), free from reagent contamination
- ☐ Standard delivery: machine complete with 6 mm glass bed, stainless steel collecting tray, reagent container, standard brass shim, when applicable: peristaltic pump, tubing and fitting.
- ☐ 240 V/ 50 Hz or 110 V/ 60 Hz

Ordering references*

The following models are based on a machine equipped with a peristaltic pump and 1 carriage assembly to specified standard. Other carriage assemblies are optionally available, to convert from existing specification to another.

Wet Abrasion Scrub Tester with pump

903	Sheen Standard Wet Scrub Tester carriage assembly with pump with applied load 500 g., 2 natural bristle brushes
903/1	Wet Abrasion Scrub Tester DIN 53778 carriage assembly with pump with applied load 250 g., 2 natural bristle brushes
903/2	Wet Abrasion Scrub Tester ASTM D 2486 carriage assembly with pump with applied load 454 g., 2 nylon brushes, 2 rubber mats, brass shim 12.7 x 0.25 mm
903/3	Wet Abrasion Scrub Tester ASTM D 3450 carriage assembly with pump with applied load 1500 g., 2 sponges
903/4	Wet Abrasion Scrub Tester ASTM D 5213 carriage assembly with pump with applied load 470 g., 2 sponges & 2 pads
903/5	Wet Abrasion Scrub Tester ASTM D 4828 carriage assembly with pump with applied load 1000 g., 2 sponges
903/6	Wet Abrasion Scrub Tester EN12956: dual speed motor, 3 carriage assemblies (No pump): ☐ spongeability: applied load 100 g., 2 sponges ☐ washability: applied load 550 g., 2 felt sheets ☐ scrubbability: applied load 600 g., 2 polyamide bristle brushes
903/7	Wet Abrasion Scrub Tester BS7719 carriage assembly with applied load 130 g., 2 non woven pads backed by sponge
903/8	Wet Abrasion Scrub Tester ISO 11998 / BS 3900 F17: carriage assembly with applied load 135 g., 2 non woven abrasive pads

Optional accessories

903/037/D	Additional weights for ref. 903 (8 x 25 g., 8 x 50 g., 8 x 100 g., 8 x 200 g.) + 4 weight holder

Consumables

903/138/P2	Black plastic panel Cobex, pack of 100
903/050/D	Scrubbing Pads for ref. 903/7, BS7719, pack of 50 – 100 or 200 pcs. Available
903/307/D	Scrubbing Pads for ref. 903/4
903/SM/1	ASTM D3450/4213 Scrub Medium, non-abrasive type, 473 ml (suitable for use with 903/4)
903/SM/2	ASTM D2486/3450 Scrub Medium, abrasive type, 473 ml (suitable for use with 903/2)
903/ST/1	ASTM D3450 Stain Medium, dispersion of carbon black, 118 ml (suitable for use with 903/3)

Replacement brushes & sponges, pads, information is available upon request
*110 V / 60 Hz available on request, please specify when ordering

Washability Tester PG Version

Based on the same principle as of the Wet Scrub Tester above, this model is specially designed for the detergent industry to assess the effects of cleaning agents. The machine is equipped with a 5-speed motor providing 20-25-30-35-37 strokes/min.
A lifting and tilting carriage assembly allows a rotation through 180* of the 4 scrubbing head to facilitate direct application of washing medium. Thus test with 1 or various products can be carried out simultaneously. Carriage easy to remove for cleaning. Weights can be added to scrub heads from 300 to 1000 g. per 100 increments to increase test load. An optional 4-display digital counter totalises the number of strokes for each track. Counting process can be individually stopped with 4 independent buttons, when a track reaches an expected result.

- ☐ 240 V/ 50 Hz or 110 V/ 60 Hz (please specify when ordering)

Ordering references*

Washability Tester PG Version

903/PG	Washability Tester PG Version
903PG/021/S	Counter unit for 903/PG

*110 V / 60 Hz available on request, please specify when ordering

Taber Abraser

This typical machine is useful to evaluate the wear resistance of numerous materials: coatings, textile, leather, rubber, plastic, wood, glass, paper etc. The sample is fastened onto a turntable rotating at constant speed whilst driving 2 abrasive wheels. The results vary according to the load applied and the wheels used. They range from mild to coarse abrasion, and are made of felt, rubber, sand paper, vitrified clay, or tungsten carbide.

Various optional accessories to extend test fields available on request:

- Abrading wheels - Grit Feeder allows specific test by feeding and removing aluminium oxide grit onto the sample.
- Multi-media attachment: recreates wear caused by liquids, fluids and powder, to evaluate abrasivity of materials e.g. paints, pigments, adhesives, pastes, etc.
- Specific specimen holders
- Wheel refacer: to dress the contact surfaces of wheels
- Calibration kit: to verify operating parameters including arm alignment, wheel tracking, vacuum suction force

Ordering references

Taber Abraser - 230/110 V – 50/60 Hz

5135	Taber Abraser, single-head
5155	Taber Abraser, dual-head
5535	Taber Multi-media Abraser, single head
5555	Taber Multi-media rotary Abraser, dual head
5556	Taber Multi-media Abraser, dual head

Standards

Complies to numerous ASTM, CCC, DIN, EN, ISO, JIS, MIL, NF, SAE, SIS, TAPPI, UNE standards.
Please consult with Sheen Instruments, for your rquirements

Taber Linear Abraser

A special machine to evaluate abrasion resistance and related properties of numerous finished products of any shape or size: flat, concave or convex. It is equipped with a reciprocating beam holding a floating head to follow sample contours.
Adjustable stroke length, speed and load, combined with various optional tools for testing abrasion, scratch, coin-scrape or Crocktest extend its application fields.

Ordering references

Taber Linear Abraser - 230/110 V – 50/60 Hz

5750	Taber Linear Abraser

Standards

ASTM	D6279, D2197, D5178
ISO	105/X12

8.0
ADHESION & ELASTICITY

Cross Hatch Cutter

The instrument is widely used to evaluate the adhesion of various coatings. A high precision machined wheel presenting 6 or 11 cutting blades with various spacing is mounted in a handle. The test is carried out by performing 2 series of crossed cuts at right angle. The obtained lattice is either brushed or cleared with adhesive tape. According to the coatings thickness and the related spacing, the results can be classified with reference to a standard scale.

Features

- Long life tool with 8 cutting edges
- Comfortable wood handle
- 5 tool sizes available

Ordering references

Cross Hatch Cutter

750/1	Cross Hatch Cutter, 6 blades, spacing 1 mm (coating thickness 0-60 µm)
750/2	Cross Hatch Cutter, 11 blades, spacing 1 mm (coating thickness 0-60 µm)
750/3	Cross Hatch Cutter, 6 blades, spacing 1.5 mm
750/4	Cross Hatch Cutter, 6 blades, spacing 2 mm (coating thickness 60-120 µm)
750/5	Cross Hatch Cutter, 6 blades, spacing 3 mm (coating thickness 120-250 µm)
750/CK	Accessories kit: carry case, brush, magnifier, tape
750/SP	1 Cross Hatch Cutter (any model, please specify) + kit 750/CK

Standards

ASTM	D3002, 3359
BS DIN EN ISO	2409

Hydraulic Adhesion Tester

This hydraulic pull-off type tester is fitted with a flexible hose, so that test can be performed on difficult to reach area, e.g. internal or external pipe surfaces. A dolly is cemented onto the test surface and after curing pulled-off by rotating the instrument handle.
The test force is displayed on the dial scale, from 0 to 25 MPa / 0-3500 PSI (0-250 bar).

Features

- Highly repeatable test
- Dial reading with peak indicator
- Supplied with carry case, dollies, adhesive, electric cleaning tool

Ordering references

HATE Tester

755/X1003	HATE Adhesion Tester complete
755/1/XA001	Flat dollies (spare, 10 pcs. - minimum order)

Standards

ASTM	D4541
BS	EN 24624
ISO	4624

Cupping Tester

A world reference instrument to efficiently assess the elasticity and cupping resistance of various coatings.
With a new highly functional geared design for linear force transmission it is designed to aid user friendly testing.
A sample panel (max 1.25mm thick x 6” x 4”) with a minimum coating thickness 0.3mm, is clamped by an upper wheel and manually cupped by 20mm circumference hemispherical indenter onto to a 27mm circumference die by a drive wheel.
The depth to cause failure is indicated very accurately on a digital display, from 0 – 20mm , in increments of 0.01mm.
An illuminated magnifier provides easy visual inspection.

Features

Precision Gearbox provides linear force transmission
Two handled crank for ease of operation
14 crank revolutions = 1mm ball travel
Magnetically retained 20mm Chrome Steel Ball
LCD display with zero, 20.00 to 2 decimal places.
Resolution : 0.001mm , Accuracy +/- 0.005mm

Ordering Reference

760N	Cupping Tester Complete (New Design)

Standards

BS EN ISO	1530

9.0
APPLICATION OF FILM

Automatic Film Applicator

The Automatic Film Applicators are made with high precision machined components, sturdy mainframe and heavy duty power train assembly, to ensure long term reliable operation. Consistent drawdown conditions such as speed, flatness, combined with applicator gap and geometry are essential to obtain perfectly reproducible samples, thus eliminating human error and uncertainty.

Features (all models)

- ☐ Standard wire bar coater attachment for all models
- ☐ Precision-controlled beam for use with all types of applicator
- ☐ Constant applied downward force
- ☐ Adjustable speed from 50 to 500 mm/s, per 10 mm/s. increments.
- ☐ Soft touch keyboard with large LED display
- ☐ 2 or 4 speed pre-selections allow custom speed memory.
- ☐ Countdown timer for speed >200 mm/s.
- ☐ Emergency stop & safety clutch

3 models available:

Large bed – vacuum type:

- ☐ Built-in vacuum pump, to maintain perfectly flat test samples
- ☐ High precision perforated aluminium bed with 2-size application areas:
  A3 (420 x 300 mm) or A4 (180 x 255 mm)
  with pump switch for automatic surface recognition
- ☐ Stroke length 350 or 180 mm
- ☐ 2 programmable pre-set speed memory
- ☐ Removable bed for easy maintenance & cleaning
- ☐ Can be used with any applicator, and 320 mm wire bar coater (ref. 1140/32, page 28)
- ☐ Ext. WxHxD = 632 x 500 x 220 mm

Large bed – glass type

- ☐ Spring released clip for easy sample fastening
- ☐ High precision glass bed for easy maintenance
- ☐ Max. test panel size: 420 x 300 mm
- ☐ 3 programmable pre-set speed memory
- ☐ Stroke length 350 mm
- ☐ Can be used with any applicator, and 320 mm wire bar coater (ref. 1140/32, page 28)
- ☐ Ext. WxHxD = 632 x 500 x 220 mm

Small bed – rubber mat

- ☐ Economy version, 250 x 195 mm application area
- ☐ High quality rubber mat with clip for smooth application
- ☐ 4 pre-set speed memory
- ☐ Stroke length 240 mm
- ☐ Can be used with almost applicators, and 180 mm wire bar coater (ref. 1140/18, page 28)
- ☐ Ext. W x H x D = 565 x 200 x 310

Ordering references

Automatic Film Applicator

1132N	Standard machine with glass bed
1133N	Standard machine with vacuum bed
1137	Smaller size machine

Standards

ASTM	D823 / C

Film Applicators

The applicators are high precision machined, individually calibrated and finished to meet the quality requirements of the coatings industry. They provide perfect film drawdowns and guarantee the most reliable sample preparation, essential for all testing purposes. Suitable for application on hiding charts or any sufficiently rigid support presenting flat and smooth surface, they can be used on glass or flat metal panels. All applicator blades are made of stainless steel. Available with standard or custom made gap sizes.

Standards

ASTM	D823

Bird applicators

A compact, easy to clean and handy mono-gap unit for intensive daily operations. The prismatic shape accommodates a wide variety of materials without applying excessive shear. Available in 2 film width as standard: 50 or 75 mm.

Ordering references *

Bird Applicator

1100/50	Bird Applicator, 50 mm film width, gap size to 200 µm
1100/75	Bird Applicator, 75 mm film width, gap size to 200 µm
1100/A	Bird Applicator, 50 mm film width, gap size 201-2000 µm

*please specify gap size when ordering
Other width & gap size available upon request

Bar applicator

Similar to the Bird applicator, this version is fitted with 2 (removable) guides and can be used with 100 mm wide test panels. For reliable repetitive drawdowns.
Standard film width 90 mm.

Ordering references

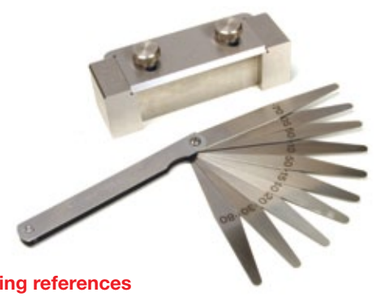
Bar Applicator

1101/90/25	Bar Applicator 90 mm film width, 25 µm gap size
1101/90/50	Bar Applicator 90 mm film width, 50 µm gap size
1101/90/75	Bar Applicator 90 mm film width, 75 µm gap size
1101/90/100	Bar Applicator 90 mm film width, 100 µm gap size
1101/90/150	Bar Applicator 90 mm film width, 150 µm gap size
1101/90/200	Bar Applicator 90 mm film width, 200 µm gap size
1101/90/250	Bar Applicator 90 mm film width, 250 µm gap size
1101/A	Bar Applicator other film width, other gap size *

*please specify film width & gap size when ordering

Adjustable film applicator

This rugged applicator is fitted with a bevelled blade, adjustable by means of 2 knurled screws, from 0 to 6000 µm. The reduced shear effect provides close to gap initial wet film thickness. Standard film width 76 mm.
Supplied with a set of shims: 3200 µm total thickness.



Ordering references

1102	Adjustable Film Applicator including shims

Cube applicator

This small applicator is available with 16 or 45 mm film width (overall width respectively 25 and 50 mm). It has 2 gap sizes, machined into each application face. Ideal for application of parallel film stripes. 25mm recommended for use in conjunction with BK drying time recorder (see page 39 and MFFT Bar page 49)

Ordering references

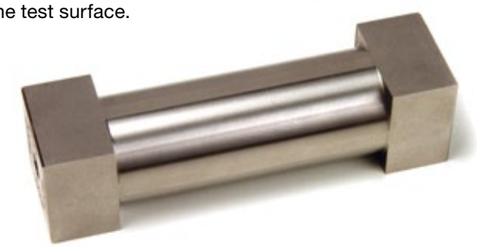
Cube Applicator

1103	25 mm Cube Film Applicator 37/75 µm
1103/A	25 mm Cube Film Applicator - special sizes*
1104/1	50 mm Cube Film Applicator 50/100 µm
1104/2	50 mm Cube Film Applicator 150/200 µm
1104/A	50 mm Cube Film Applicator - special sizes*

*please specify gap size when ordering

Four sided applicators

A flexible and easy to use applicator, combining 4 gaps sizes in one unit. The cylindrical shape provides excellent results particularly on firm substrates and smooth surfaces. By simply rotating through 90*, the next gap size is placed onto the test surface.



Ordering references

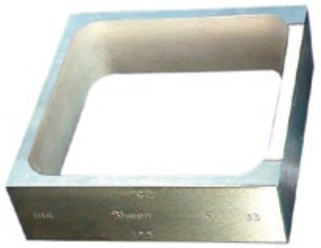
4-sided Applicator

1107/60/1	4-sided Applicator 60 mm film width, 30-60-90-120 µm gap sizes
1107/60/2	4-sided Applicator 60 mm film width 50-100-150-200 µm gap sizes
1107/60/A	4-sided Applicator 60 mm film width max. 300 µm gap sizes *
1107/80/1	4-sided Applicator 80 mm film width 30-60-90-120 µm gap sizes
1107/80/2	4-sided Applicator 80 mm film width 50-100-150-200 µm gap sizes
1107/80/A	4-sided Applicator 80 mm film width max. 300 µm gap sizes*
1107/A	4-sided Applicator othe r widths & gap sizes*

*please specify gap size when ordering

Multifilm applicator

This versatile applicator offers in one unit 8 gap sizes: 25-50-75-100-125-150-175-200 µm and 76 mm film width. Simply position the applicator with the selected film thickness, put the sample in the centre, and apply as usual.



Ordering references

Multifilm Applicator

1114	Multifilm Applicator, 8 gap sizes

Micrometer adjustable applicators

The blade of this applicator can be accurately adjusted by means of 2 micrometric screws, from 0 to 8 mm, in 10 µm increment. Suitable for various precision tests, e.g. research tasks. 5 film widths available, from 100 to 300 mm.

Ordering references

Micrometer Adjustable Applicator

1117/100	Micrometer Adjustable Applicator, 100 mm wide
1117/150	Micrometer Adjustable Applicator, 150 mm wide
1117/200	Micrometer Adjustable Applicator, 200 mm wide
1117/250	Micrometer Adjustable Applicator, 250 mm wide
1117/300	Micrometer Adjustable Applicator, 300 mm wide
1117/A	Micrometer Adjustable Applicator, special sizes*

*please specify gap size when ordering

Wire bar coaters

These wired bars are ideal for application of paints, inks and similar coatings onto flexible materials such as paper, test charts, textiles, leather et. The grooves between the wire coils determine the applied thickness. As the material levels an uniform film thickness is obtained.

- ☐ 3 film widths available: 18-25-32 cm, each offering various film thicknesses: 10-16-26-36-50-76-100-128-150-200 µm.
- ☐ For Manual drawdown: 2 bar sizes can be used with a rubber impression bed for enhanced accuracy.
  - ☐ 18 cm bar with small impression bed, 11 x 18 cm
  - ☐ 25 cm bar with large impression bed, 22 x 34 cm
- ☐ For perfect sample results, 2 bar sizes can be used with the automatic film applicator (see page 26):
  - ☐ 18 cm for small bed machine ref. 1137
  - ☐ 32 cm for large bed machines ref. 1133N or 1132N

Ordering references*

Wire Bar Coater

1120/18/10…200*	Wire Bar Coater, 18 cm film width, wet film 10-16-26-36-50-76-100-128-150 or 200 µm.
1120/18/A	Wire Bar Coater, 18 cm film width, special sizes
1120/25/10…200*	Wire Bar Coater, 25 cm film width Wet film 10-16-26-36-50-76-100-128-150 or 200 µm.
1120/25/A	Wire Bar Coater, 25 cm film width, special sizes
1140/32/10…200*	Wire Bar Coater, 32 cm film width wet film 10-16-26-36-50-76-100-128-150 or 200 µm.
1140/32/A	Wire Bar Coater, 32 cm film width, special sizes

Impression bed

1120/18/IMP	Small Impression bed
1120/25/IMP	Large Impression bed

*please specify wet film when ordering

Sag index applicators

This applicator is specially designed for sag resistance evaluation. Within a film width of 90 cm, 10 gaps are machined with progressive thickness in increments of 25 µm, providing parallel coatings tracks on the sample. The test panel is held vertically with the thickest at the bottom, after application. The sag index can be determined by the first track which does not sag onto the next track below. The step interval of each track indicates a sag of 25%.

Ordering references

Sag Index Applicator

1108/275	Sag Index Applicator, size 50-275 µm
1108/475	Sag Index Applicator, size 250-475 µm
1108/675	Sag Index Applicator, size 450-675 µm
1108/A	Sag Index Applicator, special sizes

Sagging & levelling tester

This applicator allows both sag and levelling evaluations. Sag test can be performed same as with 1108 above, but with gaps from 75 to 300 µm. Levelling test is carried out by applying 5 pair of coating stripes with increased thickness of 100-200-300-500-1000 µm. After drying, the coating is deemed to show good levelling if the gap between the film is very small.

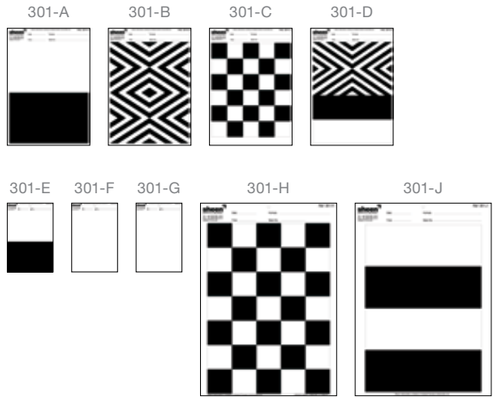
Ordering references

Sagging & levelling tester

1118	Sagging & levelling tester

Hiding Power Charts

These test charts, available in a variety of sizes and patterns, meet the requirements of the most popular tests such as hiding power, contrast ratio, colour etc. of paints, inks and coatings. They are constructed of high quality card which is UV cured. The coated version is sealed with solvent resistant lacquer, and maybe used with the majority of coating materials. The uncoated (penetration) charts are recommended for use with water based emulsion paints. Customised charts made to your specification are also available upon request. (Min. quantity 5000 pcs.)



Ordering references

Hiding Power Charts

Coated - 1000/pack

301A	Coated, 250 x 180 mm
301B	Coated, 250 x 180 mm
301C	Coated, 250 x 180 mm
301D	Coated, 250 x 180 mm
301E	Coated, 150 x 100 mm
301F	Coated, 150 x 100 mm
301H	Coated, 420 x 300 mm
301J	Coated, 420 x 300 mm
301K	Coated, 420 x 300 mm
301L	Coated, 185 x 75 mm
301/2A	Coated, 255 x 140 mm

Uncoated - 1000/pack (min. qty 500)

301AU	Uncoated penetration charts, 150 x 100 mm
301EU	Uncoated penetration charts, 150 x 100 mm
301G	Uncoated penetration charts, 150 x 100 mm
301JU	Uncoated penetration charts, 420 x 300 mm
301/2AU	Uncoated penetration charts, 255 x 140 mm

Polyester sheets

1136	Polyster sheets, 230 x 115 mm, 50 µm thick, comply to ISO 6504.3

Filmfuge Applicators

Centrifugal applicators provide perfectly reliable spin-coated samples. Complementary to conventional techniques, this method offers efficiency and flexibility to daily sample preparation process. Just fix a panel onto the turntable, pour a known volume of coating onto the centre, close the lid and start the unit. The centrifugal force creates an uniform coating. The thickness is determined by the rotational speed, nature of the product and type of panel.
Fully progammable operating parameters, ease of use and high safety makes this apparatus a must in all laboratories.

2 available models fulfil most sample size requirements:
- ☐ 1110N: for small panel 100 x 150 mm, overall dimensions 200 x 210 x 380 mm
- ☐ 1112N: for large panel 300 x 300 mm, overall dimensions 200 x 550 x 620 mm

Features

- ☐ Programmable parameters:
  - time: 10 s. to 150 min, in 10 s. increments
  - speed: 250 – 2500 rpm, in 10 rpm increments
- ☐ LCD display: preset speed & remaining time, actual speed during operation
- ☐ Safe use: automatic lock of the lid during operation, emergency stop button
- ☐ Easy to clean: removable aluminium turntable and collecting tray.
- ☐ 90 – 254 V, 50/60 Hz (dual voltage)

Ordering references

Filmfuge Applicator

1110N	Small Filmfuge – Centrifugal Film Applicator
1112N	Large Filmfuge – Centrifugal Film Applicator

Pneumatic Panel Sprayer

This fully air-operated automatic spraying system has been developed in association with world major paint manufacturers to produce perfectly reproducible sprayed samples. The panel constant quality is absolutely essential for reliable testing and evaluation - notably in the field of colour, gloss, appearance and physical properties - of high performance coatings such as metallic, perlescent or similar products.
The machine applies a coating onto various types of substrate, according to programmed settings. As a result panels are coated with consistent properties and strict control of parameters such as atomisation, flow, thickness, uniformity, film build, drying etc., impossible to achieve with manual process.

Features

- ☐ Easy to operate, with emergency & reset button
- ☐ All functions & movements are air-operated: suitable for use in hazardous environment
- ☐ Suitable for all spray booths in Automotive, Aerospace, Industrial or Protective coatings industries
- ☐ Stainless steel mainframe, heavy-duty components & sturdy construction
- ☐ Easy access to internal parts/mechanism for simplified service & cleaning
- ☐ Compliance with ASTM D823/A

Panel sprayer selection chart

3 models available, to fulfil most panel production requirements

Functions/model	4500N	4700N	4800N
Standard adjustable spray variables			
- gun to panel distance (xx-xx mm)	■	■	■
- gun traverse speed (mm/s)		20-1000	
- fixed spray stroke preset (mm)	400	300 and 500	
- adjustable spray stroke (mm)			300–700
- panel lift increment (mm)	40 and 50	40,50,60 & 70	
- 1 flash-off timer (minutes, between coats)	0-10		
- 2 flash-off timer (minutes, between coats)	0-10, gun 1 & 2		
- 1 auto flash-off timer (minutes)			0-10, auto change gun 1 to 2
- coats counter (adjustable 1-9999)	1	1	2
- passes counter (adjustable 1-9999)	1	1	1
- spray pressure		0-5.5 bar	
- manual control		spray ON/OFF, traverse, lift	
Magnetic panel holder	■	■	■
Spray gun(s) facility	1	2, manual change	2, manual & auto change
Spray area, max. with 1 gun (mm)	350 x 500	500 x 500	700 x 600
Number of panels (10 x 15 cm)	4	8	15 (1 gun) 12 (2 guns)
Optional functions			
- vacuum holder for non-ferrous panel, with individual quick release	■	■	■
- dwell timer, providing delay between each passes, adjustable 10 s. – 10 min.	■	■	■
- digital traverse time display, for precision stroke speed calculation (in/s. or mm/s.)	■	■	■
- filtered air drying unit, to reduce drying time	■	■	■
- wedge coat control, to spray 1, 2, 3 coats on different zones of a same panel	■	■	■
- number of option(s) above selectable	1	2	2

STANDARDS ASTM D823/A

Ordering references

	PANEL SPRAYER
4500N	Small Automatic Panel Sprayer, single gun facility
4700N	Medium Automatic Panel Sprayer, twin gun facility, 2 flash-off timers, 1 coat counter
4800N	Large Automatic Panel Sprayer, twin gun facility, 3 flash-off timers, 2 coat counters, adjustable spray width

Optional equipment		4500N	4700N	4800N
4500N/ADU	Air drying unit	■	☐	☐
4500N/VPH	Vacuum panel holder	■	☐	☐
4500N/DTV	Digital traverse time, including sensors	■	☐	☐
4700N/ADU	Air drying unit	☐	■	☐
4700N/DTV	Vacuum panel holder	☐	■	☐
4700N/DWT	Dwell timer assembly	■	■	☐
4700/1/WEC3-step	Wedge coat controller	■	■	■
4700/2/WEC4-step	Wedge coat controller	■	■	■
4800N/ADU	Air drying unit	☐	☐	■
4800N/VPH	Vacuum panel holder	☐	☐	■
4800N/DWT	Dwell timer assembly	☐	☐	■
4800N/DTV	Digital traverse timer, including sensors	☐	☐	■

10.0
CORROSION

Sheen delivers dramatic improvements in corrosion testing.

Fogmaster, 120 Litre

Fogmaster Corrosion Test Cabinets

An impressive range of corrosion test cabinets able to accelerate the harsh effects of humidity, salt spray, condensation and air drying underlines Sheen's position as the leading name in this type of testing technology.

Dimensions / Capacity

120-litre bench top model ref;	FMS120	FMSP120	FMC120
Internal w x d x h	715 x 490 x 490 mm		
External w x d x h	1315 x 680 x 800 mm		
Sample racks & max test panel (100 x 150 mm) capacity	4 removable racks, each with 24 x 15° angled test panel slots		
450-litre floor standing model ref;	**FMS450**	**FMSP450**	**FMC450**
Internal w x d x h	800 x 645 x 835 mm		
External w x d x h	1530 x 930 x 1055 mm		
Sample racks & max test panel (100 x 150 mm) capacity	6 removable racks, each with 31 x 15° angled test panel slots		
1000-litre floor standing model ref;	**FMS1000**	**FMSP1000**	**FMC1000**
Internal w x d x h	1250 x 935 x 1175 mm		
External w x d x h	2125 x 1200 x 1400 mm		
Sample racks & max test panel (100 x 150 mm) capacity	8 removable racks, each with 44 x 15° angled test panel slots		
Power/Air/Water Supply			
Power – FMS/FMSP120/450/1000 & FMC120	200-240VAC/Single Phase, Neutral & Earth		
Power – FMC450/1000	380-440VAC/3 Phase, Neutral & Earth		
Clean air	1.4–6.0 bar / 20–87 psi		
Deionised or distilled water	0.5-6.0 bar / 7.3-87 psi		

Control panel, model 450/1000 litre

Cabinet internal, model 450/1000 litre

Fogmaster Salt Spray Cabinets

These can be used to expose test samples to a salt spray climate, at user adjustable temperatures.
This type of test is most often used to check the effectiveness of a manufacturing process, such as the application of a surface coating. By exposing samples taken from such a process, to the controlled corrosive atmosphere created inside a salt spray cabinet, it can be determined whether or not the process is meeting expectations, in terms of corrosion resistance.
This type of corrosion test is known variously as 'salt spray testing', 'salt fog testing' or 'salt mist testing'. For all practical purposes all these terms are equivalent and mean the same.

Two model derivatives are offered;

1. Fogmaster Salt – salt spray cabinets capable of most types of 'continuous' salt spray testing, in accordance with the requirements of international test standards (see following table for details). These cabinets are designated with the model prefix; FMS.
2. Fogmaster Salt Pro – high specification salt spray cabinets, which as well as being capable of 'continuous' salt spray testing, can also create high or low humidity climates, and if required, can be programmed by the user to cycle between these conditions, automatically. All such testing can be conducted in accordance with a wide range of international corrosion test standards (see following table for details). These cabinets are designated with the model prefix; FMSP.

Fogmaster Cyclic Corrosion Test (CCT) Cabinets

These can be used to expose test samples to a variety of corrosive climates, as follows;

1. Condensation Humidity
2. Salt Spray
3. Air Drying
4. Controlled Humidity (optional accessory)

These climates can be created at user adjustable temperatures and times, and be programmed to occur in any sequence, to form a corrosion 'cycle' – hence the product name. These test cycles can then be repeated automatically, as required.
CCT cabinets are popular because of their flexibility in being able to do everything a conventional humidity cabinet and salt spray cabinet can do, but also their ability to undertake complex corrosion test cycles as well. Such corrosion test cycles have been shown to bring about the type of corrosion failure that can occur under natural exposure conditions, making this type of test a popular choice for predicting 'real – world' service life expectancy, for many types of product and surface coating.
Sheen Fogmaster Cyclic Cabinets are designated with the model prefix; FMC.

Model No. FMS 1000

Control panel detail, model 120 litre

Internal rack detail, model 120 litre

Design features for Fogmaster cabinets

- ☐ **Interior viewing window** – for visual access to the cabinet interior and samples under test.
- ☐ **Digital display** – for accurate setting and monitoring of the test conditions.
- ☐ **Hours run counter** – for continuous logging of the elapsed test time.
- ☐ **Set of Slotted sample racks** – for supporting test panels inside the cabinet (may also be used for supporting other test items, if required).
- ☐ **Automatic test stop facility** – to automatically stop a test after a user adjustable period of time.
- ☐ **Spares Kit** – selection of spare parts required for routine maintenance of the cabinet.
- ☐ **Optional Accessories** – a wide choice to enable users to customise cabinets to their exact requirements.

Fogmaster Salt Models

- ☐ Air Purge – for safely venting the cabinet atmosphere prior to opening.
- ☐ Automatic & Manual filling air saturator – to suit situations with or without a permanent pressurised water supply, for flexibility of installation,
- ☐ Peristaltic pump & flowmeter – for precise dosing of the cabinet with salt salt water, for consistent and controlled salt spray fall-out.
- ☐ Separate Salt Solution Reservoir with Low Level Alarm – for ease of filling and monitoring the salt solution, and keeping the reservoir clean.

Fogmaster Salt Pro Models

- ☐ Same as Fogmaster Salt Models, plus;
- ☐ Touch Screen Operator Interface – for ease of programming and monitoring of the test conditions.
- ☐ On-screen logging of cabinet temperature and humidity – to enable the user to review what has happened during any periods of unattended testing
- ☐ Pneumatic opening/closing roof – roof opens/closes at the touch of a button, for ease of use.
- ☐ Humidity Sensor – for display (only) of the %RH inside the cabinet.

Fogmaster Cyclic Models

- ☐ Same as Fogmaster Salt Pro Models, plus;
- ☐ Multiple modes of operation – salt spray, air drying & high humidity, for compliance with international CCT standards
- ☐ Programmable Control System – for automatic cycling of the various modes of operation, and temperature set-points, with unattended operation.
- ☐ Digital Signal Output – for logging the cabinet temperature and humidity, at a remote computer, running the optional logging software.
- ☐ Controlled humidity – in addition to being displayed, the desired %RH can also be programmed and controlled, as an optional accessory.

Specifications & Selection table

		Salt	Salt Pro	Cyclic (CCT)
Test type				
Salt Spray (continuous spraying - ambient up to +50C)		■	■	■
ASS/CASS (continuous spraying - ambient up to +50C)		■	■	■
Prohesion (spray at ambient, dry at +35C)		□	■	■
SWAAT/Intermittent (spray at +49C, wetting at +49C)		□	■	■
Temp. Control Air Flush; (air flush/drying - ambient up to +35C)		□	■	■
Temp. Control Air Flush; (fresh/warm air drying - ambient up to +60C)		□	□	■
Cyclic/CCT (multi-modes of operation - ambient up to +60C max)		□	□	■
Controlled Humidity (up to 95% at cabinet temps up to +60C max)		□	□	■
Condensation Humidity/Wetting (constant 95-100% RH, ambient +10C up to +50C)		□	■	■
Performance				
Cabinet temperature, adjustable ambient up to +50C		■	■	■
Cabinet temperature, adjustable ambient +10C up to +55C		□	□	□
Cabinet temperature, adjustable ambient up to +60C		□	□	■
Air Saturator Temperature, adjustable ambient up to +63C		■	■	■
2 set point temperature cycling		□	■	□
>2 set point temperature cycling, with programmable rates of change		□	□	■
Automatic test cycle repeat		□	■	■
Display: cabinet temperature/run time		□	□	□
Display; cabinet temp./saturator temp/pump speed/run time		■	□	□
Display; cabinet temp./saturator temp/pump speed/run time programmes/steps/%RH		□	■	■
Temp./RH logging, 72 h.		□	■	■
Alarms; low salt solution, low saturator water, over-temperature		■	■	■
Standard Equipment				
Sample racks		■	■	■
Air Pressure gauge + regulator		■	■	■
Peristaltic pump + flow meter		■	■	■
Alpha-numeric digital display		■	□	□
Touch-screen, fully pixilated, graphical display		□	■	■
Pneumatic roof		□	■	■
Saturator automatic & manual filling		■	■	■
Digital comms output		□	□	■
Integral 40-litre salt solution reservoir (for 120 l. unit)		■	■	■
External 100-litre salt solution reservoir (for 450 & 1000 l. units)		■	■	■
Optional Accessories				
Additional 100 litre salt spray reservoir	FM101	■	■	■
Temp. chart recorder	FM102	■	■	■
Independant temperature sensor PT100	FM103	■	■	■
Entry port 35mm, sealable	FM104	■	■	■
Water auto-fill for humidity cabinets	FM105	□	□	□
Trolley for 120 litre bench top cabinet	FM106	■	■	■
Internal light	FM107	■	■	■
Additional Spares kit – Salt Spray/CCT Cabinet (1 supplied as standard)	FM109	■	■	■
Reinforced false floor (for large/heavy samples) / 120 litre unit	FM110	■	■	■
Reinforced false floor (for large/heavy samples) / 450 litre unit	FM111	■	■	■
Reinforced false floor (for large/heavy samples) / 1000 litre unit	FM112	■	■	■
Controlled humidity device for CCT cabinets (adjustable up to 95%RH – subject to test temperature)	FM113	□	□	■
Temp. & RH chart recorder	FM114	□	■	■
Cabinet wall-wash	FM115	□	□	■
Logging software for CCT cabinets	FM116	□	□	■

■ standard features ■ available options

Solarmaster weathering cabinets

The Solarmaster cabinets are designed to simulate sun & rain weathering conditions. The accelerated tests according to various standards are performed by exposure to filtered Xenon light. This method efficiently helps to evaluate the damages caused by sunlight spectrum, beyond the scope of UV. The use of different UV & IR cut-off filters allow the test samples to be irradiated with specific spectral distribution.

Combined with an optional water flooding system, this test method provides comprehensive information on the material ageing process under realistic conditions.

2 versions, combined with 2 volumes are available:

- ☐ SOLARMASTER 1500 or 3000
- ☐ SOLARMASTER 1500E or 3000E

Common Features

- ☐ Air cooled Xenon lamp, easy to replace
- ☐ Adjustment & control of irradiance level
- ☐ Standard 280 nm filter as outdoor exposure
- ☐ Timer up to 999 h. & total hour counter
- ☐ Low maintenance, removable & easy to clean sample tray

Solarmaster model: 1500

Solarmaster model: 3000

Solarmaster selection chart

Solarmaster model		**1500**	**1500E**	**3000**	**3000E**
Standard Specifications	Ordering Ref.	SM1500	SM1500E	SM3000	SM300E
Air-cooled Xenon lamp		1500 W		2500 W	
Variable irradiance		up to 1000 W/m² (290-800 nm)			
Exposure area (mm)		200 x 280		200 x 480	
Sample (15 x 30 mm) capacity		120		180	
Manual irradiance adjustment		■	☐	■	☐
Timer 0-999 h.		■	☐	■	☐
Microprocessor control, 4-line display		☐	■	☐	■
Programming memory for 15 test standards		☐	■	☐	■
Temperature control up to 100°C, BST		☐	■	☐	■
Display of current temperature, BST		☐	■	☐	■
Display of irradiance level		☐	■	☐	■
RS232 output		☐	■	☐	■
UV 280 nm filter		■	■	■	■
Options					
UV filter 280 nm to simulate outdoor exposure		SM1500/1	SM1500E/1	SM3000/1	SM3000E/1
UV filter to simulate outdoor exposure		SM1500/2	SM1500E/2	SM3000/2	SM3000E/2
UV filter to simulate indoor exposure		SM1500/3	SM1500E/3	SM3000/3	SM3000E/3
UV/IR filter to simulate outdoor exposure		SM1500/4	SM1500E/4	SM3000/4	SM3000E/4
UV/IR filter to simulate indoor exposure		SM1500/5	SM1500E/5	SM3000/5	SM3000E/5
Flooding system (cyclic sample immersion)			SM1500E/6		SM3000E/6
Flooding system with water temperature control			SM1500E/7		SM3000E/7
Test chamber humidity & temperature display			SM1500E/8		SM3000E/8
Power supply		230 V – 50/60 Hz, 1N/PE			

11.0 DEFORMATION

Conical Mandrel Bend Tester

A practical unit to test the elasticity and elongation of various coatings. The sample panel is clamped and bent by rotation of the roller frame onto the 200 mm length x Ø3 ~ 37 mm conical mandrel. This allows easy identification in a single operation the coating failure at specified diameter, over part or entire mandrel length.

Features

- ☐ Sturdy construction
- ☐ Long service life mandrel

Ordering references

Conical Mandrel Bend Tester

801	Conical Mandrel Tester complete

Standards

ASTM	D522, D1737
BS	3900 E11
DIN	53150, 66669
ISO	6860

Cylindrical Mandrel Bending Tester

The test is carried out by bending the coated sample panel around mandrels of different diameters until damage occurs. Procedures can be based on pass/fail or diameter to failure methods.

Features

- ☐ Max. panel size: 50 mm width x 1 mm thick
- ☐ Robust stainless steel mandrels, easy to install in seconds
- ☐ Sturdy pre-drilled frame ready to secure on workbench

Ordering references

Cylindrical Mandrel Tester

809	Cylindrical Mandrel Tester DIN/ISO/NF: set of mandrels 2-3-4-5-6-8-10-12-16-20-25-35 mm
809A	Cylindrical Mandrel Tester ASTM: set of mandrels 1/8 - ¼ - 3/8 – ½ - ¾ - 1 inch

Standards

ASTM	D522
DIN	53152
EN ISO	1519
NF	30-040
SIS	184174

Tubular Impact Tester

The falling weight method provides reliable evaluation of the coatings resistance to impact.
A mass (with or without indenter, depending on standards) guided by a graduated tube, falls from variable heights up to 1 m onto the sample panel firmly clamped onto a die. The pass/fail height or force to failure can be determined on the tube scale. 3 versions are available, according to various standards.

Features

- ☐ Sturdy construction & heavy duty frame/base
- ☐ Easy clamping & depth adjustment (DIN EN ISO)

Ordering references*

Tubular Impact Tester

806/25	Tubular Impact Tester, ASTM D2794, 25": falling weight 2 lbs. (8.9 N), height 25" (63.6 cm), Ø indenter 0.625" (15.9 mm), die 0.640" (16.3 mm) with weight locking collar
806/40	Tubular Impact Tester, ASTM D2794 / BS 6496, 40":falling weight 4 lbs.(17.8 N), height 40" (101.7 cm), Ø indenter 0.625" (15.9 mm), die 0.640" (16.3 mm) with weight locking collar
807	Tubular Impact Tester, BS 3900 E13 / DIN 55669 / DIN EN ISO 6272: falling mass 1 kg, height 1 m, Ø indenter 20 mm / die 27 mm, fitted with depth adjustment ring and height adjustable weight locking collar (11 mm increment)

* Other ø indenters, dies & weights available upon request

Standards

ASTM	D2794
ISO	6272

12.0
DISPERSION

Laboratory Disperser

The laboratory mixer Dispermaster S2 is fitted with a robust air-cooled motor to efficiently perform most dispersing & mixing tasks, up to 2 litre. The power chain is mounted onto a sturdy aluninium stand, equipped with safety switch and counter-weight, to ensure secured and smooth displacement. The PID controller constantly maintains the dispersing speed, independent from the sample viscosity.

Features

- ☐ Speed range: 0 – 9999 rpm, PID controlled
- ☐ Safety switch at high position & vessel detection, emergency switch.
- ☐ Adjustable countdown timer 0 – 99 min. LCD display.
- ☐ Quiet & stable operation, 230V / 50 Hz
- ☐ Standard delivery: Dispermaster, 1 crown dispersing disc 40 mm.
- ☐ Options: crown discs 30 or 50 mm, 1 or 2 litre stainless steel vessel

Ordering reference

Laboratory Disperser

495	Dispermaster S2, Laboratory Disperser 2-litre
495/1	30mm Dispersing Disc
495/2	50mm Dispersing Disc
495/3	60mm Dispersing Disc
495/4	1L Capacity Dispersing Vessel
495/5	2L Capacity Dispersing Vessel
495/6	500ml Capacity Dispersing Vessel

13.0
DRYING TIME

Drying Time Recorder

A reliable apparatus to test the drying time or gelation behaviour of many paints and coatings, applied onto a glass strip of 300 x 25 mm (12” x 1”) by means of our cube applicator.
Hemispherical needles travel on these test tracks, over a selected time: 6, 12 or 24 h.
The drying time stages can be easily assessed with the graduation scale (according to traverse speed configuration):
1. evaporation of solvent: deep pear-shaped impression
2. sol-gel transition: continuous track
3. surface dry: interrupted track
4. final dry time, the needle no longer penetrates the film

Features

- ☐ 3 standard models available:
  - BK3: 6 tracks, 3 selectable speeds: 6, 12 or 24 h.
  - BK6: 6 tracks, each pair of tracks is driven by an independent motor, this allows different test start times. 1 speed: 12 h.
  - BK10: 10 tracks, same as BK6, 1 speed: 12 h.
- ☐ Special speed combinations with 6, 12, 24, and 48 h. also possible, to be specified when ordering
- ☐ Optional 6 x 5 g. brass weights to increase test pressure
- ☐ Simple maintenance & easy to clean
- ☐ Standard delivery: recorder, set of 6 (or 10) needles, pack of 6 (10) glass strips
- ☐ 240 V/50 Hz or 110 V/60 Hz*

Ordering references*

Drying Time Recorder (240 V/ 50 Hz)

BK3	Drying Time Recorder
BK3 SV	Drying Time Recorder, any other motor
BK6	Drying Time Recorder
BK6 SV	Drying Time Recorder, any other motor
BK10	Drying Time Recorder
BK10 SV	Drying Time Recorder, any other motor

Optional accessories

1103	Standard 25mm cube applicator, gap sizes 37 & 75µm
BK/CG	Castor guide
BK3/BW	Set of 6 x 5 g. brass weights
BK/GS	Additional glass strips (pack of 12)

*Please specify when ordering: custom speeds, 110 V if required, or optional accessories.

Standards

ASTM	D5895/A

Payne - Permeability Cup

This simple instrument allows reliable measurement of permeability to moisture of paints or similar coatings.
It consists of aluminium cup, a ring and a screw cap. After drying, a coated permeable backing material is cut out to form a disc and tightened by the cap/disc assembly onto the cup, containing 5 cm³ of distilled water. The whole is weighed to 0.1 mg and placed into a dessicator at 38°C. Periodic weighing every 24 hours indicates the loss of water that has permeated through the film. It is recommended to run the test in triplicate, due to film imperfections.

Features

- ☐ Precision machining ensures exposure area / total film ratio of 0.4:1
- ☐ Exposure surface : 10 cm² or 25 cm²
- ☐ High grade anodized aluminium

Ordering references

Payne Cup

1003	Payne cup, nominal mass 50 g, 10 cm²
1003/3	Set of 3 Payne cups 1003
1003A	Payne cup, nominal mass 250 g, 25 cm² - ASTM
1003A/3	Set of 3 Payne cups 1003A - ASTM

Standards

ASTM	D1653
ISO	7783/1

14.0
TEMPERATURE, PH, CONDUCTIVITY

Pocket Thermometer HI-151

A handy thermometer, with integral probe. Automatic switch ON when probe is fold-out, and OFF when fold-in. Automatic calibration and battery check. Suitable for field and lab use.

Features

- Range: -50.0° to 220.0° C, 0.1° C resolution (<199.9° C), 1° C (>200° C)
- Accuracy @20° C: ±0.4° C, ±1 digit
- Standard delivery: thermometer, 1 x 1.5V AA batteries

Ordering reference

Pocket Thermometer

HI-151	Pocket Thermometer

Conductivity Meter LC2

This conductivity meter has been developed in co-operation with the VDA, Association of German Automotive Industry. Its tube electrode concentric geometry and stainless steel polished surface is specially designed for measuring the specific resistance of solvent based paints, to determine their application and performance. The measurement is performed by dipping the cell into the test sample. The reciprocal value of the resistance related to the cell constant indicates the conductivity.

Features

- Easy to clean 2-co mponent electrode
- Solvent resistant housing, dedicated to solvent environment
- Powered by a 9 V battery

Performance

- Range: 50 kΩ – 19.99 MΩ, measuring voltage 15 V (AC/DC)
- Cell length 380 mm, 50 mm, contant C=7.55 x 10-3 cm-1

Ordering reference

Conductivity Meter

BG1722	Heavy Duty Conductivity Meter (probe not included)
BG1710	Conductivity Electrode (probe)

Standards

ASTM	D5682
DIN	55667

Pocket Conductivity Meter HI-98311

This pocket EC/TDS meter features automatic temperature compensation / calibration, user adjustable conversion and temperature coefficient factors, replaceable graphite electrode resistant to salt contamination.

Features

- Range:
  - EC: 0 – 3999 µS/cm (resol. 1 µS)
  - TDS: 0 – 2000 ppm (resol. 1 ppm)
  - Temp. : 0.0° to 60.0° C
- Accuracy @20° C, EC/TDS: 2% full scale, T°: ±1.0° C
- Calibration EC/TDS: auto, 1 point @ 1413 µS/cm
- Conversion factor EC/TDS: adjustable 0.45 – 1.00
- Temp. compensation: adjustable 0.0 – 2.4 per °C, 0.1 increment
- Standard delivery: Meter, probe, 4 x 1.5V batteries, electrode replacement tool

Ordering reference

Pocket Conductivity Meter

HI-98311	Pocket conductivity meter

Conductivity Meter HI-933000

This hand held unit features conductivity measurement from 0.1 µS to 200 mS with 1 probe. 4 stainless steel concentric rings on the probe shaft combined with a built-in temperature sensor automatically compensate all readings. No need to change probe, cell constant or re-calibrate.

Features & performance

- Ranges:
  - µS/cm: 0.0 – 199.9 / 0 - 1999
  - mS/cm: 0.0 – 19.99 / 0 – 199.9
- Accuracy @20° C : 1% of full scale (excluding probe deviation)
- Calibration: manual single point through trimmer
- Temperature compensation: 10 – 40° C
- Standard delivery: meter with rubber waterproof keypad, probe, wrist-strap, battery, carry case

Ordering reference

Conductivity Meter

HI-93300	Water-proof Conductivity Meter

Pocket pH Meter HI-98128

This pocket unit is equipped with a stainless steel probe for pH and temperature measurement. Automatic compensation. Stability indicator and hold function included. Dual-level display.

Features & Performance

- Range: 0.00 – 14.00 pH (resolution 0.01 pH), 0.0° - 60.0° C
- Accuracy @20° C: ±0.05 pH
- Calibration: auto, 1 or 2 point, 2 sets of buffers
- Standard delivery: pH-meter, electrode, 100% water-proof casing, 4 x 1.5V batteries

Ordering reference

Pocket pH Meter

HI-98128	Pocket pH meter

Waterproof pH Meter HI-991001

This compact and IP67 waterprof unit is fitted with a glass pH electrode, with buit-in temperature sensor, suitable for use with most solvent based materials, paints, inks etc. pH and temperature readings are simultaneously displayed on an LCD screen featuring symbol-guided functions. A pH electrode stability indicator for the guides the operator when measuremnt can be taken.

Features & Performance

- Range: 0.00 – 14.00 pH, temperature 0 – 60° C, automatic compensation
- Accuracy: @20° C, ±0.01 pH
- Resolution: 0.01 pH, EC/TDS: 1µS/cm – 1ppm
- Automatic 1 or 2-point calibration, 2 sets of buffer: 4.01 - 7.01 - 10.01 or 6.86 - 7.01 - 9.18
- Standard delivery: pH meter, glass pH/T° electrode with 1m cable, battery, carry case.

Ordering reference

Waterproof pH Meter

HI-991001	Waterproof pH meter

pH/Conductivity/TDS Meter HI-991300

This unit offers pH, conductivity and TDS measurements. It also includes automatic calibration and temperature compensation, selectable EC/TDS conversion factor, stability indicator, battery indicator.
The multi-parameter probe features gel electrolyte with long life cloth junction and graphite sensor for EC/TDS.

Features & performance

- Ranges: pH: 0.00 – 0.14, TDS: 0 – 2000 ppm (mg/l), µS/cm: 0 – 3999, temperature: 0 – 60° C
- Resolution: 0.01 pH, EC/TDS: 1µS/cm – 1 ppm, T°: 0.1° C

Ordering reference

pH/Conductivity/TDS Meter

HI-991300	pH/Conductivity/TDS Meter

15.0
FINENESS OF GRIND

Fineness of Grind Gauge

The grinding quality of solid materials in coatings, pigment, ink, pharmaceutical or food formulation is essential for optimal dispersion. Sheen high precision gauges are made of hardened stainless steel, for long term durability and reliability.
They are available as single or 2 channel version, engraved with 2 scales: 0-25, 0-50 or 0-100 µm and respectively 8-6, 8-4 or 8-0 Hegman units. The test consists of placing a small volume of product on the deep end and drawing it with a straight scraper toward the shallow end. The position on the scale where oversize particles and their tracks appear can be rated for determination of dispersion.

Features

- ☐ High accuracy machining, 175 x 63 x 12 mm.
- ☐ Standard delivery: blade scraper, leather carry case.

Ordering references

Fineness of Grind Gauge

501/25	Grind Gauge, double channel, 0-25 µm
501/50	Grind Gauge, double channel, 0-50 µm
501/100	Grind Gauge, double channel, 0-100 µm
502/25	Grind Gauge, single channel, 0-25 µm
502/50	Grind Gauge, single channel, 0-50 µm
502/100	Grind Gauge, single channel, 0-100 µm
504/25	Grind Gauge, wide single channel, 0-25 µm
504/50	Grind Gauge, wide single channel, 0-50 µm
504/100	Grind Gauge, wide single channel, 0-100 µm
505	Spare scrapper blade
510	Grind Gauge, special sizes upon request (please specify)

Standards

ASTM	D333, 1210
BS	3900 C6, 3900 E9
ISO	1524

16.0
HARDNESS

Buchholz Indentation Tester

This indentation tester can be used to evaluate hardness of mono or multicoat paints. A bevelled disc with a sharp edge is applied onto the test surface under a constant 500 g. test load provided by a steel block holder. The trace left after 30 s. load is measured with a 20 x magnification illuminated microscope. The length of the indentation is inversely proportional to the hardness.

Features

- ☐ Long life indentor
- ☐ High precision microscope
- ☐ Standard delivery: Indentor & load, illuminated microscope, indentation template, 2 x AA batteries, carry case

Ordering references

Buchholz Indentation Tester

605	Buchholz Hardness Tester, complete

Standards

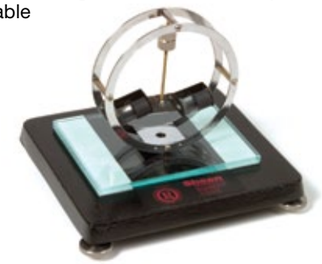
BS EN ISO	2815
ECCA	T12

Sward Hardness Rocker

Non-destructive hardness test can be carried out with this rocking instrument. The equilibrated unit has 2 wheels and 2 bubble references. The instrument is rolled to display the bubbles, and test consists of counting the oscillations until the bubbles disappear, respectively starting from left and ending from right. The hardness of the coatings is related to the number of oscillations, thus the amplitude decreases more rapidly on soft test surfaces. Results can be expressed in %.
Calibration on glass plate: 50 rocks over 60 ±0.5 s. (100%).

Features

- ☐ Simple to use, reliable measurement
- ☐ Adjustable calibration screw
- ☐ Supplied with draught screen, reference plate, levelling table



Ordering reference

Sward Hardness Rocker

703/704	Sward Hardness Rocker complete

Standards

ASTM	D2134

Pendulum Hardness Rockers

An apparatus internationally approved for coating hardness evaluation. The test consists of measuring the damping time of a pendulum oscillating on a test surface. The hardness is function of the oscillation amplitude, detected by electronic optical cells from 2 specified pendulum deflection positions. It decreases faster on softer medium.

3 versions available:

- ☐ KOENIG: the 200 g. triangular pendulum rests on 2 x 5 mm ball bearings.
  Reference on glass plate:
  250 ±10 s. (172 to 185 oscillations), deflections from 6° to 3°.
- ☐ PERSOZ: the 500 g. square pendulum rests on 2 x 8 mm ball bearings.
  Reference on glass plate:
  430 ±10 s., deflections from 12° to 4°
- ☐ KOENIG & PERSOZ: combination of both methods in one unit.

Features:

- ☐ High precision instruments, electronic counting & display
- ☐ Top quality components to ensure long term stability & reliability
- ☐ Easy cleaning & maintenance
- ☐ Standard delivery: level-adjustable mainframe, pendulum(s), draught screen, reference plate, spirit level
- ☐ 240V/50 Hz or 110V/60 Hz (please specify when ordering)

Ordering references

Hardness Pendulum

707K	Pendulum Hardness Rocker KOENIG
707P	Pendulum Hardness Rocker PERSOZ
707KP	Pendulum Hardness Rocker KOENIG + PERSOZ

Standards

	KOENIG	PERSOZ
ASTM	D4366	☐
DIN	53157	☐
ISO	1522	☐
NF	☐	T30-016

Scratch Tester

This motorised apparatus is dedicated to coatings hardness evaluation based on scratching resistance method. A test panel is clamped and slowly moved whilst a stylus or alternative tool scratches the surface. Depending on test procedures, specified or variable loads can be applied to obtain different degrees of failure, from trace to destruction. A voltmeter indicates the contact of the tool with the metallic sample substrate.
Max. panel size : 100 x 150 x 1.6 mm (0.3 mm coating).
Alternatively a simple manually operated version is also available.

Features

- Robust construction, reliable and reproducible results
- Simple maintenance, easy to replace tools
- 220-240 V / 50 Hz
  (110-120 V / 60 Hz on request, please specify)

Ordering references

Motorised Scratch Tester

3 versions, 220-240 V / 50 Hz:

705	Mechanised Scratch Tester ISO 1518 / BS 3900 E2: for scratch test, 3-4 cm/s. displacement, tungsten carbide hemispherical stylus, 2 kg set of weights (1 x 100 g., 2 x 200 g., 1 x 500 g. 1 x 1000 g. & 1 spindle).
705/1	Mechanised Mar Resistance Tester ASTM D5178: 6 mm/s. displacement, Ø1.6 mm toroidal tool, set of weights 2 kg (id. above) + 4 x 2kg = 10 kg
705/2	Mechanised Scrape Adhesion Tester ASTM D2197: 1-2" /s. displacement, Ø1.6 mm toroidal tool, set of weights 2 kg (id. above) + 4 x 2kg = 10 kg

Manual Scratch Tester

706	Hand Scratch Tester ISO 1518 / 3900 E2 (including weights/needles)

Pencil Hardness Tester

A traditional method to test the resistance of coatings to scratch. Pencils of progressive hardness, hold by a specific carriage are applied onto the test surface under a force of 750 g, at 45° angle. The surface will be variably damaged, in function of the pencil hardness, thus pass/fail or hardness to failure evaluations are possible.

Features

- Reliable test with high quality pencils
- Standard delivery: specific pencil holder, set of 20 pencils ranging from 9B to 9H, pencil sharpener, 400 grit abrasive paper, carry case.

Ordering references

Pencil Hardness Tester

720N	Wolff-Wilborn Pencil Tester, complete set
721	Spare set of pencils

Standards

ASTM	D3363
ISO	15184
ECCA	T4

Barcol Indentation Tester

A handy and easy to use instrument to test the hardness of soft materials such as metals (aluminium, brass, alloys), plastics, fibreglass, polyesters, leather etc. By pressing the instrument onto the test surface a needle penetrates the material and the degree of hardness is displayed on a dial scale from 0 to 100.
3 ranges available:

Ordering references

Barcol Tester

710/934/1	Barcol Tester 25-150 Brinell for fibreglass
710/934/2	Barcol Tester for soft metals/plastic
710/934/3	Barcol Tester for very soft materials

Standards

ASTM	B648 (Aluminium alloy)
	D2583 (Rigid plastics & soft metals)

17.0
MOISTURE, HYGROMETRY

Protimeter BLD5800LH MMS+

Moisture Measurement System

The MMS+ is a complete moisture measurement system in one robust, easy to use instrument.
It offers various operating modes: moisture measurement or moisture search for wood or buiding materials e.g. wall, concrete, plaster, masonry etc. , and environmental hygrometry. This versatile capability is useful for reliable building dampness detection, damage assessment, drying evaluation, indoor air monitoring.

Features

3 operating modes

- MEASUREMENT of moisture with pin type & deep wall probes, in wood, floor, building materials
- SEARCH moisture behind tiles, stains, floor covering, wood, plaster, concrete etc. up to 19 mm depth with non-invasive radio frequency probe
- HYGROMETRY CHECK with hygrostick probe of air temperature/relative humidity/dew point, and with surface temperature probe for evaluation of condensation. Can be use also for concrete moisture detection (ASTM F2170-02), by using the hygrostick in combination of a humidity sleeve, inserted into a drilled hole.
- Memory: 1000 readings with date & time stamp
- Data download to PC with included software
- Standard delivery: MMS+, data dowload software, Hygrostick + extension lead, 10 mm pin moisture probe, deep wall 127 mm probe, surface temp. probe, wood calibration chart, calibration check device, spare pins, 2xAA batteries, manual, nylon zipper pouch.

Performance

- Probe measuring ranges (tolerances):
- pin (%WME): 8-99 %, relative >30%
- radio frequency: 0-1000, relative
- temp: -10° to 120° C
- Hygrostick, nominal: 30-40% rH (±3%), 41-98% rH (±1.75%), 0-50° C ±0.3° C

Ordering references

Moisture Measurement System

BLD5800LH	Protimeter Moisture Measurement System

Protimeter MINI Moisture Meters

The Mini series are precion but cost effective meters offering instant moisture measurement and detection in wood (% MC), or in building materials e.g. dry wall, concrete etc. (% WME), for quality control on construction sites or building investigations.

Features

- Pin type, LED 3-scale indicator: green=dry, yellow=at risk, red=wet
- Range: 6 – 90%, numerical label
- Range % WME: 6 – 90%
- Standard delivery: Mini unit, extension pin probe, check device, 2 x AA battries, pouch with belt loop

Ordering reference

Mini Moisture Meter

BLD2000	Protimeter Mini Moisture Meter

Protimeter Timbermaster BLD5601

The Timbermaster is the instrument of choice for quality control applications across the wood industries, from the sawmill to finished products. The compact instrument has 8 calibration scales, enabling the user to take moisture measurements in 150 wood species. When necessary, it can be used with a temperature probe that automatically corrects the measured moisture level with respect to the temparature of the wood being tested.

Features

- Pin type, digital display
- Range: 7 – 99.9%
- Temperature: 10° – 50° C

Ordering reference

Timbermaster

BLD5601	Timbermaster including temperature probe

Protimeter Surveymaster BLD5360

The versatile Surveymaster offers dual-mode operation and display. In non-invasive search, the instrument detect moisture beneath the surface of walls, floor covering, independent from surface conditions through radio frequency. In measuring mode with pin type probes, moisture level of wood or building materials on surface or at incremental depth can be precisely evaluated.

Features & Performance

- ☐ Ranges:
  - non-invasive: 0-999 relative, nominal depth up to 19 mm
  - pin probe: 7 – 99 % WME, 10 mm or 127 mm wall probes
- ☐ Displays: LCD and 60 LED colour-coded green/yellow/red
- ☐ Standard delivery: Surveymaster, 127 mm wall probes, moisture probe, 2 spare pins, 1 x 9V 6F22R battery, calibration check, pouch with belt loop, manual.

Ordering reference

Surveymaster

BLD5360	Protimeter Surveymaster SM

Protimeter Hygromaster BLD7700

This handy hygrometer measures with Hygrostick probe the relative humidity, temperature with dewpoint, surface temperature, and proximity to dew point (optional surface probe). This flexible capability is usefull for building survey/ inspection, flooring and coatings applications. It can also record measurements over time. Set-up via the buttons or PC (optional software).

Features

- ☐ Hygrostick Range: 30-40% rH (±3%), 41-98% rH (±1.75%), 0-50*C ±0.3*C
- ☐ Surface temp. range: 0 – 50° C (probe optional)
- ☐ Data logging - interval set-up and delayed start: 1 min. – 24 h Memory 398 records, 1 – 15 jobs
- ☐ Standard delivery: Hygromaster with Hygrostick probe, pouch, 2 x AA batteries, manual

Ordering references

Hygromaster

BLD7700	Hygromaster II with detachable Hygrostick probe

Standards

ASTM	F2420-05
BS	8201, 8203, 5325

18.0
PIN HOLE & POROSITY

Wet Sponge Multi-voltage Tester

This handy and effective instrument can detect pinholes in non-conductive coatings on conductive substrates (e.g. steel or concrete). The unit is earthed to the substrate. The wet sponge probe is then applied onto the test surface. When the wetting solution has formed a sufficient conductive path through flaws or pinholes, the detection is confirmed by an audible and visual alarm.

Features

- ☐ 3 selectable voltages of 9 – 67.5 – 90 VDC, for detection capacity up to 500 µm.
- ☐ Easy & safe operation, non destructive method
- ☐ Compact unit with removable sponge/probe assembly
- ☐ Standard delivery: handle & sponge, 5 m earth cable, PP3 battery, carry case.

Ordering references

Wet Sponge Multi-voltage Tester

PFD2	Wet Sponge Tester

Optional accessories

50, 100 or 200 mm circular sponge, extension rods & UKAS traceable calibration certificate upon request

High Voltage Holiday Detector

This apparatus detects pinholes, vacuholes or flaws in coatings. The conductive background is earthed to instrument and a high voltage is applied by moving a brush across the coating. This value is a related to the coating dielectric strength. When a flaw is detected, then the current will spark through it whilst a light flashes and audible alarm sounds. For maximum safety a high impedance supply will collapse to zero upon detection.

Features

- ☐ Capacity 1-20 or 2-40 kV, for coatings from 100 µm to respectively 8 mm or to 12 mm
- ☐ Precision ± 1%, resolution 0.01 kV
- ☐ Compact & light weight, easy to use, single or continuous test
- ☐ Adjustable output by means of a multiturn knob
- ☐ Probe hand with safety switch
- ☐ Standard delivery: probe handle, band brush probe, shoulder/neck strap, 5 m earth cable, 2 x PP3 (± 10 h. operation @ 10kV), carry case

Ordering references

Holiday Detector

PHD1-20	High-Voltage Holiday Detector 1-20 kV
PHD2-40	High-Voltage Holiday Detector 2-40 kV

Optional accessories

Multi-angle probe adaptor, broad brush right angled, extension rods, circular brushes 51-203 mm, conductive rubber bands 200-450 mm width, rolling springs ∅102-600 mm, adaptors & UKAS traceable calibration certificate upon request.

19.0
PROCESS CONTROL

Oven Logging System

This compact logger accurately records temperature distribution over time of many processes and notably of coatings curing data. Easily set-up with or without PC and protected by an efficient heat barrier, it can travel in the production line, fitted with up to 6 thermocouples. Collected data can be printed out to a USB printer, or downloaded to Excel for QC or oven monitoring, and to supplied Paint View Analysis Software, specifically designed for the curing calculations in the paint industry. Sturdy and high quality probes combining air/surface measurement and easy fastening with clamp/magnet ensure high operating flexibility.

Features

- ☐ Easy to use & fast set-up via front panel or with PC, temperature or time trigger
- ☐ Up to 6 channel inputs
- ☐ Configuration & data output to USB printer or PC
- ☐ PaintView software: set-up, download, historical graphing, statistics, paint cure data
- ☐ Battery operated: 2 x AA cells for 200 hrs operation
- ☐ Standard delivery: logger, PaintView software, thermal barrier, 4 probes (3 metre cable)

Performance

- ☐ Max. measuring range: -200° to 1300° C, accuracy ±0.5° C
- ☐ Interval set-up up to 8 readings/s
- ☐ Memory 240 k readings, multiple batch facility
- ☐ Probe range (K type) : -50° to 300°C, accuracy ±1.5°C
- ☐ Thermal barrier: 2 mm stainless steel wall, fully sealed insulation, mechanically assembled, for max. operation at 250° C over 50 min. L x W x H: 230 x 230 x 110 mm.

Ordering references

Oven Logger

TRS/7	Oven Temperature Logger

Optional accessories

K-thermocouple probe, for air/surface with clamp/magnet, Custom probes, up to 900*C heat barrier available upon request

Gradient Oven

Optimal curing and drying time are essential to ensure best coatings performances, mainly for conventional, high-solids, water-borne, powder paint technologies. Temperature, time, limits are key parameters to obtain optimal physical and appearance properties, e.g. hardness, flexibility, adhesion, durability, colour, gloss etc.
The Gradient Oven is designed to simulate the curing process. The apparatus is equipped with a microprocessor controlled heating bank of 45 elements, individually insulated and monitored by a Pt100 probe.
Constant temperature, linear gradient with max. 100° C difference, or step gradient can be accurately and easily programmed via a keyboard. Thus a test panel can be baked at various profiles.

Features

- ☐ Save time & energy: generates various curing profiles on 1 panel,
- ☐ Output to optional printer
- ☐ Standard delivery: oven, exhaust tube, 1 glass plate, 25 test panels, 25 marking strips, tool set
- ☐ 230V - 50/60 Hz, 465 x 720 x 595 mm, 50 kg

Performance

- ☐ Temperature range, 2 versions: 30° to 250° C or 30° to 320° C
- ☐ Accuracy:
  - heating element <±2° C
  - surface temp. element 3 to 34: ±2° C (to 200° C), ±3° C (to 250° C), ±5° C (to 320° C)
- ☐ Test surface: 500 x 70 mm, heating surface: 520 x 100 mm
- ☐ Linear gradient: max. difference 100° (30° - 250° C)
- ☐ Step gradient: 2 – 3 – 4 steps, max. 50° C difference between 2 steps
- ☐ Heat-up speed: 2° to 30° C/min., programmable
- ☐ Memory: 10 gradients

Ordering references

Gradient Oven

BG2602	Gradient Oven 30° to 250° C
BG2610	Gradient Oven 30° to 320° C

Optional accessories

BG2630	Flat bed printer
BG2636	Self-adhesive paper for report, 100 pcs / 200 reports
BG2637	Self-adhesive paper for marking strip, 100 pcs / 200 strips
BG2623	Test panels, 100 pcs
BG2622	Self-adhesive marking strips, 100 pcs

MFFT – Minimum Film Forming Temperature Bar

This apparatus is designed for determination of temparature where a clear thin film of emulsion or water-borne latex will coalesce and forms below this point a powdered, cracked film. A nickel plated copper platen, protected by a hinged perspex cover, is electronically cooled at one end and warmed at the other end. Dry air flows over the surface and ensures temperature uniformity. Temperature sensors mounted at intervals control and indicated the programmed gradient. A roving sensor helps to check spot temperatures. The test consists of drawingn down sample stripes onto the bar by using a supplied 75 µm x 1” cube applicator. After equilibrium, exact film forming can be identified with a moving cursor.

2 vorking ranges available (° C):

- ☐ MFFT-60: 6 programmes

Cool end:	-5	0	+5	+15	+23	+33
Warm end:	+13	+18	+23	+33	+50	+60

- ☐ MFFT-90: 9 programmes, (+ additional ranges) :

Cool end:	+43	+53	+63			
Warm end:	+70	+80	+90			

Features & Performance

- ☐ Temperature sensing: 10 points, interval of 37 mm
- ☐ Sensor accuracy: 0.1° C
- ☐ Display: point temp. and differential temp.
- ☐ Nickel plated platen, 483 x 235 mm, easy maintenance
- ☐ Air dryer and cooling tap water failure indicators
  - Standard delivery: MFFT, air & water connectors, 25 µm x 1” cube applicator, roving sensor, guide bar, dessicator & indicator crystals, 5 seringue dispensers, spatula, fuses and manual.
- ☐ 220-240 V or 110-115 V, air flow rate required: 4 l/min. @ 100 psi., water: tap mains.

Ordering references

Minimum Film Forming Temperature Bar

MFFT-60	Minimum Film Forming Temperature -5° to +60° C, 6 ranges
MFFT-90	Minimum Film Forming Temperature -5° to +90° C, 9 ranges

Standards

ASTM	D2354

20.0
ROUGHNESS

Surtronic Duo

An efficient, portable roughness tester, designed for various applications and skill levels. It offers Ra & Rz measurements at a touch of a button. When the instrument is used on difficult to access surfaces, the split mode up to 1 m distance allows the reading to be sent link from to its base.

Features

- Easy to use, compact & light weight 200 g., large LCD display (µm or µin, 0.01 µm resolution).
- Stylus: diamond radius 5 µm, piezzo-electric pick-up, protected by auto-park position
- Calibration: on supplied standard, automatic settings selection
- Battery life - 5000 measurements minimum

Performance

- Range: Ra 0.1 – 40 µm (1 µin – 1600 µin), Rz 0.1 – 199 µm (1 µin – 7800 µin)
- Cut-off: 8 mm ±15 %, traverse legth 5 mm (0.197 in)
- Accuracy Ra/Rz: ±5 % of readings, resolution: 0.01 µm

Ordering reference

Roughness Tester

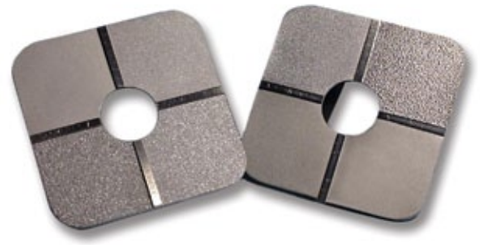
921	Surtronic Duo Ra & Rz, capacity

Surface Comparator

These two visual comparators allow qualitative assessments of surface roughness to be made on blast cleaned steel surfaces. They are available in two types, Ref. 922/1 for shotblasting and Ref. 922/2 for gritblasting each of which having 4 precision roughness profiles.

Grade Determinations

Fine Grade	Profiles equal to segment 1 and up to but excluding segment 2
Medium Grade	Profiles equal to segment 2 and up to but excluding segment 3
Coarse Grade	Profiles equal to segment 3 and up to but excluding segment 4



Ordering references

Surface Comparator

922/1	Surface Comparator – Grit 25, 60, 100, 150um Profiles
922/2	Surface Comparator – Shot 25, 40, 70, 100um Profiles

Standards

ISO 8503-1, 8503-2

21.0
SPECIFIC GRAVITY, DENSITY

Specific Gravity Cup (Pyknometer)

For specific gravity determination of paints or similar materials. These robust and light weight cups are high precision machined in stainless steel or aircraft alloy. Available without or with optional counterpoise tare weight.

Ordering references

Specific Gravity Cup

1501/50	Weight per gallon cup 50 cm^3, aircraft alloy
1501/100	Weight per gallon cup 100 cm^3, aircraft alloy
1501/A	Weight per US gallon cup 83.3 cm^3, aircraft alloy
1503/50	Stainless steel weight per gallon cup 50 cm^3
1503/100	Stainless steel weight per gallon cup 100 cm^3
1503/A	Stainless steel weight per US gallon cup 83.3 cm^3
1501/CW	Counterpoise (tare) weight to 1501 or 1501A
1503/CW	Counterpoise (tare) weight for 1503

Standards

ASTM	D1475
BS	3900-A19
DIN `	53217
ISO	2811-1

Pressure Density Cup - Pyknometer

For accurate specific gravity determination of paints or similar materials that may contain bubbles. The test sample is compressed in a stainless steel cylinder to 150 psi (10.3 bar), to reduce any significant error due to these inclusions. Density is calculated from the mass of the fluid and the calibrated cylinder volume.

Features

- Precision: better than 0.5 %
- Removable parts for easy cleaning

Ordering references

Pressure Density Cup

1510	Pressure Density Cup
1510/A	Pressure Density Cup, US gallon size (83.3 cm^3)

Standards

BS	3900 A22
ISO	2811-4

22.0
THICKNESS

Wet Film Wheel Thickness Gauge

A stainless steel precision gauge to check wet film. A wheel machined with an eccentric central rim calibrated to increasing gap is rolled across the paint. The contact point on the rim indicates the film thickness. 4 standard scales available: 0 to 1000 µm. Custom range upon request. A special version designed with knurled outer rims for coil coating also available.

Ordering references

Wet Film Wheel Thickness Gauge

1109/100	Wet Film Thickness Gauge, wheel type, 0-100 µm
1109/200	Wet Film Thickness Gauge, wheel type, 0-200 µm
1109/500	Wet Film Thickness Gauge, wheel type, 0-500 µm
1109/1000	Wet Film Thickness Gauge, wheel type, 0-1000 µm
1109/A	Wet Film Thickness Gauge, wheel type, special sizes (please state requirements)
1109/B	Wet Film Thickness Gauge, for coil coating 0-125 µm

Standards

ASTM	D1212
ISO	2808

Wet Film Comb Gauge

Stainless steel precision gauge to check wet film applied on smooth flat surfaces. Each edge of the gauge bears a range of teeth of increasing depth. The thickness value can be read where film is in contact. Handy credit card size, easy to clean.
3 scales available. Custom printing of your logo available.

Ordering references

Wet Film Comb Gauge

1115/120	Wet Film Comb, 5-120 µm, 5 µm increments
1115/600	Wet Film Comb, 25-600 µm, 25 µm increments
1115/1200	Wet Film Comb, 50-1200 µm, 50 µm increments
1115/3	Set of 3 Wet Film Comb above, including case

Standards

ASTM	D4414
ISO	2808

Wet Film Calling Card Gauge

Aluminium gauge to check wet film applied on smooth flat surfaces. Its attractive price and optional solvent resistant printing with your logo make this gauge an excellent promotional material.
Scale: 25-2000 µm, size: 83 x 57 mm, easy to clean.

Ordering references

Wet Film Calling Card Gauge

1150	Calling Card Wet Film Gauge, 25-2000 µm, (price per quantity: 1-9, 10-99, >100, >500 pcs.)

For customised logo printing – applicable to min. 100 pcs.: upon request.

Standards

ASTM	D4414
ISO	2808

Wet Film Gauge

Large capacity stainless steel gauge to check wet film applied on smooth flat surfaces, from 0 to 5000 µm.
Can be printed with your logo.

Ordering references

Wet Film Gauge

1155	Wet Film Gauge, 50-5000 µm,

For customised logo printing – applicable to min. 100 pcs.: upon request.

Standards

ASTM	D4414
ISO	2808

Paint Inspection Gauge

A handy instrument, using destructive method to measure coatings thickness up to 1250 µm, applied on a large variety of substrates, e.g. concrete, wood, plastic, aluminium etc.
A cut is made on the test surface with a V-shaped tool. The width of the layers obtained can be measured with the built-in illuminated/graduated 50 x microscope, and converted into corresponding thickness, depending on the blade used. 3 tungsten carbide tips are included:

1. Max. thickness 1250 µm, ±6 µm, 1 graduation = 20 µm
2. Max. thickness 500 µm, ±3 µm, 1 graduation = 10 µm
3. Max. thickness 75 µm, ±0.6 µm, 1 graduation = 2 µm

Ordering references

Paint Inspection Gauge

202/PIG	Paint Inspection Gauge, complete with microscope, 3 cutting tips, battery, hood
202/11	No.1 cutting tip
202/12	No.2 cutting tip
202/13	No.3 cutting tip
202/H	Cutting tip holder

Standards

ASTM	D4138-A

Pentest / Minipen - Coatings Thickness Gauge

A simple but efficient instrument, for instant indication of coatings thickness on steel.
The magnetic attraction method consists of lifting a spring tensioned magnet away from the surface. The differential release is related to coating thickness. 2 models:

- ☐ Pentest model: has a cursor to hold the reading on the scale.
- ☐ Minipen: a simpler version without hold device. Coloured bands can be used for Pass/Fail test

Ordering references

Pull-off Thickness Gauge

Pentest	Coatings thickness gauge, range 25-700 µm, with max. holding cursor
Minipen	Pull-off thickness gauge, range 50-500 µm, without holding device

Standards

ASTM	D4138-A

Mikrotest - Coatings Thickness Gauge

Using the magnetic attraction principle, this traditional gauge offers reliable thickness measurement of coatings, electroplating, enamel, rubber, electroplated nickel on steel, or electroplated nickel on non-ferrous substrates.
A spring released mechanism indicates accurately on a dial indicator or digital display the thickness.
Cost effective operation: no calibration required, no power needed (dial models), simple set-up.
Tolerance: ± 5 % (dial), ± 3 - 4 % (digital) of the reading.

Ordering references

Mikrotest

Mikrotest 6 G	Mikrotest G 0-100 µm, automatic version
Mikrotest F 6	Mikrotest F 0-1000 µm, automatic version
Mikrotest S3 6	Mikrotest S3 0.2-3 mm, automatic version
Mikrotest S5 6	Mikrotest S5 0.5-5 mm, automatic version
Mikrotest S10 6	Mikrotest S10 2.5-10 mm, automatic version
Mikrotest NiFe50	Mikrotest NiFe Nickel on Ferrous 0-50 µm, automatic version
Mikrotest G 7	Mikrotest G digital 0-300 µm
Mikrotest F 7	Mikrotest F digital 0-1500 µm
Mikrotest S5 7	Mikrotest S5 digital 0.5-5.0 mm
Mikrotest S15 7	Mikrotest S15 digital 3.0-15.0 mm

Standards

ASTM	B499, B530, E376, D1186, G12
BS	5411
DIN	50982
DIN EN ISO	2178
ISO	2361, 2808

Quanticoat – Coating Thickness Gauge

A revolutionary new gauge using “state of the art” digital signal processing based on the unique SIDSP* Technology.

SIDSP* allows the signals to be processed into a digital format inside the sensor probe at the time of measurement using automatic substrate recognition and either Eddy-current or Magnetic induction the result will be digitally transferred to the display unit independently from any form of external interference. The Quanticoat Gauge offers the ultimate reproducibility temperature stability and adaptability and thus extremely accurate thickness control on ferrous and non ferrous substrates.

Features

- Innovative unique probe design
- Digital signal processed within probe
- High Immunity to external electrical interference
- Temperature compensated probe
- Vastly reduced calibration requirements
- Greater measurement reproducibility and stability
- 3 Models, Integrated, External and Dual
- Sensor range up to 15mm
- Huge memory capacity – 100,000 readings
- Large easy read rotatable display
- Intuitive menu guided operation , 25 Languages
- IrDA port for data transmission to printer or PC

Ordering references

Quanticoat F1/INT	Gauge F (0-1500um) internal probe
Quanticoat F2/INT	Gauge F (0-2000um) internal probe
Quanticoat F3/INT	Gauge F (0-5000um) internal probe
Quanticoat F4/INT	Gauge F (0-15mm) internal probe
Quanticoat N1/INT	Gauge N (0-700um) internal probe
Quanticoat N2/INT	Gauge N (0-2500um) internal probe
Quanticoat FN1/INT	Gauge FN (0-1500um F) internal probe
	(0-700um N) internal probe
Quanticoat FN2/INT	Gauge FN (0-5000um F) internal probe
	(0-2500um N) internal probe
Quanticoat F1/EXT	Gauge F (0-1500um) external probe
Quanticoat F2/EXT	Gauge F (0-2000um) external probe
Quanticoat F3/EXT	Gauge F (0-5000um) external probe
Quanticoat F4/EXT	Gauge F (0-15mm) external probe
Quanticoat N1/EXT	Gauge N (0-700um) external probe
Quanticoat N2/EXT	Gauge N (0-2500um) external probe
Quanticoat FN1/EXT	Gauge FN (0-1500um F) external probe
	(0-700um N) external probe
Quanticoat FN2/EXT	Gauge FN (0-5000um F) external probe
	(0-2500um N) external probe
Quanticoat Dual	Thickness gauge excluding probe
Dual Probe F1.5	Probe F (0-1500um)
Dual Probe F2	Probe F (0-2000um)
Dual Probe F5	Probe F (0-5000um)
Dual Probe F15	Probe F (0-15mm)
Dual Probe N0.7	Probe N (0-700um)
Dual Probe N2.5	Probe N (0-2500um)
Dual Probe FN1.5	Probe F (0-1500um) N (0-700um)
Dual Probe FN5	Probe F (0-5000um) N (0-2500um)

Ecotest Plus - Coating Thickness Gauge

Working on the same principle as for Exacto above, the Ecotest offers precision thickness measurement suitable for various tasks, especially in the field control. The gauge is connected to a robust, wear resitant external probe, available as F, N or FN, thus covering most industrial applications: coatings, non-magnetic materials applied on steel or insulating layers on non-ferrous substrates.

Features & performance

- Precision: ±2% ± 2µm of reading, units: µ or mils
- Minimum surface radius : convex 5 mm / concave 25 mm
- Calibration : standard, 1 or 2 point
- Large LCD display, 11 mm character height
- Standard delivery: Ecotest with probe, calibration shims & zero plate(s), rubber shock absorbing shell, soft carrying pouch, 2 x AA batteries, manual.

Ordering references

Ecotest

SE1000F	Ecotest Plus Thickness Gauge, Fe 0-3000 µm
SE1000N	Ecotest Plus Thickness Gauge, Non Fe 0-2000 µm
SE1000FN	Ecotest Plus Thickness Gauge, Fe/Non Fe 0-2000 µm

Standards

(see Mikrotest)

MiniTest 600 - Coating Thickness Gauge

Same range as Ecotest above, this unit features in addition a memory for 9,999 readings, statistics (n, ∅, std. dev., min/max.) and data output to PC or MiniPrint printer.

Ordering references

Minitest 600

Mintest 600F	Minitest 600F including stats (Fe) 0-3000 µm, includ. probe
Minitest 600N	Minitest 600N including stats (Non Fe) 0-2000 µm, includ. probe
Minitest 600FN	Minitest 600FN including stats (Fe/Non Fe) 0-2000 µm, includ. probe

Optional Accessories

4100/3	Connection cable to PC for 4100 series
Msoft 7000	MSSoft 7000 Bsic Edition
MP4100	Mini printer for Minitest & Exacto

MiniTest 4100/3100/2100/1100 Coating Thickness Gauges

This series of instruments not only offer the same measuring principles as the Ecotest Plus, but also offer flexible applications with a wide selection of probe range, to offer versatile coatings thickness measurement and advanced statistics. The high precision and sophisticated documentation facility make this gauge a reference in various industries: coatings, automotive, ship building, aircraft etc. It is recommended by world leading corporations either for lab use or for process QC purposes.

Features & performance

- Precision, all probes: ±1 % of reading (50 mm probe: ±3 %), tolerance depending on probe range. Units: µ or mils
- Minimum surface radius: convex 0.75 – 100 mm / concave 5 – 200 mm depending on probe
- Calibration: multi-point, flat, curved, rough surfaces, through coating
- Statistics: n, ∅, σ, min/max, kvar., Cp, Cpk, adjustable limits & alarm
- RS232 output to MiniPrint printer (optional) or PC
- Offset function with constant value, key-locked calibration
- Continuous hi-speed measurement
- Standard delivery: Minitest (probe not included), calibration shims & zero plate(s), carry case, 1 x 9V battery, and AC adapter, manual

Ordering references

Minitest Base Unit – probe not included

Optional Accessories

MP4100	Mini printer for Minitest & Exacto
MSOFT41	Software for 4100 series
4100/3	Connection cable to PC for 4100-series

*Other e.g. rubber case, probe stand holder available upon request.

Standards

(see Mikrotest)

Calibration Standards, for all thickness gauges

Accurate calibration is essential for reliable measurements. Sheen reference shims are made of high grade materials, and can be supplied with or without traceable certificates.

Ordering references

Calibration Standards

5005	Spare set of standards 25-50-125-250-500 µm, uncalibrated
5006	Individual shim, with calibration certificate (please specify thickness)
5006/1	Set of 8 shims, 25-50-75-125-175-250-500-750 µm, with calibration certificate, in protective case
Zero plate	F or N, to check all gauges

Minitest Base Unit – probe not included

Minitest 1100	Minitest100 basic version, no memory/statistics
Minitest 2100	Minitest 2100 memory 10,000 readings, 1 application, 1 batch, statistics
Minitest 3100	Minitest 3100 memory 10,000 readings, 10 applications, 10 application batches, 100 batches/single values, statistics
Minitest 4100	Minitest 4100 memory 10,000 readings, 99 applications, 98 application batches, 500 batches/single values, statistics

Probes*

Ref.	Type	Range resolution (of reading)		Low range Convex/concave	Tolerance Min curvature
F 05	Ferrous	0-500 µm	0.1 µm	±(1%+0.7 µm)	0.75 mm / 5 mm
F 1.6	Ferrous	0-1600 µm	0.1 µm	±(1%+1 µm)	1.5 mm / 10 mm
F 1.6/90	Ferrous, 90°	0-1600 µm	0.1 µm	±(1%+1 µm)	flat / 6 mm
F 3	Ferrous	0-3000 µm	0.2 µm	±(1%+1 µm)	1.5 mm / 10 mm
F 10/2	Ferrous	0-10 mm	5 µm	±(1%+10 µm)	5 mm / 16 mm
F 20	Ferrous	0-20 mm	10 µm	±(1%+10 µm)	10 mm / 30 mm
F 50	Ferrous	0-50 mm	10 µm	±(3%+50 µm)	50 mm / 200 mm
N 02	Non-ferrous	0-200 µm	0.1 µm	±(1%+0.5 µm)	1 mm / 5 mm
N 1.6	Non-ferrous	0-1600 µm	0.1 µm	±(1%+1 µm)	1.5 mm / 10 mm
N 1.6/90	Non-ferrous	90° 0-1600 µm	0.1 µm	±(1%+1 µm)	flat / 6 mm
N 10/2	Non-ferrous	0-10 mm	10 µm	±(1%+25 µm)	25 mm / 100 mm
N 20	Non-ferrous	0-20 mm	10 µm	±(1%+50 µm)	25 mm / 100 mm
N 100	Non-ferrous	0-100 mm	100 µm	±(1%+0.3 mm)	100 mm / flat
FN 1.6 P	Fe/Non-Fe	0-1600 µm	0.1 µm	±(1%+1 µm	flat surface & powder coating
FN 1.6	Fe/Non-Fe	0-1600 µm	0.1 µm	±(1%+1 µm)	1.5 mm / 10 mm
FN 1.6/90	Fe/Non-Fe, 90°	0-1600 µm	0.1 µm	±(1%+1 µm)	flat mm / 60 mm
CN 02	Cu on insulating	10-200 µm	0.2 µm	±(1%+1 µm)	0nly flat surface surface

MiniTest FH 7400/7200, Wall Thickness Gauges NEW !

A new gauge, based on magnetostatic principle, to measure wall thickness of bottles, containers etc.
A target ball is placed inside the samle whilst the probe can be moved across outside to pinpoint variations.
2 interchangeable probe ranges are available to suit various application requirements. They feature the new Sensor-Integrated Digital Signal Processing (SIDSP) to eliminate error during data transfer. The reference balls are specially treated to ensure enhanced dimensional precision.
2 base units offer flexible operation and processing capabilities (probe not included) :

- ☐ Minitest FH7200**:** real-time measurement, display min/max., offset mode, automatic storage up to 100,000 values
- ☐ Minitest FH7400: same functions, but in addition: statistical graphs, trend, memory for up to 240,000 values in max. 200 batches.

2 probes ranges, each supplied with 3 balls of various sizes, 3 precision standards, 3 zero calibration standards and stand:

probe	ball (mm)	qty (pcs.)	range (mm)	tolerance ± (µm+1% of reading)
☐ FH 4:	1.5	100	0-1.5	3
	2.5	100	0-2.5	5
	4.0	50	0-4	10
☐ FH 10	2.5	100	0-2.5	5
	4.0	50	0-4.0	10
	6.0	25	0-10	20 (0-6 mm), 1.5% of reading (6-10 mm)
	9.0 (option)	10	0-10	20

Features

- ☐ Precision: ±1% of reading, tolerances depending on probe & ball used. Units: µm/mm, mils/inch.
- ☐ Resolution FH4: 0.1 µm, FH10: 0.2 µm
- ☐ Calibration: factory, zero, or 0 + up to 4 points
- ☐ Logging speed (selectable); 1–2-5-10-20 readings/s.
- ☐ Statistic chart: n, trend, histogramme (FH7400 only)
- ☐ Output RS232 TTL & IRDA 1.0
- ☐ Standard delivery: Minitest FH7400 or 7200, probe not included, rubber protective case, carry case, 4 x AA LR06 batteries, magnetic screw driver

Ordering references

Minitest FH 7400/7200

7200 FH	Wall Thickness Gauge, with mounting device, without probe
7400 FH	Wall Thickness Gauge, with mounting device, without probe
FH 4	Probe, range 0-4 mm, including 3 balls: ∅1.5-2.5-4.0 mm, standards, zero cal. standards & stand
FH 10	Probe, range 0-10 mm, including 3 balls: ∅2.5-4.0-6 mm, standards, zero cal. standards & stand

Optional Accessories

FH10/Ball/9	Ball ∅9 mm, set of 10 pcs. Including standard & zero cal. standard
MP7000	Portable printer with charger
MP7000/1	Printer cable
FH7200/2	Foot switch
FH7200/3	IR/USB converter4
FH7200/4	Connecting box incl, USB cable for connecting power supply, footswitch, alarm, headphones
FH7200/5	MSoft7000 basic, data transfer software
FH7200/6	MSoft7000 pro, data management software

QuintSonic – Ultrasonic Thickness Gauge

This ultrasonic non-destructive gauge measures the thickness of paint, varnish, plastics or other insulating coatings applied on wood, plastics, glass, ceramics etc., as well as polymers on metals. The pulses sent by the probe through the coatings are reflected to the transducer, and the time intervals are calculated to total or individual layer thickness. Reading & statistics output to printer.

Features & performance

- ☐ Uncertainty: ±2 µm, 3% (<100µm), or ±2 µm, 2% (>100 µm).
- ☐ Range, coating thickness: total 500 µm, single layer 10-500 µm
- ☐ Range, wall thickness: metals 0.2-8 mm, plastics 0.2-3 mm
- ☐ Memory: 10,000 readings, 500 batches
- ☐ Statistics: n, ∅, σ, kv, max/min
- ☐ RS232 output to optional MiniPrint printer
- ☐ Standard delivery: Quintsonic with probe, coupling liquid 100 g., Qsoft software, RS232 cable, carry case, rechargeable batteries & charger, manual

Ordering references

Quintsonic Ultrasonic Coating Gauge, including probe

Standards

ASTM	D6132
ISO	2808

23.0
WEIGHING

Balances

Sheen Instruments offer an effective selection of quality balances for various applications. They feature precision, traceability to UKAS, long term stability and easy maintenance.

ACB+ Compact Balance

Features

- ☐ 2 models, capacity/resolution:, 600 g./ 0.01 g.
- ☐ Automatic external calibration via keypad
- ☐ Weighing, %weighing, parts counting
- ☐ Stainless steel pan ∅120 mm, draught shield as standard
- ☐ Large, clear backlit LCD, 15 weighing units: g, ct, lb, oz, d, GN, ozt, dwt, nommes, taels, ti, N, g2
- ☐ Capacity tracker, integral security bracket, low battery indicator
- ☐ Supplied with recheargeable batteries & mains adapter
- ☐ RS232 interface
- ☐ Height adjustable, sprit level included

Ordering reference

ACB+ Balance

ACB600H	Precision Compact Balance, capacity: 600 g., resolution: 0.01 g.

AQT - Compact Balance

Features

- ☐ Capacity: 5000 g., resolution: 1 g.
- ☐ External calibration
- ☐ Weighing in kg, g, lb, oz,
- ☐ Stainless steel pan ∅130 mm, draught shield as standard
- ☐ Large, clear backlit LCD,
- ☐ Integral security bracket, low battery indicator
- ☐ Supplied with recheargeable batteries & mains adapter
- ☐ Height adjustable, sprit level included

Ordering reference

AQT Balance

AQT5000	Compact Balance, capacity: 5000 g., resolution: 1 g.
AQT2600	Compact Balance, capacity: 2600 g., resolution: 0.1g

CBW – Bench Check Weighing Scale

Features

- ☐ Capacity: 6000 g., resolution: 0.1 g
- ☐ Automatic external calibration
- ☐ Check-weighing to pre-set, % weight, basic part counting. Unit: kg, g.
- ☐ Memory accumulation
- ☐ Overload protection
- ☐ Stainless steel pan 225 x 275 mm
- ☐ Rechargeable battery (approx. 70 h. operation) & mains adapter
- ☐ Optional bi-directional RS232 interface

Ordering reference

CBW Weighing Scale

CBW6H	Bench Balance, capacity: 6000 g., resolution: 0.1 g

Viscosity

The Flowing Quality

In the coatings world, as well as in many other industries, where liquid or non-solid materials are manufactured, emerging fast growing and demanding markets have led to the development of new innovative product ranges.

As a result, many of these products are manufactured today using materials with complex formulations and processes, resulting in greater quality. Due to this, viscosity, amongst the many other important material properties to be considered becomes more complex to control.

To meet this stringent manufacturing requirement and to continually achieve such high performance products, the use of highly accurate testing techniques is absolutely essential in R&D, Production and Quality Control.

Sheen Instruments offer an extensive range of complementary viscometers, covering many viscosity and consistency testing methods. Featuring leading edge technology and user friendly operation, they are dedicated to various industrial applications.

General

Comprehensive viscosity measurement providing consistent data is essential in controlling the manufacturing of complex systems such as paint, lacquers or similar products.
In conjunction with other physical and chemical parameters, induced rheological factors interfere with all stages of the process: raw material control, research, formulation, production, final control and the prediction of product performance.

According to the demands of the process, viscosity testing procedures may vary from simple to advanced methods. Both empirical tests and scientifically developed calculations provide satisfactory information, but specific to their respective fields of investigation. For this reason, complementary measuring techniques can be combined to efficiently characterize product behaviour allowing compensatory actions to be taken where necessary.

This section is intended to helping identify the instruments to use in relation to their particular field of application, whilst taking into consideration some of the basic viscometric concepts.

Flow properties

In the science of rheology, viscosity measurement plays a key role in the understanding of flow behaviour of materials and their response to certain imposed stresses. Referring to the basic Newtonian model, when a shear is applied to a fluid it is deformed such that the material layers move according to a velocity gradient in relation with the force imposed. Thus viscosity, depending on the nature of the product, is the relationship of the shear stress vs. shear rate.

As some products are shear-dependent it is essential to consider the fluids characteristics when dealing with viscosity measurement.

Newtonian vs. non-Newtonian fluids

The viscosity of “Newtonian” products, e.g. water and some oils, is constant at a given temperature, regardless of the shear applied, while “Non-Newtonian” products show a change in viscosity when variations are made to the rate of shear applied. This dependency can lead to a thinning effect where the deformation reduces the viscosity, or correspondingly thickening where the viscosity increases.

Thixotropy vs. Rheopexy

Practically most modern paint systems or similar products show a decreasing viscosity to some extent as a function of shear, a property typically expected, e.g. when they are shaken, applied or sprayed.

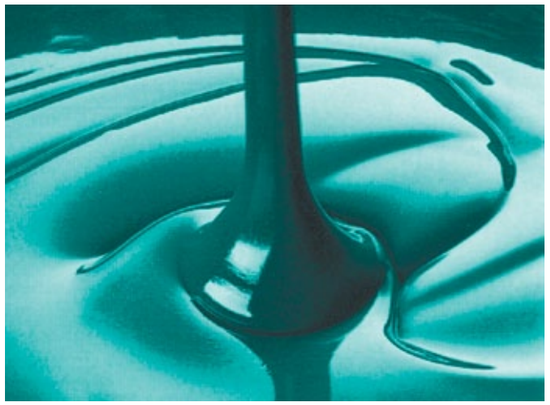
The lack of controlling this deformation can cause undesirable effects such as inconsistent performance, poor levelling or sagging.

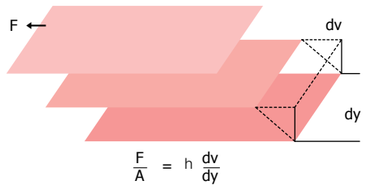
Commonly encountered shear-dependant fluids include pseudo-plastic, plastic or thixotropic behaviours.
When varying the shear over a period of time, the structural properties of many products reduce their viscosity to different equilibrium values and recover to their original value when the shearing action stops, according to their initial sol-gel profile. Some other products flow beyond their yield value, when a sufficient force is applied.

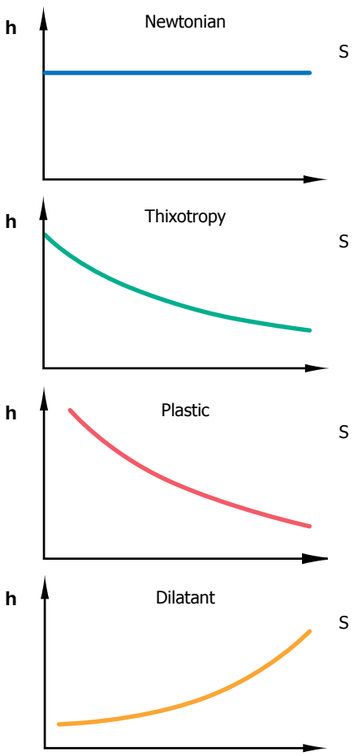
An opposite behaviour perhaps somewhat less considered, the rheopectic effect, exhibits increasing viscosity as a function of shear, occasionally this property shows indications on some processes e.g. grinding or dispersion.

The instruments

As discussed above, viscosity measurements vary from simple to complex techniques, the definition of which should relate to the overall objective. Due to the variety of methods available to perform material evaluation, each one will only provide a limited indication or description of flow behaviour with data relevant to each.







Examples of typical flow behaviour

Efflux Devices

Efflux devices provide kinematic data produced by a fluid flowing during a period of time under defined conditions. This generally gravity-driven efflux time is related to the product density, volume and geometry of the instrument, the fluid flowing through a capillary or orifice, at a specified temperature.
Paint or ink industries traditionally use the popular flow cups to quickly evaluate the viscosity or “consistency” flow. Units are expressed in St (Stokes), or cSt (mm^2/s).
Due to their simple design and basic principle, they are intended mainly to measure Newtonian or near-Newtonian liquids, within a limited range, generally from 5 to 15000 cSt., corresponding to 20 to 300 sec. Where conversion equations are given by International Standards, the kinematic value can be calculated from the efflux time, and the cup calibrated.

Rotational instruments

Depending on the method, from traditional scale readings to scientifically defined geometries, rotational viscometers apply a controlled stress to the material under test using defined operating conditions. The resultant data can be then be plotted as a function of the selected criteria.
They provide extended information, as the product under test is submitted to variable stress conditions, depending on the spindle design.
Units are expressed in P (Poise), or cP (mPa.s), or converted into other scales, i.e. Krebs units or torque.
Single-speed instruments equipped with rotor, ball, or vane spindles such as the Krebs Viscometer, Rotothinner, or Gel Strength Tester are commonly used world wide by numerous industries, to instantly evaluate the flow behaviour according to conventional scales.
Multi-speed viscometers equipped with different spindle sizes offer flexible investigations and cover a wider range of applications.
They operate with variable dynamic stress and shear rates and can also be configured for absolute measurements, when available, depending on the specific spindle geometry.
The high-speed CP1 Cone & Plate is specifically dedicated to measuring structural deformation under spraying, brushing or rolling applications. The low-shear multipurpose CP1 allows multiple combinations of speed & spindle geometries to evaluate various non-Newtonian properties e.g. thixotropy. This instrument also accommodates a number of additional coaxial accessories to perform absolute measurement of very low viscosity or small sample volumes and a helical T-bar spindle for non-flowing materials e.g. pastes or gels.

Special applications

Falling ball viscometers according to Höppler are useful for some specific research applications.
The Penetrometer equipped with either a needle or cone is used to evaluate consistency of non flowing materials such as grease, paste, bitumen etc.

Temperature control

Due to the isothermal dependence of viscosity, it is absolutely critical to control the specified temperature of the sample during test at the specified conditions in order to obtain accurate and reproducible results. Sheen Tempmaster multi-purpose circulating baths are specially designed to accurately control the sample and allow versatility in sample preparation.

Instrument	Standards	Type	Speed	Application	Operating range (max.)	Units	Temperature control
Flow cups (bench top & dip type)	ASTM, BS, DIN, EN, ISO, NF	Efflux		Paint / quick consistency evaluation	5-15000	cSt	optional Tempmaster
Dip flow cups (Shell / Zahn)	ASTM	Efflux		Ink / quick flow evaluation	5-1800	cSt	optional Tempmaster
Rotothinner	BS, ISO	Rotational, mono disc or ball spindles	562 rpm	Thinning rate evaluation	0-340	Poise	optional Tempmaster
Krebs (digital)	ASTM	Rotational, mono rotor spindle	200 rpm	Conventional evaluation	37-141 70-1100 10-5000	Krebs units gram cP	optional Tempmaster
Gel Strength Tester		Rotational, mono vane spindle	2 rpm	Yield strength tests	0-450	gm/cm	optional Tempmaster
Cone & Plate	ASTM, BS, ISO	Rotational, 5 cone selection	2 speeds: 750 & 900 rpm	High-shear test	0-100	Poise	Integral 5°-65°C
Viscomaster	ASTM, ISO	Rotational, Multi-spindle	18/19 speeds: 0.3-100/200 rpm	Multi-purpose	20-106.10^6	cP (mPa.s)	optional Tempmaster
Höppler	DIN, ISO	Falling Balls (6)		Special	0.5-100000	cP	optional Tempmaster
Penetrometer	ASTM, DIN, ISO, NF, IP	Cone or needle Penetration		Semi solid material evaluation, gel consistency		mm	optional Tempmaster

24.0
FLOW CUPS

General

Flow cups, originally designed to perform quick viscosity and consistency evaluations of Newtonian or near non-Newtonian products, can provide a high degree of accuracy and repeatability depending on the quality of their manufacture. From their early forms, although somewhat simple in design, today’s flow cups are manufactured in accordance with the numerous International Standards which have developed over the years which not only specify the close dimensional tolerances required during the process but also their use and recording of data obtained.
With our long established experience in the manufacture of these types of products, Sheen flow cups offer outstanding testing quality. They are produced from selected high grade materials, with the latest computerised machining technology under stringent quality control conditions. A smooth, bright finish makes them easy to use and clean for a long lasting operating life.
Conformance certificates are included with all our flow cups to the relevant National Standard. Calibration certificates according to calculation data given by the relevant standard, or to internal comparative procedures are available upon request when ordering.
To ensure optimal accuracy of your testing results, a periodic calibration check of your cups is strongly recommended, either by our own calibration department, or alternatively by using our range of standardised calibration oils*.

* Standard certified Viscosity Standard Fluids, stop watch, precision thermometer and temperature controlled bath are required. (See pages 76 & 77)

Economy aluminium stand (418/LC)

Level adjustable stand (418)

Bench top

ASTM, BS, DIN, EN ISO CUPS

These unrivaled high accuracy cups cover a wide range of viscosities in accordance with the appropriate international standard.
Most can be certified and calibrated using the prescribed efflux / viscosity conversion equations, otherwise can be controlled against an internal standard reference cup with calibration test fluids.

Features

- ☐ Made of high quality aluminium and feature stainless steel nozzle inserts (specification dependent)
- ☐ Manufactured using high precision computerised machining
- ☐ Mirror polished & smooth finished for high efflux accuracy and easy maintenance
- ☐ Stringent quality & compliance inspection.

Note-:

- ☐ Flow cup stand holding the cup not included, see optional accessories
- ☐ Calibration certificate not included, to be specified when ordering, see optional accessories.

Ordering ref	Standard	Orifice-Ø (mm)	Flow time (s)	Nominal range (cSt)	Cal. certificate To flow equation	Cal. certificate To ref cup
401/2-B2	BS 3900 A6-71 (replaced by EN ISO 2431, BS 3900 A6-96)	2.38	30-300	38-71	☐	☐
401/3-B3		3.17	30-300	38-147	☐	☐
401/4-B4		3.97	30-300	71-455	☐	☐
401/5-B5		4.76	30-300	299-781	☐	☐
401/6-B6		7.14	30-300	781-1650	☐	☐
402/1	ASTM D1084 (PARLIN)	1.77	30-100	6-160	☐	☐
402/2		2.54	30-100	100-550	☐	☐
402/3		3.8	30-100	500-2300	☐	☐
402/4		6.35	30-100	2000-15000	☐	☐
404/4	DIN 53211 (Replaced by ISO 2431)	4	25-150	112-685	☐	☐
404/2	DIN 53211 (Format only fitted with special size orifice)	2	25-150	15-30 (approx.)	☐	■
404/6		6		550-1500 (approx.)	☐	■
404/8		8		1200-3000 (approx.)	☐	■
406/1-N°1	ASTM D1200 (Ford cup)	2.1	55-100	10-35	☐	☐
406/2-N°2		2.8	40-100	25-120	☐	☐
406/3-N°3		3.4	30-100	49-220	☐	☐
406/4-N°4		4.1	30-100	70-370	☐	☐
406/5-N°5		5.8	30-100	200-1200	☐	☐
417/3-N°3	BS EN ISO 2431 (ASTM 5125, DIN 53211, NFT 30-070, JIS K 5600-2-2)	3	30-100	7-42	☐	☐
417/4-N°4		4	30-100	35-135	☐	☐
417/5-N°5		5	30-100	91-325	☐	☐
417/6-N°6		6	30-100	188-684	☐	☐
417/8-N°8		8	30-100	600-2000	☐	■
419/2.5	NF T 30-014 (replaced by NFT 30-070, Format only fitted with special sizeorifice)	2.5	30-300	5-140	☐	■
419/4		4	30-300	50-1100	☐	■
419/6		6	30-300	510-5100	☐	■
419/8		8	30-300	700-11500	☐	■
Optional accessories						
418	Level adjustable stand, stainless steel rod on cast aluminium base, supplied with spirit level.					
418/LC	Economy light aluminium stand, supplied with spirit level.					
400	Calibration certificate (for each cup).					
405/ST	Stand for 5 Zahn cups					

Parlin Cup

Manufactured from high quality solid brass, with a press-fitted stainless steel orifice, this cup (originally developed by the E.I. Dupont Company) is used for consistency measurement of cellulose lacquers, or free-flowing adhesives. This cup differs from a conventional viscosity cup in that the final determination of flow time is determined at a volumetric point of 50 ml and not the breaking point of the efflux stream upon the completion of draining.

Autovisc - Flow cup timer

This instrument is specially designed for automatic flow time determinations. Its built-in optical sensor detects the start/break of the liquid flow and counts the elapsed time, thus eliminating human error.
The integral water jacket enables accurate temperature control when connected to an external water circulating bath (optional). Suitable for all ASTM/BS/ISO Ø55.8 mm or DIN Ø58.0 mm cups.
Supplied with a separate cup stand for easy filling.

Features

- ☐ Sturdy construction
- ☐ LCD display of efflux time in sec., resolution 0.1 sec.
- ☐ Accuracy: 0.05 %, repeatability: 0.5 %
- ☐ Power Supply:
  - Portable operation: 2 x 9V batteries operated
  - Mains Operation: 220V, 50Hz / 110V, 60Hz
- ☐ Standard package: Instrument, cup stand, spirit level, closing plate.

Ordering references

Autovisc

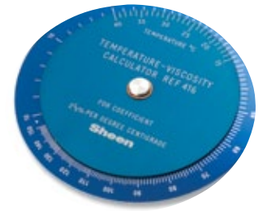
450N	Autovisc - Flow Cup Timer

Optional accessories

Water circulating bath temperature controlled, see page 76

Temperature/Viscosity Calculator

These useful devices allow viscosity corrections to be calculated when tests are not carried out at the specified temperature. The device comprises of two discs one mounted on top of the other. The upper disc is rotated to the temperature specified and the corresponding viscosity value at other temperatures is simply read off.



Ordering references

Temperature/Viscosity Calculator

415	Coeficient of 5.5% per °C e.g. resins, clear or pigmented products
416	Coeficient of 2.66% per °C e.g. water based products

Dip Flow Cups - With handle

Zahn & Shell Cups

Made of nickel plated brass (Zahn) and stainless steel (Shell) and fitted with a handle, these cups are generally used for a quick check of product flow.
The Zahn series are suitable for paints and inks, while the Shell series are designed with a capillary orifice suitable for use with inks, enamels and lacquers.

Frikmar Cup

This cup with specifications identical to the DIN 53211 bench top cup is fitted with a handle to allow dipping tests to be performed.
Practically all standard cups can be supplied in this version (i.e. with handle) on request with the same accuracy and quality.

Lory Cup

This cup, made of bright nickel plated steel, is generally used for checking purposes. The cup is filled to the top and flow time is taken when the needle fitted in the bottom of the cup appears.
Optional stand to hold 5 Zahn cups (405/ST)

	Ordering Ref	Standard	Orifice-Ø (mm)	Flow time (s)	Nominal range (cSt)	Cal. certificate To flow equation	Cal. certificate To ref cup
ZAHN	**405/1**	**ASTM D4212 D1084**	**1.93**	**35-80**	**5-60**	■	□
	405/2		**2.69**	**20-80**	**20-250**	■	□
	405/3		**3.86**	**20-80**	**100-800**	■	□
	405/4		**4.39**	**20-80**	**200-1200**	■	□
	405/5		**5.41**	**20-80**	**400-1800**	■	□
	405/ST	**Stand for 5 Zahn cups**	□	□	□	□	□
SHELL	**422/1**	**ASTM D4212**	**1.8**	**20-80**	**2-20**	■	□
	422/2		**2.4**	**20-80**	**10-50**	■	□
	422/2.5		**2.7**	**20-80**	**20-80**	■	□
	422/3		**3.1**	**20-80**	**30-120**	■	□
	422/3.5		**3.5**	**20-80**	**40-170**	■	□
	422/4		**3.8**	**20-80**	**70-270**	■	□
	422/5		**4.6**	**20-80**	**125-520**	■	□
	422/6		**5.8**	**20-80**	**320-1300**	■	□
FRIKMAR	**420/4**	**DIN 53211** (replaced by EN ISO 2431)	**4**	**25-150**	**112-685**	■	□
	420/2	**DIN 53211** (Format only fitted with special size orifice)	**2**	**25-150**	**15-30** (approx)	□	■
	420/6		**6**	**25-150**	**550-1500** (approx)	□	■
	420/8		**8**	**25-150**	**1200-3000** (approx)	□	■
LORY	**421**		**4**	**25-150**	**50-1100**	□	■

25.0
ROTATIONAL VISCOMETERS

Cone & Plate Viscometer

The viscosity of coatings, such as paint, show typical changes when applied with brush, roller or spray gun etc. under high shear rates.
For this reason, it is essential that the flow behaviour of such non-newtonian products is tested under stringent conditions, in order to achieve optimal formulation and process monitoring.
Standardised test methods recommend a shear rate of 10,000 s^{-1} (BS) or 12,000 s^{-1} (ASTM) as satisfactory test figures.
This new Cone & Plate viscometer is specially designed for this purpose. A highly accurate wear resistant cone rotating at high speed on a temperature controlled plate simulates the expected “real world” application shear.
The combination of the instrument’s 2 standard speeds and the choice of 5 viscosity ranges allow precise testing of a wide range of products in compliance with National test methodologies.

Features

- Interchangeable cones, simple to install with quick release chuck for easy cleaning
- Reading in P, cP, Pa.s, or mPa.s
- Pre-selected or adjustable runtimes 5 – 59 s, with manual or automatic start
- Rapid temperature control with adjustable pre-heating time 0 – 59 s
- Adjustable limit/tolerances setting with warning
- Calibration by user: viscosity (for any cone used with certified oils), and temperature
- Memory for 100 readings, with 3-digit adjustable sample identification, RS232 PC/printer data output
- Easy menu-guided / soft-key operation: cone range, parameter setting, reading, set point & plate temperature, speed, viscosity, sample identification, calibration, date
- Selectable modes: fully functional or simplified routine, security protected
- Standard package: Viscometer base unit with built-in temperature control system, PC/printer cable

Note: suitable cone kit for your application (including 5 certified calibration oils) to be ordered as a separated accessory.

Cone kit, with 5 certified calibration oils

Performance

- Dual speed (standard): 750 rpm = 10,000 s^{-1}
  900 rpm = 12,000 s^{-1}
- Viscosity: 5 cone/measuring ranges:
  0-5, 0-10, 0-20, 5-50, 10-100 P
  Resolution: 0.01 P, accuracy <± 2%, repeatability: <± 0.5%
- Built-in temperature control: 5° to 65°C
  Resolution: ± 0.1°, accuracy: ± 0.2 °C
- 90-240V AC – 50/60 Hz

Ordering references

Cone & Plate Viscometer

CP1	Cone & plate base unit (cone not included)
490/1/CK	Cone 0-10 Poise (490/754/D1) with 5 certified oils (490/166/D1)
490/2/CK	Cone 0-20 Poise (490/754/D2) with 5 certified oils (490/166/D2)
490/3/CK	Cone 5-50 Poise (490/754/D3) with 5 certified oils (490/166/D3)
490/4/CK	Cone 10-100 Poise (490/754/D4) with 5 certified oils (490/166/D4)
490/5/CK	Cone 0-5 Poise (490/754/D5) with 5 certified oils (490/166/D5)

Optional accessories

490/715/S	Vapour trap
490/P	Printer, battery operated

Note: Individual cones and calibration oils available upon request.

Standards

ASTM	D4287
BS	3900 A7-1
ISO	2884-1

Cone & Plate – High Temperature Version

The new CP2 High Temperature Cone & Plate, whilst maintaining the standard viscosity ranges of the CP1, allows the testing of products at elevated temperatures anywhere between 30°C - 240°C.

Retaining dual speed operation at 750 and 900rpm as per BS and ASTM specifications this instrument offers superb accuracy and control in allowing the user to evaluate a wide range of materials, including resins, that are temperature sensitive. In addition to all the features of the CP1 two new measuring modes have been included for Newtonian and Non Newtonian Rheopectic materials.

A highly accurate wear resistant cone rotating at high speed on a temperature controlled plate is shrouded by an integrated vapour trap for solvent evaporation control and general safety whilst working at the elevated temperatures.

As with the CP1, a choice of five viscosity ranges are available including high temperature calibration oils to allow precise testing of a wide range of products in compliance with National Standards methodologies.

Features

- All standard features of the CP1
- Plate temperature range 30degC – 240degC
- Programmable in 0.1degC increments.
- Precision plate temperature control
- Independent temperature sensing system
- High temperature cone & oil kits
- Vapour trap fitted as standard
- Very low power consumption – 90W Max
- Universal Voltage input – 90 – 264V AC.
- Easy menu guided calibration and control
- RS232 PC/printer data output
- Peak & Average mode flexibility

Vapour Trap

Performance

- Dual speeds (standard) – 750 / 900rpm
- Viscosity : 5 cone measuring ranges : 0-5,0-10,0-20,5-50,10-100 P
- Measurement accuracy – better than +/-2%(cal at 10degC above ambient)
- Measurement repeatability – better than +/-0.5%
  90-240V AC – 50/60 HZ

Applications

- Automotive – High performance autocoats.
- Printing – Screen Printing Inks , Paper / UV coatings
- Industrial – Hot melt adhesives , Sealants , Bitumen
- Chemical – Resins , Plastisols , Epoxies , Polymers
- Coatings – Paint , Varnish
- Food – Starch , Chocolate , Molasses.

Order references

Cone & Plate High Temperature Viscometer

CP2	Cone & plate base unit (cone not included)
490/6/CK	Cone 0-10 Poise (490/754/D1) with 5 certified oils (490/166/D6)
490/7/CK	Cone 0-20 Poise (490/754/D2) with 5 certified oils (490/166/D7)
490/8/CK	Cone 5-50 Poise (490/754/D3) with 5 certified oils (490/166/D8)
490/9/CK	Cone 10-100 Poise (490/754/D4) with 5 certified oils (490/166/D9)
490/10/CK	Cone 0-5 Poise (490/754/D5) with 5 certified oils (490/166/D10)

Standards

ASTM	D4287
BS	3900 A7-1
ISO	2884-1

Optional accessories

490/P	Printer, battery operated

Rotothinner

This easy to use viscometer allows the operator to continuously monitor the viscosity of the test sample, whilst simultaneously adding a solvent or thinner. A sample taken from large production batch can be quickly measured in a 250 ml tin and the related thinning ratio scaled for instant process adjustment if required.
The Rotothinner's robust construction enables it to operate either in a production environment or in the laboratory.
A selection of 3 versions equipped with ball or disc shaped rotors cover the various test ranges.

Features

- Continuous reading in Poise
- Simple to install spindle into quick release chuck, easy to clean
- Possibility of multi-point calibration by user with optional key
- Memory for 9 readings, RS232 serial interface to printer
- Standard package: Viscometer, 1 spindle, 250 ml tin can, printer cable.

Performance

- 3 models & measuring ranges: 0-15, 0-65, 1-340 Poise
- Spindle speed: 562 rpm, ± 1%
- Resolution: 0.1 P; 1 P for 340 P model
- Accuracy: ±-2%; repeatability: ±1% of full scale
- Operating temperature: +15° to +35°C
- 90-240V AC - 50/60 Hz

Ordering references

Rotothinner

455N/15	Rotothinner 0-15 Poise, spindle included
455N/65	Rotothinner 0-65 Poise, spindle included
455N/340	Rotothinner 1-340 Poise, spindle included

Optional accessories

480/019/S	Calibration key
455N/15/CAL	Set of 3 calibration oils for 0-15 P range
455N/65/CAL	Set of 3 calibration oils for 0-65 P range
455N/340/CAL	Set of 3 calibration oils for 1-340 P range

Standards

ISO	2884
BS	3900 A7

Gel Strength Tester

Based on the Rotothinner design, this instrument is specially suited to assess the yield strength and consistency of thick paints and other materials such as gels and putties etc.
A 250 ml can containing the sample is magnetically fastened onto a turntable, which is loaded with a calibrated spring displaying an engraved scale of 0-450 gm/cm. When immersed into the sample, the flat 4 x 2 cm paddle spindle rotates automatically at 2 rpm, and drives the whole can & turntable.
After a peak reading followed by a short time of stabilisation, a steady torque value is indicated on the scale. Other paddle sizes are available on request.

Features

- Electronic constant speed control over the full range
- Paddle spindle simple to install with quick release chuck, easy to clean
- Safety height sensor preventing the rotor from rotating above the can
- Sturdy construction for use either in lab or production line
- Standard package: Viscometer, paddle spindle, 250 ml / Ø85 mm can.
- 220-240V - 50 Hz

Ordering references

Gel Strength Tester

414N	Gel Strength Tester

Krebs Viscometer - Digital

Based on the popular traditional KREBS method, using a weight-driven rotating paddle to sense the paint viscosity at a constant 200 rpm, this modern digital instrument provides automated motor operation, without weights & pulley, allowing accurate direct reading in KU (Krebs units), mPa.s (cP) or g (gram). The conversion between these units is automatically calculated by the microprocessor and displayed on request. Sturdy construction allows for use either in a production environment or in the laboratory.

Features

- Single or continuous reading in KU, mPa.s (cP), gram
- Over-range indication
- Simple to install rotor spindle into quick release chuck, easy to clean
- Safety height sensor preventing the rotor from rotating above the can
- Possibility of multi-point calibration by user with optional key
- Memory for 9 readings, RS232 serial interface to printer
- Standard package: Viscometer, rotor spindle, 1 pint (500 ml) / Ø85 mm can, printer cable.

Performance

- Range: 37-141 KU, 70-1100 g., 10-5000 cP (mPa.s)
- Accuracy: ±-2%; repeatability: ±1% of full scale
- Resolution: KU: 0.1, gram: 1 g., cP: 10 cP
- Operating temperature: +15° to +35°C
- 90-240V AC - 50/60 Hz

Ordering references

Krebs Viscometer - Digital

480	Digital Krebs viscometer, direct viscosity reading

Optional accessories

480/019/S	Calibration key
480/CAL	Set of 3 certified calibration oils

Standards

ASTM	D562
JIS	K5600

Krebs Viscometer - Original

This traditional KREBS instrument uses a rotating paddle driven by falling weights to determine the paint viscosity. The viscosity value in Krebs units can be easily converted using the table supplied or by calculation by formula from the resultant value of total weight required to reach 200 rpm. The robust and simple construction of this viscometer allows it to be used in various environments.
2 versions available: with tachometer or with stroboscope.

Features

- Range: 54-140 KU (75-1000 g.)
- Sturdy mechanical assembly & easy maintenance
- Easy to read speed indication
- Good value for money
- Standard package: Viscometer, paddle rotor, 1 pint (500 ml) / Ø85 mm can, Set of 7 weights (2 x 5g, 1 x 10g, 1 x 25g, 1 x 50g, 2 x 100g, 1 x 200g, 1 x 500g), AC/DC 12V adapter (for digital version)

Ordering references

Krebs Viscometer - Original

407	Krebs viscometer with stroboscope speed reading, 220-240V AC - 50 Hz
407/110	Krebs viscometer with stroboscope speed reading, 110V AC - 60 Hz
407/A	Krebs viscometer with digital speed reading, dual voltage
408	Coaxial cylinder attachment for 407/407A

Optional accessories

480/CAL	Set of 3 certified calibration oils

Standards

ASTM	D562
JIS	K5600

Spindle Viscometers

This easy to use rotational viscometer can be used in a number of industrial applications, paints, lacquers, chemicals, cosmetics, foods etc, where the determination of flow properties and behaviour is essential.
The principle of measurement is simple, but reliable, based on the well-established method of measuring the resistance of a spindle rotating in the sample under test. The viscosity value being automatically calculated and displayed as a function of the products characteristics, resultant torque, rotational speed and spindle properties
This method of viscosity determination is accepted worldwide, being approved to ASTM D2196, results therefore can be correlated with those obtained from comparable systems.
In addition to the standard spindle set supplied, optional accessories with specific coaxial spindle configurations extend the operating range of the instruments to very low viscosity products or small sample volumes and allow absolute viscosity determinations with shear rate & shear stress data.
Non-flowing substances such as pastes, gels, creams or gelatine can also be measured with a set of helical motion T-bar spindles.
2 models: VM1 & VM2 are available in 3 measuring ranges: - Low viscosity (LV)
- Medium viscosity (RV)
- High viscosity (HV) – see table.

Standards

ASTM	D5789, 1824, 2196, 2669, 2983, 4878
ISO	2555

Features	VM1	VM2
Number of speeds / rpm	**18 / 0.3 to 100**	**19 / 0.3 to 200**
Working range* in cP (centipoise) with standard spindle set		
- Low viscosity (LV= 4 spindles)	20 - 2,000,000	
- Medium viscosity (RV= 6 spindles)	100 - 13,000,000	
- High viscosity (HV= 6 spindles)	320 - 106,000,000	
Direct reading		
- Viscosity (cP or mPa.s)	■	■
- Kinematic viscosity (cSt) with density input	□	■
- Selected speed, rpm	■	■
- Selected spindle indentification	■	■
- % of full torque scale	■	■
- Sample temperature, °C (°F)	□	■
- Temperature PT100 sensor	□	■
- Shear rate (with coaxial spindles)	□	■
- Shear stress (with coaxial spindles)	□	■
Automatic functions		
- Auto-range	■	■
- Auto-test + acoustic & visual alarm	■	■
- Safe progressive spindle stop	■	■
- Alarm when working below 15% full scale	■	■
Calibration by user		
Memory		10 working sets
Data output		RS232, or chart recorder 0-5V DC
Standard accessories		
- PT100 temperature sensor	□	■
- Carrying case	■	■
- Set of spindles	■	■
- Software for data download to Excel-™	□	■
Compatible accessories :		
- Small Sample Adapter	▭	▭
- Low Viscosity Adapter	▭	▭
- Helical T-bar spindle drive	▭	▭
Power	100-240V AC, 50/60 Hz	

■ standard, ▭ option, □ non applicable
* To be specified upon order

Spindle Viscometer VM1

This standard model of the VM series allows accurate viscosity measurements to be made quickly and efficiently. The combination of the 18 pre-selected speeds and the spindle set provides flexibility in operation, complying with numerous requirements of product analysis and industrial quality control.

Features

- 4-line illuminated display of viscosity & operating parameters.
- Constant viscosity sensing & reading, resolution = 0.1 (< 10,000 cP), 1 (> 10,000 cP).
- Data convertible, SI or CGS units.
- Easy menu-guided operation.
- Calibration by user.
- Compatible with Low Viscosity Adapter (excepted for HV models), Small Sample Adapter, Helical T-bar spindle.
- 8 language: English, French, German, Spanish, Italian, Portuguese, Japanese, Catalan.
- Standard package: Viscometer, height adjustable stand, set of AISI 316 stainless steel standard spindles (LV=4 spindles,RV & HV=6 spindles), carry case.

Performance

- 18 speeds : 0.3 - 0.5 - 0.6 - 1 - 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 10 - 12 - 20 - 30 - 50 - 60 - 100 rpm.
- Accuracy: ±1 % of full scale, repeatability: 0.2 %.
- Measuring range with standard spindles: see selection table.

Spindle Viscometer VM2

This enhanced version of the VM series is designed for advanced viscosity measurement with data logging capability.
The combination of the 19 pre-selected speeds and the spindle set provides a highly versatile instrument, covering a wide range of industrial R&D or quality control applications.
The instrument also has a built-in temperature sensor (0° to 100°C) to closely monitor the operating conditions of the product during test.

Features

- Same as for VM1.
- Additional functions:
  - direct temperature reading with Pt100 sensor.
  - memory for 10 working data sets.
  - display of kinematic viscosity in cSt (with user density input).
  - Data output to Excel ™ using the file transfer software included or output to chart recorder (not included).
- Standard package: Viscometer, height adjustable stand, set of AISI 316 stainless steel spindles (depending on range: LV=4 spindles, RV & HV=6 spindles), PT100 probe, file transfer software, carry case.

Performance

- 19 speeds : 0.3 - 0.5 - 0.6 - 1 - 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 10 - 12 - 20 - 30 - 50 - 60 - 100 - 200 rpm.
- Measuring range & accuracy: same as for Viscometer VM1.
- Thermometer range: 0-100°C (32°-212°F).
  - Resolution: 0.1°C (0.1°F).
  - Accuracy: ±0.25°C (0.5°F).
  - Repeatability: ±0.1°C (0.2°F).

Ordering references

VM Series Viscometers

VM1/LV	VM1 / Low viscosity
VM1/RV	VM1 / Medium viscosity
VM1/HV	VM1 / High viscosity
VM2/LV	VM2 / Low viscosity
VM2/RV	VM2 / Medium viscosity
VM2/HV	VM2 / High viscosity

Accessories for VM1 & VM2

Low Viscosity Adapter (LVA)

This simple attachment is specially designed to extend the lower measuring range of the VMs.
Accurate and reproducible measurements of very low viscosity samples can be performed using the adaptor which consists of a stainless steel sample chamber with a specific spindle, the geometry of which provides absolute viscosity determinations with defined shear rates & shear rates (displayed only when using with VM2) for detailed product analysis.
Sample temperature between -10° to +100°C can be externally controlled by the fitted flow jacket (model without flow jacket also available).

Features

- Measuring range*, cP (mPa.s):
  - LV: 0.9-2,000
  - RV: 6.4-21,333
  - HV: not applicable
- Sample volume: 16-18 ml.
- Shear rates range: 0.3671 - 122.36 s^{-1}
- Removable sample chamber for easy cleaning
- Optional temperature probe.

* The lower limit is determined at 10-% full scale.

LVA

LVA with a flow jacket

Ordering references

Low Viscosity Adaptor

VM2/5	LVA / with flow jacket, spindle included
VM2/6	LVA / without flow jacket, spindle included

Optional accessories

VM2/4	PT 100 Temperature probe

Small Sample Adapter (SSA)

This attachment allows accurate measurement of limited sample sizes. The stainless steel cylindrical coaxial geometry provides absolute viscosity determinations with shear rates & shear stress data (displayed only when using with VM2). Sample temperature between -10° to +100°C can be externally controlled by a fitted flow jacket (model without flow jacket also available).
The SSA is supplied without spindle.
Please order the spindle set separately or the individual spindle required.

Features

- Measuring range*, cP (mPa.s):
  - LV, 3 spindles available:
    TL5 = 3-10,000 / TL6 = 30-100,000 / TL7 = 60-200,000
  - RV, 4 spindles available:
    TR8 = 50-166,600 / TR9 = 250-833,300
    TR10 = 500-1,600,000 / TR11 = 1,000-3,300,000
  - HV, 4 spindles available:
    TR8 = 400-1,360,000 / TR9 = 2000-6,660,000
    TR10 = 4000-13,330,000 / TR11 = 8,000-26,300,000
- Sample volume: 8-13 ml, depending on spindle size
- Shear rates range, s-1:
  - LV = 0.084-132 / RV & HV = 0.075-93
- Removable sample chamber for easy cleaning
- Optional temperature probe.

* The lower limit is determined by turbulent flow.

SSA

SSA with a flow jacket

Ordering references

Small Sample Adapter (SSA)

VM2/1	SSA / with flow jacket, spindle included
VM2/2	SSA / without flow jacket, spindle included

Optional accessories

VM2/3A	Set of spindles** for RV & HV ranges: TR8 - 9 - 10 - 11
VM2/3B	Set of spindles** for LV range: TL5 - 6 - 7
VM2/4	PT100 Temperature probe

** Individual spindles also available on request

26.0
SPECIAL APPLICATIONS

Helical Drive & T-bar Spindle (HTS)

When measuring substances that do not flow easily such as gels, pastes, creams or putty, the standard spindles form a hole around it due to cavitation. To overcome this problem, the Helical Drive unit provides an alternative method, suitable for comparative consistency evaluations. The motorised device drives the Viscometer head slowly up and down between preset limits, allowing a special T-bar spindle to trace a helical path into the fresh material, thus eliminating the “channelling” effect.

Feature

- Comparative evaluation range, cP (mPa.s):
  - LV = 156-3,120,000
  - RV = 1,660-33,300,000
  - HV = 13,000-260,000,000
- Easy to assemble and clean
- Standard package: Motor drive, 6 x T-bar spindles and couplings.

Ordering references

Helical Drive & T-Bar Spindle (HTS)

VM2/8	Helical Drive Unit, complete 230V, 50/60 Hz
VM2/9	Helical Drive Unit, complete 115V, 50/60 Hz

Höppler Viscometer

An accurate and versatile instrument, suitable for absolute viscosity measurement of various transparent fluids such as lacquers, resins, oils, foods, cosmetics, chemicals etc. as well as gas products. The test method consists of timing the travel of a ball in a tube filled with the product sample. The integrated water jacket, when connected to external circulating bath (optional, see p.15), allows temperature control from -20° to +120°C for high accuracy determinations.

Features & Performance

- Range: 0.5 to 100.000 cP/mPa.s
- Excellent visibility for accurate measurements
- Reproducibility: < 0.5 %
- Standard package: Viscometer, set of 6 balls for fluids, thermometer -1° to +26°C (other ranges optional), cleaning tool, calibration sheet.

Ordering references

438	Höppler viscometer
438/1	Extra ball for gas measurement

Standards

DIN	53015
ISO	12058
JIS	K5600-2-2
ASTM	D1131, D1545, D1725

Bubble Viscometer

435	Bubble Viscometer	– 20 tubes, case & spare tubes
BG0500	Bubble Viscometer	– A5 - A1
BG0510	Bubble Viscometer	– A - T
BG0540	Bubble Viscometer	– U - Z6
BG0560	Bubble Viscometer	– Z7 - Z10

Penetrometer

An efficient & cost effective instrument, for consistency determinations of semi-solid to solid materials such as greases, waxes, cosmetics etc. The test method is based on measuring the depth of penetration of a standardised cone or needle into the material over a given time.
2 models available: automatic or manual, both compatible with penetration accessories, to be ordered separately according to the specific application.

Automatic Penetrometer

A programmable and motorised unit, for high accuracy consistency evaluations of various materials whilst simplifying testing procedures and minimizing set up time. It makes use of the lastest in electronic techniques to offer user friendly and interactive operation.

Features & Performance

- Programmable penetration & pause time 0-999 min.
- Acoustic & visual alarm when penetration exceeds set limits
- 4-speed vertical step displacement, 3-speed approach: quick 0.1- 0.01 mm / impulsion
- Quick penetrator positioning procedure with 4 programmable preset positions
- Real-time depth reading to 0.1 or 0.01 mm, with opto-electronic detection
- Standard package: penetrometer, cone or needle plunger, RS232 output, automatic level detection for conductive materials, flexi-light & magnifier. 230V, 50Hz (115V, 60Hz on request)
- Cone or needle, cups: see optional accessories

Cone kit

Needle kit

Ordering references

Automatic Penetrometer

499	Automatic Penetrometer, without cone, needle, cup

Optional accessories

	For ASTM D5 (Bitumenous)
499/1	Standard needle 2.5 g, 350 u.
499/2	Standard needle 2.5 g, 500 u.
499/3	Alluminium sample cup 55 x 35 mm (200 u.)
499/4	Alluminium sample cup 55 x 57 mm (500 u.)
499/5	One way sample cup 55 x 35 (300 pcs.)
499/6	Additional weight 100 g.
499/7	Additional weight 50 g.
499/8	Bitumen automatic lev el detection device
	For ASTM D217 (grease)
499/9	Standard cone 102.5 g
499/10	Sample cup 76 x 63 mm

* Accessories for ASTM D937, 1321, 1403, upon request

Standards

ASTM	D 5, 217, 937, 1321, 1403
DIN	51579, 51804, 52010
ISO	2131, 2137
NF	T 60119, 601312, 66004
IP	49 & related

Manual Penetrometer

An economy instrument, equipped with a manual release mechanism and dial indicator graduated to 0.1 mm. Sturdy construction mounted on heavy adjustable base plate with spirit level. Compatible with cone or needle assembly (not included)

Ordering references

Manual Penetrometer

498	Manual Penetrometer, without cone or needle

Optional accessories

498/1	Needle kit ASTM D5 (1 std. needle + 1 plunger + 1 sample cup)
498/2	Cone kit ASTM D217 (1 std. cone + 1 plunger + 1 sample cup)
	Other sample cups & additional weights: see automatic model above

* Accessories for ASTM D937, 1321, 1403, upon request

27.0
VISCOSITY STANDARDS

Viscosity Standard fluids

Two formats of calibrated Viscosity Oils are available, Sheen Viscosity Oils and Cannon Viscosity Oils, both of which have been selected to cover a wide range of applications.
Sheen Viscosity Oils are specifically formulated to meet all calibration requirements and offer high quality at an affordable price. The oils meet the requirements of ASTM D2162 & D1480 and are manufactured in accordance with ISO 17025 and are traceable to UKAS certified standards. UKAS certified oils are available on request to cover the ranges of Refs 442 & 443.

Their 100% hydrocarbon based composition makes them suitable for verification and calibration of all flow cups and rotational viscometers, from low to high shear applications. Supplied in 500 ml (1.06 pint) bottle. Precision: ± 0.3%, for dynamic & kinematic viscosity.
3 ranges available: see Selection Chart below.

Standard range (ref. 442):

- ☐ Calibrated between 20° to 25°C inclusive, in 1°C increments,with nominal viscosity given at 25°C (77°F).
- ☐ Values listed in mm^2/s (cSt), mPa.s (cP), Krebs Units (KU) & g/ml (density).

General range (ref. 443):

- ☐ Calibrated through 20°-25°-37.78°-40°-50°-60°-98.89° to 100°C (also in °F), with nominal viscosity given at these temperatures where applicable
- ☐ Values listed in cP (mPa.s), cSt (mm^2/s), g/ml (density) & Saybolt where applicable.

Cannon range (ref. 441):

- ☐ Traceable to the National Bureau of Standards (NIST)
- ☐ Calibrated values at 20°-23°-24°-24.5°-25°-25.5° to 26°C
- ☐ Supplied in 470ml bottles

Oil Standards - Selection Chart
Standard Range (ref. 442)

Nominal Viscosity @ 25°C/77°F

Cat. N°	cP (mPa.s)	cSt (mm2/s)	Krebs (KU)
442/1	50	59	☐
442/2	75	88	☐
442/3	100	115	☐
442/4	150	174	☐
442/5	200	233	54
442/6	250	289	56
442/7	300	352	60
442/8	350	405	62
442/9	390	446	64
442/10	500	580	69
442/11	750	862	78
442/12	1000	1160	86
442/13	1500	1718	97
442/14	2500	2860	114
442/15	3900	4530	130
442/16	6000	6900	☐
442/17	7750	9000	☐
442/18	10000	11300	☐
442/19	15000	17000	☐
442/20	20000	22500	☐
442/21	14	17	☐
442/22	28	33	☐
442/23	390	447	☐
442/24	2000	2300	107

Standards

ASTM D1480, ASTM D2162

Oil Standards - Selection Chart
General Range (ref. 443)

Nominal Viscosity* cP/-mPa.s [Saybolt]

Ref. N°	20°C 68°F	25°C 77°F	37.78°C 100°F	40°C 104°F	50°C 122°F	60°C 140°F	98.89°C 210°F	100°C 212°F
443/N 0.4**	0.31	0.30	0.27	0.26	☐	☐	☐	☐
443/N 0.8**	0.54	0.50	0.44	0.43	☐	☐	☐	☐
443/N 1.0**	1.0	0.9	0.8	0.76	0.67	☐	☐	☐
443/N2	2.0	1.8	☐	1.4	☐	☐	☐	☐
443/S3	3.7	3.3	2.5	2.3	1.9	☐	0.92	0.91
443/D5	5.8	5.0	☐	3.4	2.7	☐	☐	1.2
443/S6	8.5	7.2	4.9	4.6	3.6	☐	1.5	1.4
443/D10	12	9.9	☐	6.0	4.6	☐	☐	1.7
443/N10	17	14	8.8	8.2	6.1	☐	2.1	2.1
443/S20	36	28	16 [96]	15	11	☐	3.2	3.1
443/N35	68	51	28 [160]	25	17	☐	4.4	4.3
443/S60	140	100	51 [280]	46	29	☐	6.4	6.3
443/N100	340	240	110 [600]	99	60	39	11	10
443/S200	570	400	180 [950]	160	92	☐	15 [90]	14
443/D500	720	500	☐	190	110	☐	☐	17
443/N350	1100	750	320	280	160	☐	22 [130]	21
443/D1000	1500	1000	☐	380	220	☐	☐	29
443/S600	1900	1300	520	450	250 [135]	☐	31 [180]	30[140]
443/N1000	3900	2600	☐	860	460	260	☐	48
443/S2000	7100	4700	1700	1500	780	☐	75 [420]	72
443/D5000	7700	5000	☐	1600	830	☐	☐	76
443/D7500	12000	7600	☐	2300	1200	650	☐	99
443/N4000	16000	10000	☐	3100	1500	☐	☐	120
443/S8000	31000	20000	7000	5900	2900	☐	☐	200
443/15000	64000	40000	☐	12000	5500	2800	☐	350
443/30000	☐	73000	24000	21000	9700	☐	☐	560

*Kinematic viscosity & density values available on request.
**This product is classified as hazardous and according to EC regulations, special carriage provisions must be made. Additional carriage charges will therefore apply.

Standards

ASTM D2162, ASTM D445, 446

Cannon Range (ref. 441)

Nominal Viscosity @ 25°C/77°F

Ref. N°	cP (mPa.s)	cSt (mm2/s)	Krebs (KU)
441/1-VP31	50	59	☐
441/2-VP45	75	88	☐
441/3-VP62	100	118	☐
441/4-VP80	150	173	☐
441/5-VP98	200	232	☐
441/6-VP125	250	286	☐
441/7-VP160	300	345	☐
441/8-VP175	350	400	☐
441/9-VP190	400	462	☐
441/10-VP250	500	570	☐
441/11-VP330	700	796	☐
441/12-VP450	1000	1130	☐
441/13-VP620	1500	1700	☐
441/14-VP960	2500	2875	☐
441/15-VP1600	4000	4615	☐
441/16-VP2400	6000	6870	☐
441/17-VP3000	8000	9100	☐
441/18-VP3700	10000	11800	☐
441/19-VP5800	15000	16900	☐
441/20-VP8400	20000	22700	☐

Krebs Viscosity Standards
(Specifically selected for calibrating Krebs Viscometers)

Ref. N°	cP (mPa.s)	cSt (mm2/s)	Krebs (KU)
441/S200KU	400	472	64
441/N350KU	750	850	79
441/S400KU	940	1060	84
441/S600KU	1400	1550	95
441/N1000KU	1985	2346	≤106

28.0
TEMPERATURE & TIME MEASUREMENT

Temperature Circulating Baths

Accurate temperature control during viscosity measurements is essential for reliable and repeatable results. It also allows the determination of product behaviour to be evaluated.
All Sheen water baths are fitted with an insulated stainless steel tank for sample heating or cooling and a circulation pump with adjustable flow rate to suit a variety of external temperature control applications, e.g. connection to Autovisc or similar water jacket.

3 models available:

- ☐ Tempmaster 100: from ambient + 5° to 100°C
- ☐ Tempmaster 200: from ambient + 5° to 200°C
- ☐ Tempmaster -10: from -10° to 100°C

Safety standard

DIN 12879 - 2

Tempmaster 100 or 200

This microprocessor controlled water bath offers high performance, long-term stability and flexibility.
The touch responsive keyboard allows easy configuration of operating parameters.
Supplied with a 12 litre double-walled stainless steel tank (AISI 304 for external container, AISI 310 for inner tank).

Features

- ☐ Temperature range from ambient + 5° to 100° or 200°C
- ☐ Maximum and minimum temperature limit setting
- ☐ Display in C° or F°, Pt100 sensor, resolution 0.1°C
- ☐ Cooling coil for ambient temperature controlled using tap water
- ☐ Circulation pump with adjustable flow rate
- ☐ Incoloy stainless steel heating element resistant to high temperature & corrosion
- ☐ All parts in contact with liquid made of stainless steel
- ☐ Safety according to DIN 12879-2 : over temperature alarm with manual reset, power failure alarm, low liquid level indicator
- ☐ RS232 interface for computer control or data ouput
- ☐ Calibration facility
- ☐ Minimum tank depth: 14 cm
- ☐ Clamp and finger screw fixtures, 1 m hose
- ☐ 12-litre tank dimensions H x W x D (cm): inner 15 x 30 x 31, ext. 20 x 37 x 35
- ☐ 230 V - 50 Hz (110 V - 60 Hz on request).

Tempmaster with optional tank lid, shown with Spindle Viscometer (see page 68).

Tempmaster -10

This cooling & heating circulation unit is useful to achieve sub-ambient test temperatures to max. -10°, and to heat up to 100°C. It benefits the same general features as of the Tempmaster 200, including:

Features

- ☐ Maximum volume capacity: 8 litres (built-in tank)
- ☐ Hermetically sealed CFC free compressor with ventilated evaporator, mounted on anti-vibration assembly
- ☐ Inner tank dimensions H x W x D: 12 x 20 x 14 cm

Tempmaster Selection chart

Cat N°	Model	Max. capacity (litre)	Standard Tank (litre)	Stability (±)	Ext. Dimensions (H-x-W-x-D) cm	Pump Pressure -Flow rate	Power W
TM-100	Tempmaster Amb. +5°C to 100°C	20	12*	0.05° to 100°C	28x18x19 (thermostat)	150 mbar - 12l/min	1060
TM-200	Tempmaster 200 Amb. +5°C to 200°C			0.05° to 100°C 0.1 to 200°C			2060
TM-10	Tempmaster -10 Amb. -10°C to 100°C	8	8	0.05° to 100°C 0.1 to -10°C	26x66x44		1150

Optional accessories

TM-EXT	External Pt100/135 mm sensor, with 150 cm cable
TM-LID	Lid support for 2 x 600 ml beakers, only for 12 litre tank

Multi-Purpose Thermometer

This robust and competitively priced thermometer is designed for stringent industrial use.
Its accuracy and versatility makes it the ideal choice for numerous temperature measuring applications.

Features

- ☐ Large LCD display
- ☐ Hold button to store reading
- ☐ Wide range of optional probes
- ☐ Sturdy case for optimal protection during operation

Performance

- ☐ Suitable for K-type (NiCr-Ni) probes
- ☐ Max. range: - 50° to +1000°C (depending on probe range)
- ☐ Precision:
  @ - 40°…900°C : ± 0.7°C, ± 0.5% average
  @ - 50°…+ 40.1°C & 900°…1000°C :
  ± 1°, ± 1% average
- ☐ Resolution: 0.1°C (- 50°…+ 199.9°C),
  1°C (200°…1000°C)

Ordering references

Multipurpose Thermometer

925	Testo 925, without probe
925/1	Immersion probe, 110 mm length, Ø3.2 mm, -40°…600°C, Cl.2, t99=7 sec.
925/2	Immersion probe, 300 mm length, Ø1.5 mm, -60°…1000°C, Cl.1, t99=2 sec.
925/3	contact surface probe, 150 mm length, Ø10 mm, -60°…300°C, Cl.2, t99=3 sec.

Glass Thermometer

These General Purpose Glass Thermometers are economical, accurate, simple to use instruments that measure the temperature of many fluids. Ideally suited to many viscosity measurement techniques.

Features

- ☐ Toughened stirring bulbs
- ☐ 'Duramark' permanent markings
- ☐ Vertical figuring
- ☐ Non-roll fitting and ring tops
- ☐ Mercury and red spirit fillings

Ordering references

Red Spirit Filled Thermometer

GPT1	-10° to 50° C, 305mm length, 0.5° / div
GPT2	-10° to 110° C, 155mm length, 1° / div

Low Toxicity Blue Mercury Thermometer

GPT3	-10° to 50° C, 76mm immersion length

Stopwatch

Precision instrument required for efflux time determination and many other applications.

Features

- ☐ Split time, clock & alarm
- ☐ Reading 0.01 sec. on large LCD display
- ☐ Water resistant, supplied with neck cord

Ordering references

Stopwatch

SW	Stopwatch

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STANDARDS

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